
Agenda

Roanoke River Blueway Advisory Committee
May 2, 2024, 10 am

Meetings of the RBAC are held at the Roanoke Valley – Alleghany Regional Commission Top Floor Conference Room unless otherwise noted. (313 Luck Avenue SW, Roanoke, VA)

Please Note: RVARC's elevator is under maintenance and currently not in operation. Please contact Bryan Hill, RVARC's ADA Coordinator, at bhill@rvarc.org, if you need ADA accommodations. We apologize for the inconvenience!

1. Call to Order, Roll Call, Introductions
2. Consent Agenda
 - a. Approval of Agenda
 - b. Approval of Minutes: April 2, 2024
3. Chair's Remarks
4. FY25 Budget Adoption
5. Guest Speaker: Smith Mountain Lake Association, Keri Green
6. Guest Speaker: Niagara Dam Relicensing, Frank Simms
7. Other Business
 - a. Upcoming Events
 - b. Locality Updates
 - c. Citizen Comments
8. Adjourn





MINUTES

The April meeting of the Roanoke River Blueway Advisory Committee, a subcommittee of the Roanoke Valley – Alleghany Regional Commission, was held on April 2, 2024, at 3:00 PM at the Roanoke Valley – Alleghany Regional Commission office, 313 Luck Ave, SW, Roanoke, VA.

1. Introductions

Chair Maguire called the meeting to order.

Voting members attending:

Katie Slusher, City of Roanoke
Nathan McClung, Town of Vinton
Brian Epperly, Roanoke County
Lindsay Webb, Roanoke County
Frank Maguire, Greenway Commission, CHAIR
Courtney Plaster, Clean Valley Council
Cheryl Morales, Visit Virginia's Blue Ridge
Bill Tanger, Friends of the Rivers of Virginia
Mary Lou Legg, Pathfinders for Greenways
Pete Eshelman, Roanoke Outside

Voting members absent:

Fayula Gordon, Town of Vinton
Mckenzie Bocker, City of Roanoke
Jeff Caesar, City of Salem

Others present:

Renee Powers, City of Roanoke

Staff:

Amanda McGee

2. Approval of the Consent Agenda

MOTION: Bill Tanger motioned for approval of the consent agenda. Mary Lou Legg seconded.

ACTION: The motion carried unanimously.

3. Chair's Remarks

Chair Maguire noted two items in his remarks. The first was the Scenic River Designation for the Roanoke River, which was brought up in a previous meeting. He stated that there are conversations ongoing, but no update at this meeting. The second was a potential change in the

listing of the Roanoke River Logperch which would result in its removal from the Federal List of Endangered and Threatened Wildlife.

4. FY24-FY25 Budget Review

Ms. McGee presented the staff report. She noted that that actual estimated carryover from FY24 will be \$30,572. She noted that the brochure was budgeted for FY24 but that the project will need to be rebudgeted for FY25. She handed out a new draft budget which is enclosed. She discussed options for use of the money in FY25, which included allocating more staff time for specific projects, or allocating money for purchases or consultant work.

5. Blueway Committee Goals and RVARC Work Program

Ms. McGee presented the staff report. The committee discussed possible projects including kiosk signage, a gap analysis, and a master plan for the Blueway. Discussion included the possibility of hiring a consultant to perform the master plan, requesting staff time from the RVARC for the master plan or for a gap analysis, and general promotional projects. The EDA time outlined currently in the work program is for marketing-related projects exclusively. Discussion also included the Niagara Dam Relicensing effort and impacts on staff flexibility.

MOTION: Mary Lou Legg motioned to direct RVARC staff to craft language to develop a master plan for inclusion in the RVARC Work Program. Courtney Plaster seconded.

ACTION: The motion carried unanimously.

6. Other Business

Bill Tanger mentioned that fundraising efforts have continued for Craigs Creek.

a. Upcoming Events

- Clean Valley Day Cleanup, April 6th
- Public Meeting for the West Roanoke River Greenway Phase 2 Alignment, April 11th, 5-7 pm, Fort Lewis Elementary School
- First Public Meeting for the Roanoke River Watershed Study, April 10th, 5:30 pm, 901 Russel Drive, Salem, VA 24153
- Earth Day/Blue Ridge Marathon, April 20th
- Valley Outdoor Infrastructure Committee, May 10, 5-7pm, Historic Trans Station Event Venue
- Rethink, Reuse, Repair Fair, May 11

b. Locality Updates

Renee Powers shared that the completion of the Tinker Creek Greenway project from Wise Avenue to Mason Mill will include a Blueway access point on Tinker Creek and requested



support for a kiosk sign to place in the kiosk prior to a planned ribbon cutting in June. Staff will work to support this request.

Glade Creek Phase 2B is nearing completion with a ribbon cutting in May.

c. Citizen Comments

No citizens were present to provide comments.

7. Adjourn

With no other business, the committee adjourned at approximately 4:05 PM.

FY25 Draft Budget 4.24.24

	Estimated
Carryover from FY24 (estimated)*	\$ 30,572.00
New Dues FY25 (expected)	\$ 11,491.00
<i>Roanoke City</i>	\$ 5,200.00
<i>Roanoke County</i>	\$ 4,525.00
<i>Salem</i>	\$ 1,333.00
<i>Vinton</i>	\$ 433.00
Total Revenues FY25	\$ 42,063.00
Personnel (250 Hours) ESTIMATE	\$ (18,450.00)
<i>Salary</i>	TBD
<i>Fringe</i>	TBD
<i>Indirect</i>	TBD
Miscellaneous	\$ (180.00)
<i>Computer Services</i>	\$ (130.00)
<i>Travel</i>	\$ (50.00)
Kiosk Improvements	\$ (1,000.00)
<i>Panel Printing</i>	\$ (1,000.00)
Marketing Materials	\$ (4,500.00)
<i>Brochure Design</i>	\$ (1,500.00)
<i>Brochure Printing</i>	\$ (3,000.00)
Remainder	\$ 17,933.00

**ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE**

Niagara Hydroelectric Project
FERC Project No. 2466-037
Virginia

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, D.C. 20426

April 2024

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ACRONYMS AND ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
B.C.E.	Before Common Era
BEHI	Bank Erosion Hazard Index
BMPs	Best Management Practices
certification	water quality certification
C.E.	Common Era
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CPUE	catch per unit effort
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	Environmental Assessment
EIA	U.S. Energy Information Administration
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
fph	fish per hour
fps	feet per second
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
FWS	U.S. Fish and Wildlife Service
Interior	Department of the Interior
IPaC	Information for Planning and Consultation
IWG	Interagency Working Group
kV	kilovolt
kVA	kilovolt ampere
mg/L	milligrams per Liter
MW	megawatt
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standards
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act of 1966
NPCC	Northeast Power Coordinating Council
NWI	National Wetland Inventory

Park Service	National Park Service
PEM	palustrine emergent marsh
PFO	palustrine forested wetland
PM&E	Protection, Mitigation, and Enhancement
PSS	palustrine scrub-shrub wetland
REA	Ready for Environmental Analysis
RM	river-mile
SPDES	State Pollution Discharge Elimination System
TMDL	Total Maximum Daily Load
U.S.C.	United States Code
USGS	United States Geological Survey
Virginia DCR	Virginia Department of Conservation and Recreation
Virginia DEQ	Virginia Department of Environmental Quality
Virginia DGIF	Virginia Department of Game and Inland Fisheries
Virginia DHR	Virginia Department of Historic Resources
Virginia DWR	Virginia Department of Wildlife Resources
Virginia SHPO	Virginia State Historic Preservation Office

ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, D.C.

Niagara Hydroelectric Project FERC Project No. 2466-037 – Virginia

1.0 INTRODUCTION

1.1 APPLICATION

On February 28, 2022, Appalachian Power Company (Appalachian) filed an application for a new major license for the 2.4-megawatt (MW) Niagara Hydroelectric Project (Niagara Project or project) (FERC Project No. 2466).¹ The Niagara Project is located on the Roanoke River, in Roanoke County, Virginia (figure 1). The project is adjacent to and partially within the Blue Ridge Parkway.²

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Niagara Project is to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a new license to Appalachian for the Niagara Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality. Issuing a new license for the Niagara Project would allow Appalachian

¹ The current license for the Niagara Project was issued on March 25, 1994, for a term of 30 years, with an effective date of March 1, 1994, and an expiration date of February 29, 2024. *See Appalachian Power Company, Virginia*, 66 FERC ¶ 62,185 (1994).

² The Blue Ridge Parkway, which is managed by the National Park Service (Park Service), is a linear national park, extending 469 miles through Virginia and North Carolina. A Blue Ridge Parkway bridge crosses the Roanoke River approximately 500 feet downstream of the project powerhouse (figure 1).

to continue to generate electricity at the project for the term of a new license, making electric power from a renewable resource available to its customers.

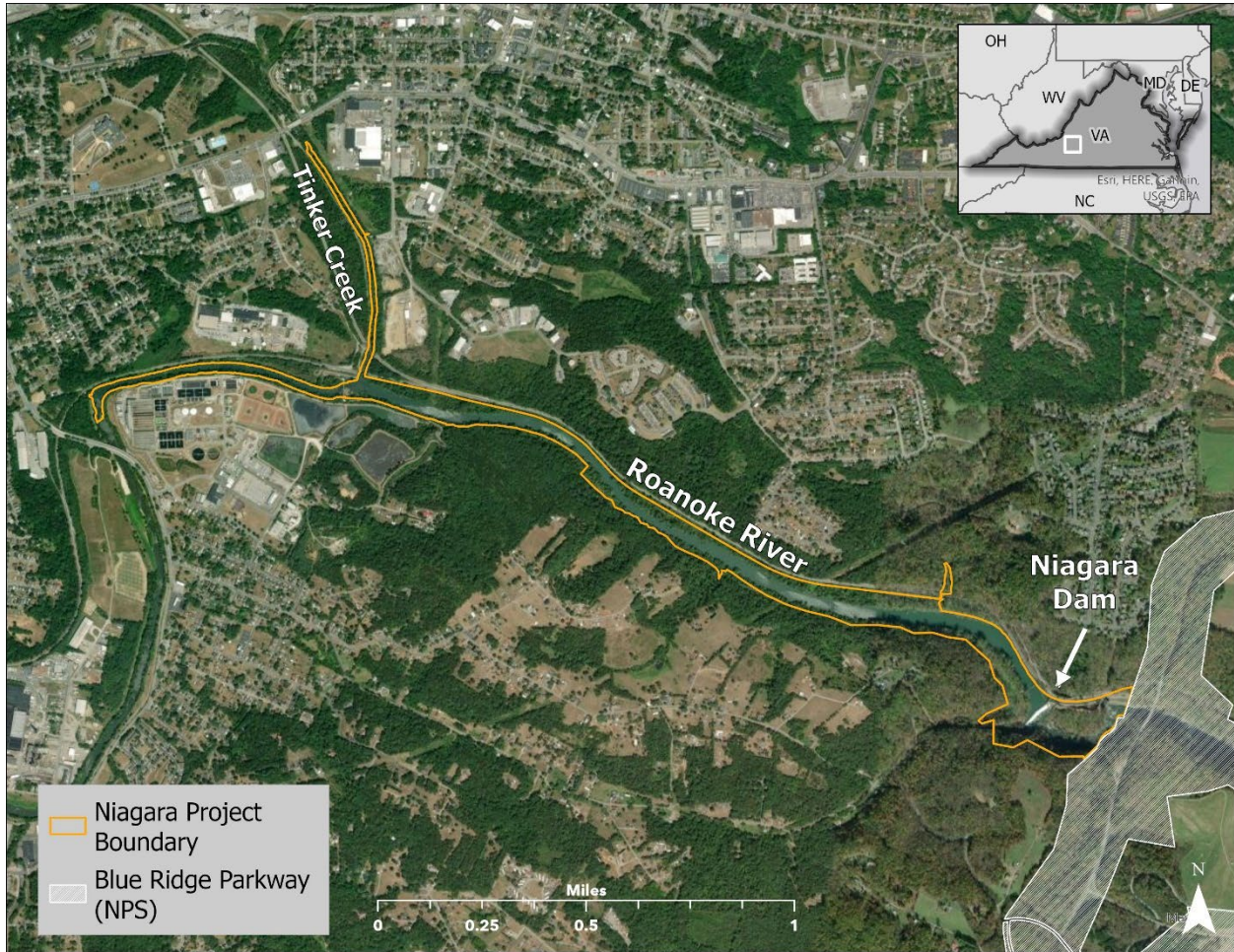


Figure 1. Location of the Niagara Project (Source: staff).

This environmental assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA)³ of 1969 to assess the environmental and economic effects associated with the operation of the project, alternatives to the project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

In this EA, we assess the environmental and economic effects of continuing to operate the project: (1) as proposed by Appalachian (proposed action); and (2) the proposed action with additional or modified measures and mandatory conditions (staff alternative). We also consider

³ On April 20, 2022, the Council on Environmental Quality (CEQ) issued a final rule, *National Environmental Policy Act Implementing Regulations Revisions* (Final Rule, 87 Fed. Reg. 23,453), which was effective as of May 20, 2022. Commission staff prepared this EA in accordance with CEQ's new regulations.

the effects of no action (no-action alternative). Under the no-action alternative, the project would continue to operate as it does under the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. The primary issues associated with relicensing the project are the adequacy of current minimum flows in the bypassed reach, effects of the project on threatened and endangered species, and the adequacy of existing recreation facilities and public access.

1.2.2 Need for Power

The Niagara Project provides hydroelectric generation to meet part of the region's power requirements, resource diversity, and capacity needs. The project has an installed capacity of 2.4 MW and generates approximately 8,557 megawatt-hours (MWh) per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Niagara Project is located in the Northeast Power Coordinating Council (NPCC) - Pennsylvania-New Jersey-Maryland (PJM) of NERC. PJM Interconnection is a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. According to NERC's 2023 long-term reliability assessment report, annual total internal demand in the region is expected to range between 149,737 MW and 160,971 MW over the period from 2024 through 2033 (NERC, 2023). The anticipated reserve margin (i.e., the primary metric used to evaluate the adequacy of projected generation resources to serve forecasted peak load) is forecasted to range from 36.8% in 2024 to 29.9% in 2033. Although anticipated capacity margins would be above the target capacity margin level of 14.7%, the project would continue to meet part of existing load requirements as well as assist with the maintenance of the system's stability.

If relicensed, the Niagara Project would continue to help meet a need for power in the PJM in both the short- and long-term. The project provides power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions and create an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

Any license for the Niagara Project is subject to numerous requirements under the FPA and applicable statutes. The major regulatory and statutory requirements are described in Appendix A.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 C.F.R. § 16.8) require that applicants consult with appropriate resource agencies, Tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, Endangered Species Act (ESA), National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EA, we conducted scoping for the Niagara Project to determine what issues and alternatives should be addressed. We issued an initial scoping document on March 26, 2019, that was noticed in the *Federal Register* on April 1, 2019.⁴ The following entities provided comments:

<u>Commenting Entity</u>	<u>Filing Date</u>
Tri-County Lakes Administrative Commission	May 22, 2019
U.S. Environmental Protection Agency (EPA)	May 23, 2019
Roanoke Valley Greenway Commission	May 23, 2019
U.S. Department of the Interior (Interior) – National Park Service (Park Service)	May 24, 2019
Virginia Department of Environmental Quality (Virginia DEQ)	May 24, 2019
Virginia Department of Game and Inland Fisheries (Virginia DGIF) ⁵	May 24, 2019
Town of Vinton	May 24, 2019
Dr. Paul Angermeier, Virginia Polytechnic Institute and State University (Virginia Tech)	May 24, 2019
Interior – Fish and Wildlife Service (FWS)	May 28, 2019
Roanoke County	May 28, 2019
Roanoke River Blueway Committee of the Roanoke Valley – Alleghany Regional Commission (Roanoke River Blueway Committee)	May 28, 2019

Based on comments received during the April 24 and 25, 2019 scoping meetings and written comments received during the scoping process, we issued a revised scoping document (SD2) on July 9, 2019. Staff issued a third scoping document (SD3) on December 22, 2020, to indicate that Commission staff would conduct its NEPA review in accordance with CEQ's new regulations issued on July 15, 2020. However, as noted above, this document was prepared in accordance with CEQ's revised regulations issued on April 20, 2022.

⁴ 84 Fed. Reg. 12,244.

⁵ Virginia DGIF has subsequently changed its name to the Virginia Department of Wildlife Resources (Virginia DWR). Throughout this EA we refer to the agency as Virginia DWR.

1.4.2 Interventions

On February 7, 2023, the Commission issued a notice accepting the license application. The notice set April 10, 2023, as the deadline for filing protests and motions to intervene.⁶ Interior filed a notice of intervention on April 7, 2023.

1.4.3 Comments on the Application

On February 7, 2023, the Commission issued a Ready for Environmental Analysis (REA) notice setting April 10, 2023⁷ as the deadline for filing comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions. Interior filed comments, recommendations, and preliminary terms and conditions on April 5, 2023. Virginia DWR filed comments, recommendations, and preliminary terms and conditions on April 10, 2023. Comments and recommendations were also filed by Paul Angermeier and Eric Hallerman of Virginia Tech, the Roanoke Outside Foundation, the Town of Vinton, Roanoke County, and the Roanoke Valley Greenway Commission. Appalachian filed reply comments on May 23, 2023.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate under the terms and conditions of the current license, and no new environmental protection, mitigation, and enhancement (PM&E) measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

2.1.1 Current Project Facilities

The Niagara Project is located at river-mile (RM) 355 of the Roanoke River, in Roanoke County, Virginia. The project facilities are shown in figure 2.

The project consists of: (1) a 52-foot-high, 462-foot-long concrete dam, inclusive of the right non-overflow abutment and main spillway (392 feet long) with a crest elevation of 885 feet;⁸ (2) a 62-acre impoundment with a storage capacity of 425 acre-feet at the normal pool

⁶ The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2). Because the 60-day filing deadline fell on a Saturday (i.e., April 8, 2023), the filing deadline was extended until the close of business on Monday, April 10, 2023.

⁷ *Ibid.*

⁸ All elevations reported herein are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

elevation of 884.4 feet; (3) a 6.5-foot-wide sluice structure located at the east end of the main spillway; (4) a 103-foot-long auxiliary spillway with a crest elevation of 886 feet located downstream of the upstream intake; (5) a 60-foot-long intake structure of cyclopean concrete masonry design, with five vertical steel headgates; (6) an 11-foot-diameter, 500-foot-long corrugated metal pipe penstock with associated entrance and discharge structures; (7) a 1,500-foot-long bypassed reach; (8) a 92-foot-long, 58-foot-wide, 42-foot-high concrete powerhouse containing two generating units with a total authorized installed capacity of 2.4 MW; (9) a switchyard and grid connection consisting of 50-foot-long, 2.4-kilovolt (kV) generator leads and a 3-phase, 2.4/12-kV, 2,500-kilovolt ampere (kVA) step-up transformer; and (10) appurtenant facilities.

Project recreation facilities include a boat take-out facility and associated portage trail.⁹

2.1.2 Current Project Boundary

The current project boundary encompasses the dam, impoundment, intake, penstocks, powerhouse, switchyard, tailrace, and bypassed reach. The project boundary encloses a total of approximately 110 acres (figure 2). Appalachian holds title or rights to all land within the current project boundary. The project is located adjacent to and occupies 0.9 acre of the Blue Ridge Parkway, which is managed by the Park Service (figure 1).



Figure 2. Current Project Boundary and Facilities at the Niagara Project (Source: staff).

⁹ Appalachian states in its license application (section E.11.2.1, page E-135) that while the boat take-out facility and portage trail are project facilities, the boat put-in is not a project facility. Section 3.3.5.2 of this document includes additional details and discussion on this topic.

2.1.3 Project Safety

The Niagara Project has been operating for more than 29 years under the current license issued in 1994. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

As part of the relicensing process, Commission staff will evaluate the continued adequacy of the project's facilities under a new license. Special articles will be included in any license issued, as appropriate. Commission staff will continue to inspect the project during the term of the new license to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.4 Current Project Operation and Environmental Measures

The Niagara Project operates in a run-of-river mode under all flow conditions, where outflow approximates inflow at any given point in time.¹⁰ The project is operated to maintain the impoundment at or near elevation 884.4 feet, which is 0.6 foot below the crest of the main spillway. During extreme flow conditions, such as rapidly changing inflows, Appalachian operates the project with a minimum impoundment elevation of 883.4 feet. Run-of-river operation may be temporarily modified, if required, by operating emergencies beyond the control of Appalachian and for short periods upon mutual agreement among Appalachian, FWS, and Virginia DWR. Project operation is monitored both locally and remotely through a programmable logic controller and float controller.

From the intake, water passes through the penstock into the turbine-generator units and then discharges into the Roanoke River. The maximum and minimum hydraulic capacities of the project are 684 cubic feet per second (cfs) and 200 cfs, respectively. Flows in excess of the maximum hydraulic capacity of the project are passed over the main spillway into the Roanoke River.

As required by Article 402 of the current license, a minimum flow of 50 cfs, as measured at the U.S. Geological Survey (USGS) Gage No. 02056000 (USGS gage) located approximately 200 feet downstream of the powerhouse, or inflow to the impoundment, whichever is less, is provided to the Roanoke River downstream of the project when the project is not generating. As required by Article 403 of the current license, a continuous minimum flow of 8 cfs is provided to the bypassed reach. The minimum flow is passed through a sluice structure with an inflatable, pneumatically activated Obermeyer gate and operating system at the project dam or over the

¹⁰ In the license application, Appalachian alternately uses both the terms "approximates" and "equals" when describing flows under the current run-of-river operation. However, Article 401 of the current license requires Appalachian to operate the project in run-of-river mode such that, at any point in time, flows, as measured immediately downstream from the project tailrace, approximate the sum of inflows to the project impoundment. Therefore, throughout this EA we use the term "approximates" when describing the current project operation.

spillway. The Obermeyer gate can be lowered in the event of a power failure by releasing air from the bladder via a manually operated valve.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

Appalachian does not propose any new or modified project facilities as part of the relicensing process for the Niagara Project.

2.2.2 Proposed Project Operation and Environmental Measures

As described in the license application, Appalachian proposes to continue the existing operation and maintenance of the project, with the following additional or updated environmental measures:

- Operate the project in a run-of-river mode under all flow conditions, where inflow equals outflow, and the impoundment is maintained at or near an elevation of 884.4 feet. During extreme flow conditions, such as rapidly changing inflows, Appalachian would continue to operate the project with a minimum impoundment elevation of 883.4 feet. Run-of-river operation would be temporarily modified by operating emergencies beyond the control of Appalachian and for short periods upon mutual agreement among Appalachian, FWS, and Virginia DWR;
- Provide a year-round, continuous minimum flow of 30 cfs into the project's bypassed reach;
- Continue to provide funding for the USGS gage No. 2056000 (Roanoke River at Niagara, VA);
- Develop and implement a terrestrial resources protection plan in consultation with FWS and Virginia DWR that includes supporting information about potentially sensitive areas, as well as the limits of the project boundary and lands owned by Appalachian; standard protection measures implemented by Appalachian; identification and communication of activities that may disturb wildlife or wildlife habitat; and other coordination measures;
- Develop and implement a recreation management plan (RMP) in consultation with project stakeholders that includes:
 - descriptions and locations of recreation facilities in the project area;
 - new signage at the Tinker Creek canoe launch about the Niagara Project portage facilities and other local recreation opportunities;
 - improvements to the boat take-out facility (e.g., replacement of steps, bank stabilization);

- improvements to the portage route (e.g., grading, additional gravel);
 - a conditional requirement to relocate the existing boat put-in facility upstream near the project tailrace and within the project boundary if Park Service-owned lands are no longer an option for this facility;
 - updated project signage related to recreation amenities as well as emergency contact information;
 - participation in and promotion of river cleanups led by other organizations; and
 - development of a website with information about downstream flows and recreational opportunities in the project area.
- Consult with the Virginia State Historic Preservation Office (Virginia SHPO) if previously unidentified cultural resources are encountered during the term of any new license issued for the project to ensure the proper treatment of these resources and discontinue all ground-disturbing activities until the proper treatment of the resources is established.

2.2.3 Modifications to Applicant’s Proposal – Mandatory Conditions

Water Quality Certification Conditions

Virginia DEQ’s Virginia Water Protection Permit¹¹ (certification) for the Niagara Project is included in Appendix K. Condition I.D.2 requires a seasonal minimum flow of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less) to the project’s bypassed reach. Conditions I.D.2, I.D.3, I.E.1, and I.E.2 outline provisions related to operation compliance and monitoring, including development of a monitoring and operations plan, and Condition I.E.3 outlines procedures for when a drought emergency is declared. A total of 50 conditions, including Conditions I.A.1 through I.A.3, I.B.1 through I.B.3, I.C.1 through I.C.11, I.E.4 of Part I-Special Conditions, and all conditions in Part II-General Conditions, are general, administrative, or legal in nature, and are not analyzed in this EA.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would be operated as proposed by Appalachian and would include most of Appalachian’s proposed measures, with the exception of Appalachian’s proposed minimum flow to the bypassed reach and the terrestrial resources protection plan. The staff alternative includes Virginia DEQ’s certification conditions contained in Appendix K, including the seasonal minimum flows to the bypassed reach, and the following staff-recommended additions or modifications:

¹¹ While Virginia DEQ refers to the permit issued pursuant to section 401 of the Clean Water Act (CWA) as a Water Protection Permit, it is Commission practice to refer to a section 401 permit as a “water quality certification” or “certification.”

- Develop an erosion and sediment control plan to minimize effects of turbidity and sedimentation related to enhancements of the existing boat take-out facility and construction of a new boat put-in facility;
- Operate the project in a run-of-river mode under all flow conditions, where inflow *approximates* outflow at any given point in time and the impoundment is maintained at or near the elevation of 884.4 feet (883.4 feet under extreme flow conditions, as defined in an operation compliance and monitoring plan);
- Develop an operation compliance monitoring plan that incorporates the monitoring and operations plan specified by the certification (I.D.2, I.D.3, I.E.1, and I.E.2) and describes the methodology, instrumentation, and reporting procedures that would be used to verify the project is being operated in accordance with the operational requirements of any new license issued for the project;
- Following a drawdown of the impoundment for maintenance or emergency purposes, pass at least 90 percent of inflow downstream of the powerhouse and use the remaining 10 percent of inflow to refill the impoundment to protect aquatic habitat;
- Develop a bald eagle protection plan, consistent with FWS’s National Bald Eagle Management Guidelines, to ensure the protection of eagles that roost or nest at the project;
- Avoid the removal of trees with diameters that are equal to or greater than 3 inches at breast height from April 1 through November 14, to protect Indiana, northern long-eared, and tricolored bats;
- Avoid vegetation maintenance (i.e., removal and trimming) or ground disturbance outside of routinely maintained areas between March 15 and August 15, to protect nesting migratory birds;
- Avoid vegetation maintenance during the monarch breeding season (April 1 through September 30)¹² where routine vegetation maintenance does not occur, to protect the monarch butterfly and its host plant (milkweed);
- Construct, operate, and maintain a boat put-in facility within the project boundary;
- Develop and implement an RMP as proposed by the applicant with modifications, including:

¹² In letters filed April 5, 2023 and April 10, 2023, respectively, Interior and Virginia DWR characterize the monarch butterfly breeding season as “spring through early fall.” As discussed below in section 3.3.4, *Threatened and Endangered Species*, staff estimates this period to be April 1 through September 30 based on the host plants’ (i.e., milkweed species) growing season in Virginia.

- a description of project recreation facilities (i.e., boat take-out, portage trail, and boat put-in) including ownership, operation, and maintenance responsibilities;
 - a map depicting the type and location of all project recreation facilities in relation to the project boundary;
 - a provision to conduct recreation use monitoring at recreation facilities at and near the project 5 years and 10 years post license issuance; and
 - a list of stakeholders that would be consulted in the development of the RMP; this list would include, but not be limited to: (1) Park Service; (2) Roanoke County; (3) Town of Vinton; (4) City of Roanoke; (5) Blueway Committee; (6) Roanoke Valley Greenway Commission; (7) Roanoke Outside Foundation; (8) Friends of the Rivers of Virginia (FORVA); (9) Virginia DCR; (10) Virginia DWR; and (11) FWS.
- In addition to consulting with the Virginia SHPO, the licensee would notify the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe if previously unidentified cultural resources are encountered during the term of any new license issued for the project and discontinue all ground-disturbing activities until the proper treatment of the resources is established.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Certain alternatives to Appalachian’s proposal were considered but eliminated from further analysis because they are not reasonable in this case. These alternatives are presented in Appendix B.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity and (2) our analysis of the proposed action and recommended environmental measures.¹³ Sections are organized by resource area (aquatics, recreation, etc.). Under each resource area, current conditions are described first. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed protection, mitigation, and enhancement (PM&E)

¹³ Appendix D, *Glossary of Terms*, includes definitions of selected terms relating to the project, environment, and our analysis.

measures. Staff conclusions and recommendations are discussed in section 5.1, *Comprehensive Development and Recommended Alternative*.¹⁴

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Niagara Project is located near the Town of Vinton in Roanoke County, Virginia in the Roanoke River Basin. The 410-mile-long Roanoke River originates from the eastern slope of the Appalachian Mountains west of Salem, Virginia and flows in a south-easterly direction through Virginia and into North Carolina, where it empties into the Albemarle Sound. The project is located at RM 355, approximately 6 miles downstream of the City of Roanoke and drains an area approximately 511 square miles. Downstream from the project, there are five hydroelectric developments and reservoirs impounding the mainstem of the river, including: the Smith Mountain Lake Pumped Storage Project (FERC Project No. 2210), consisting of the Smith Mountain and Leesville developments; the multipurpose U.S. Army Corps of Engineers' (Corps) John H. Kerr reservoir, which was constructed in the early 1950s for flood control and hydroelectric generation; and the Roanoke Rapids - Gaston Project (FERC Project No. 2009), consisting of the Roanoke Rapids and Gaston developments.

Major tributaries in the northern section of the Roanoke basin include the Little Otter, Big Otter, Blackwater, and Pigg rivers. Major tributaries in the southern portion include the Dan River, Smith River, and Banister River. The lower portion of Tinker Creek, a smaller tributary to the Roanoke River, and the mouth of Wolf Creek are included in the project boundary. Land cover and land use within the project boundary is primarily deciduous forest, with low-intensity development along the northern bank of the Roanoke River downstream of the project, low- and medium-intensity development in westernmost areas, and some areas of pastureland including along Tinker Creek.

On average, the areas surrounding Roanoke receive 42 inches of rain and 15 inches of snow per year. Summer high temperatures in the hottest month (July) are around 87 degrees Fahrenheit (°F) on average and winter low temperatures in the coldest month (January) are around 26 °F.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to CEQ's regulations that implement NEPA [40 C.F.R. § 1508.1(g)(3)], cumulative effects are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time.

Based on our review of the license application and agency and public comments, water quality, aquatic habitat, and fisheries resources (i.e., diadromous fishes and Roanoke logperch)

¹⁴ Unless otherwise noted, the sources of our information are the license application filed February 28, 2022, including the study reports developed in support of the application, and additional information filed on July 21, 2022 and December 22, 2022.

are resources that could be cumulatively affected by the continued operation and maintenance of the Niagara Project.

3.2.1 Geographic Scope

Our geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of: (1) the proposed action's effect on the resources, and (2) contributing effects from other hydropower and non-hydropower activities within the Roanoke River watershed. Because the proposed actions would affect the resources differently, the geographic scope for each resource may vary.

We have identified the geographic scope for water quality to include the Roanoke River from the confluence of the North and South Forks (near Lafayette, Virginia) to the upper extent of Smith Mountain Lake, the 20,260-acre impoundment for the Smith Mountain Pumped Storage Project. We chose this geographic scope because it appears to capture the main municipalities upstream of the Niagara Project impoundment, which may cumulatively affect water quality in the identified geographic reach. For the Roanoke logperch, we have extended the above geographic scope downstream to the confluence of Big Otter Creek with the Roanoke River. This scope encompasses the known downstream extent of the middle Roanoke River population of the Roanoke logperch. For aquatic habitat and diadromous fish, we have extended the geographic scope further downstream to the Roanoke Rapids Dam, as multiple hydroelectric projects on the Roanoke River may contribute to cumulative effects on fish migration and riverine habitat.

3.2.2 Temporal Scope

The temporal scope of our cumulative effects analysis in the EA will include a discussion of past, present, and future actions and their effects on each resource that could be cumulatively affected. Based on the potential term of a new license, the temporal scope will look 30-50 years into the future, concentrating on the effect to the resources from reasonably foreseeable future actions. The historical discussion will, by necessity, be limited to the amount of available information for each resource. The quality and quantity of information, however, diminishes as we analyze resources further away in time from the present.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the site-specific environmental issues.

Only the resources that have the potential to be affected are addressed in this EA. Based on this, we have determined that geology and soils, aquatic resources, terrestrial resources, threatened and endangered species, recreation resources, cultural resources, and environmental justice communities may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to land use associated with the proposed action, and

therefore, this resource is not addressed in this EA. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

The Niagara Project is located in the EPA Level IV Southern Limestone/Dolomite Valleys and Low Rolling Hills ecoregion within the larger Ridge and Valley portion of the Appalachians. This lowland region consists of low ridges and broad valleys underlined mostly by limestone and dolomite, with small amounts of interbedded shale and other rocks. Due to the solubility of these minerals, the region has karst topography, with sinkholes and underground streams. Bedrock in the central and northwestern parts of Roanoke County consist primarily of sandstone, limestone, and shale of Paleozoic age, whereas the southeastern part consists of crystalline rocks of pre-Cambrian age. Along the western edge of the Blue Ridge province, the resistant pre-Cambrian rocks have been over thrust from the south and east with less resistant Paleozoic rocks.

Soils within the project boundary downstream from the confluence of Tinker Creek, along the shoreline of the Roanoke River, include stony Hayesville channery fine sandy loam with 25 to 50 percent slopes. The Hayesville series consists of very deep, well-drained soils on gently sloping to very steep ridges and side slopes of the Southern Appalachian Mountains. The soils within the project boundary upstream from Tinker Creek include the occasionally flooded Speedwell-Urban land complex with 0 to 2 percent slopes, Chiswell-Litz complex with 25 to 50 percent slopes, urban land, and Udorthents-Urban land complex.

The topography bordering the project impoundment is relatively steep in areas, especially along the southern bank. The steeper slopes flatten out close to the shoreline resulting in an undulating topography. Grasses and perennial vegetation grow along the impoundment shoreline in various areas and help prevent shoreline erosion. The shoreline downstream of the project dam and powerhouse is generally steep with large boulders and exposed bedrock substrates and graded in certain areas (especially near the powerhouse).

In support of the license application, Appalachian conducted a *Shoreline Stability Assessment* in 2021 to characterize the shorelines of the project impoundment, bypassed reach, and tailrace using the Bank Erosion Hazard Index (BEHI) method; inventory, map, and document any areas of erosion or shoreline instability; and prioritize any areas where remedial action or further assessment may be needed. Of the approximate 7 miles of shoreline assessed, results of the field investigation indicated that approximately 90 percent of the shoreline within the study area exhibited no signs of erosion. The areas identified as having some degree of shoreline erosion had average BEHI scores ranging from 13.75 (low) to 33.85 (high)¹⁵ and were mostly concentrated in upstream-most reaches that have more urban development, impervious

¹⁵ BEHI scores are categorized as follows: (1) extreme (42.51-50); (2) very high (34.76-42.50); (3) high (24.76-34.75); (4) moderate (14.76-24.75); (5) low (7.26-14.75); and (6) very low (≤ 7.25).

surfaces, and experience higher and/or more flashy flows.¹⁶ High BEHI scores were observed in localized areas along both banks of Tinker Creek and immediately downstream of the confluence of Tinker Creek and the Roanoke River. Streambanks in the upstream portion of the Roanoke River exhibited generally moderate BEHI scores. No active erosional areas were observed further downstream on the Roanoke River (below the confluence of Tinker Creek), downstream of the dam, or in the bypassed reach.

3.3.1.2 Environmental Effects

Construction Effects of Boat Take-out and Put-in Facilities

Appalachian proposes to develop and implement a recreation management plan that may include enhancements to the boat take-out facility (e.g., replacement of steps, bank stabilization). Additionally, as described in section 5.1.2, *Additional Measures Recommended by Staff* and Appendix G, staff recommend that Appalachian construct a new boat put-in facility downstream of the project powerhouse and within the project boundary.

Our Analysis

Construction activities associated with project recreation facilities, such as Appalachian's proposed enhancements to the take-out facility and construction of a new boat put-in location, may temporarily disturb soil resources, which could result in limited sediment discharge into the Roanoke River. It is expected that any effects of implementing Appalachian's proposed enhancements to the boat take-out facility on erosion or sedimentation would be minimal and short term. The staff recommended boat put-in facility, to be located downstream of the project powerhouse, would be designed to protect the shoreline from erosion (e.g., elevated pier, concrete ramp, etc.). Nevertheless, developing an erosion and sediment control plan with procedures and best management practices (BMPs) to reduce erosion, contain sediment, and stabilize soils during and after completion of any construction activities, would help to minimize turbidity and sedimentation associated with in-water disturbance.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity and Use

The drainage area at the Niagara Project is approximately 511 square miles. Flows at the Niagara Project are estimated by the USGS gage located on the Roanoke River approximately 200 feet downstream of the project powerhouse and just downstream from the confluence of the project tailrace and bypassed reach. From 1994 through 2022, mean annual flow of the Roanoke River at the project was 572 cfs (table C-1). Flows vary seasonally, typically reaching the highest values during April and the lowest values in August and September (figure C-3). The minimum and maximum daily flow at the project over the period of record is 79 cfs and 23,029

¹⁶ See Figure E.7-3 of the license application.

cfs, respectively. Maximum hydraulic capacity of the project (i.e., 684 cfs) plus the minimum 8-cfs bypassed reach flow (total flow of 692 cfs) is exceeded about 20% of the time annually.

Existing uses of project waters include municipal and industrial water supply, wastewater disposal, recreation, and hydroelectric generation. The City of Roanoke, Virginia and several industries draw water from the river upstream of the Niagara Project impoundment. Virginia DEQ issues Virginia Pollutant Discharge Elimination System permits for all point source discharges to surface waters, discharges of stormwater from Municipal Separate Storm Sewer Systems, and discharges of stormwater from industrial activities. The regional wastewater treatment plant discharges to the river 2.5 miles above the dam.

Water Quality

The Roanoke River in the vicinity of the project is designated as Virginia DEQ's Class IV (Mountainous Zone), while Tinker Creek is designated as Class VII (Swamp Waters). Water quality criteria for Class IV surface waters are: (1) daily average dissolved oxygen (DO) values of at least 5.0 milligrams per liter (mg/L), with instantaneous DO values above 4.0 mg/L; (2) pH values between 6.0 and 9.0; and (3) a maximum water temperature of 87.8°F.¹⁷ Water quality criteria for Class VII surface waters are pH values between 3.7 and 8.0. In man-made impoundments in Virginia, such as the project impoundment, the water quality criteria for DO and pH apply only to surface waters (i.e., above any thermocline that may be present). In addition, these water quality criteria do not apply when flows are below the lowest 7-day average flow expected to occur once every 10 years (i.e., the 7Q10 flow).

Due to impaired water quality in the watersheds of several tributaries flowing into the Roanoke River, Total Maximum Daily Load (TMDL) programs have been created and implemented. River reaches within vicinity of the Niagara Project boundary listed as impaired in the 2016 303(d) Water Quality Assessment Integrated Report include a 5.4-mile-long reach of Tinker Creek upstream of its confluence with the Roanoke River, an approximately 0.6-mile segment of which is located within the project boundary. Segments of the mainstem Roanoke River within the project boundary listed as impaired include the 0.8-mile reach of the Roanoke River impounded by the Niagara Dam, a 0.2-mile reach of the Roanoke River from near the backwaters of the Niagara impoundment to the confluence with Tinker Creek. Causes for impairment include sediment loading, polychlorinated biphenyls (PCBs), and bacteria.¹⁸

In support of the license application, Appalachian conducted a study to assess the effects of project operation on water quality parameters including temperature and DO. Continuously recording data sondes were placed at eight sites to measure temperature and DO at 15-minute intervals from July 29 through November 10, 2020. These sites included: (1) Roanoke River upstream of the confluence with Tinker Creek; (2) Tinker Creek; (3) the upper end of the impoundment; (4) the forebay (surface and bottom); (5) the upper bypassed reach; (6) the lower

¹⁷ <https://law.lis.virginia.gov/admincode/title9/agency25/chapter260/section50/>

¹⁸ See Table E.8-3 of the license application.

bypassed reach; and (7) the tailrace.¹⁹ In addition, during the initial deployment and subsequent data download events, discrete multi-parameter water quality measurements of temperature, DO, pH, and specific conductivity were collected at each monitoring location, including vertical profiles at the impoundment and forebay sites. Flows in the bypassed reach were higher than normal for much of the 2020 study season due to above average project inflows, damage to the sluice gate operating system, and a powerhouse outage during the latter part of the study period. Therefore, additional continuous temperature and DO data were collected at the upper and lower bypassed reach and tailrace sites from June 29 through October 27, 2021. In addition, vertical profiles of temperature and DO were collected in the forebay at approximate 2- to 3-week intervals in 2021.

Water temperatures ranged from approximately 48°F to 86°F across all monitoring sites. Water temperatures during July and August 2021 were slightly higher than during 2020 at all monitoring locations with daily peaks ranging from 72°F to 86°F. Diurnal variations in water temperatures at the two bypassed reach monitoring locations in 2021 were also greater than in 2020. At no time during the monitoring periods in 2020 and 2021 did water temperature exceed the state maximum water temperature standard.

Vertical profiles in the project impoundment and forebay indicate little stratification. While water temperature varied seasonally, there was no thermal stratification at the impoundment monitoring location during 2020. Thermal stratification at the forebay monitoring location was also small (i.e., less than 1.5 °F) for most of 2020 and 2021, with the exception of the August 12, 2021 and September 15, 2021 download events where the difference between forebay surface and bottom temperatures was approximately 4.9°F and 5.6°F, respectively. The latter event occurred during a powerhouse outage when flows in the forebay area were reduced.

DO values during the study period, from both continuous and discrete sampling, were consistent with state standards and did not fall below 4.0 mg/L for instantaneous DO and 5.0 mg/L for a daily average across most monitoring sites. At the forebay site, instantaneous DO concentrations recorded at the sonde near the bottom of the water column measured 3.3 mg/L and 3.4 mg/L on September 8 and 11, 2020, respectively, coinciding with a planned project shutdown. On both dates, the occurrence of instantaneous DO concentrations below 4.0 mg/L lasted less than 1.5 hours in duration, and DO concentrations near the surface remained above 5.0 mg/L. In addition, DO concentrations less than 4.0 mg/L during nighttime hours occurred in the upper bypassed reach on several days in July and August of 2021 when flows were at the minimum requirement of 8 cfs. From August 11 to August 13, 2021, flows to the bypassed reach were increased from 8 cfs to approximately 20 cfs due to an operational adjustment associated with the Obermeyer sluice gate. During this 2-day period, DO concentrations at the upstream bypassed reach monitoring location remained above the 4.0 mg/L instantaneous and 5.0 mg/L daily average standard. After August 13, 2021, the Obermeyer gate returned to its normal operating mode and DO concentrations in the bypassed reach remained consistent with the state standards during the remainder of the 2021 monitoring period.

¹⁹ See Figure E.8-2 of the license application.

Aquatic Habitat

The project impoundment comprises about 62 acres and 7.1 miles of shoreline. The impoundment is shallow, with a maximum depth of approximately 10 feet. Because the project is operated in a run-of-river mode, with a goal of maintaining relatively consistent water levels at 884.4 feet, fluctuations in the impoundment are minimal.

Aquatic habitat downstream of and within the project boundary includes about 6.87 acres in the bypassed reach and an additional 1.01 acres from the powerhouse discharge to the Blue Ridge Parkway bridge. Approximately half of the bypassed reach contains instream cover (60.6%), followed by overhead cover (27.3%). The majority of substrate in the bypassed reach consists of boulder, bedrock, or woody debris (63.2%), followed by cobble (25.9%). Primary mesohabitats consist of shoals (32.1%), pools (24.1%), and riffles (15.8%). An additional 11.3% of the bypassed reach is characterized as “upland,” or areas that remain exposed under the 8-cfs minimum flow release but are inundated during spill events. Availability of aquatic habitat in the bypassed reach under varying flows was evaluated in the *Bypassed Reach Flow and Aquatic Habitat Study* and is discussed further in section 3.3.2.2, *Environmental Effects, Minimum Flows*.

The short, approximately 65-foot-wide tailrace channel extends from the downstream wall of the powerhouse approximately 54 feet to rejoin the main river channel, at the confluence with the bypassed reach. The river-left bank (looking downstream) is steep and lined with riprap, and the right bank is natural hillside. Substrate in the tailrace is primarily mud and bedrock, with no instream cover.

Fish Communities

The Roanoke River in the project area supports a variety of warmwater game and forage species, with a relatively similar fish community composition above and below the dam. In support of the license application, Appalachian conducted a fish community survey at the project in September and October 2020. Sampling methods included boat electrofishing at eight sites in pool habitat within the project impoundment. Backpack electrofishing surveys were conducted at wadable sites in riffle/run habitat at two sites upstream of the project impoundment, including one in Tinker Creek, and five sites downstream of the project dam, including the bypassed reach.

A total of 590 fish representing 29 species were collected during the study, the majority of which (89%) were collected by backpack electrofishing. In the project impoundment, catch per unit effort (CPUE) ranged from 0 to 2.91 fish per minute. Of the ten species captured in the surveys, redbreast sunfish and golden redhorse were the most numerically abundant, representing 40% and 18.5% of the total catch, respectively, followed by bluegill and largemouth bass (table C-2). Average CPUE at riffle/run sites upstream of the project dam was 8.63 fish per minute, with rosefin shiner (60.4%), Roanoke darter (6.3%), and central stoneroller (3.5%) as the most numerically abundant species. Average CPUE at riffle/run sites downstream of the project dam was 5.72 fish per minute, with central stoneroller (36.5%), rosefin shiner (12.3%), and riverweed darter (10.8%) as the most numerically abundant species (table C-3). Other species observed at riffle/run sites include fantail darter, blacktip jumprock, and margined madtom.

The Roanoke River in the vicinity of the Niagara Project has been designated by Virginia DWR as a “Threatened and Endangered Species Water” due to the presence of the federally listed endangered Roanoke logperch and state threatened orangefin madtom. The orangefin madtom is native to the Roanoke River system, where it inhabits moderate to strong riffles and runs having little or no silt in moderate gradient and is often found in or near cavities formed by rubble and boulders. According to the Virginia Department of Conservation and Recreation (Virginia DCR) and Virginia DWR, the orangefin madtom may occur within 2 miles of the project in the Roanoke River and Tinker Creek; however, the species was not observed in the 2021 surveys nor in previous relicensing studies in the project area. A single federally listed Roanoke logperch was collected during the 2020 fish community surveys at the most upstream survey site in the mainstem of the Roanoke River. Additional surveys targeting multiple life stages of Roanoke logperch were conducted in 2021 and 2022 and are discussed further in section 3.3.4, *Threatened and Endangered Species*.

Freshwater Mussels

In support of the license application, Appalachian conducted a freshwater mussel survey at the project in October 2020 to characterize mussel habitat and community composition. A combination of transect and abbreviated surveys²⁰ were conducted following methods modified from the Draft Freshwater Mussel Guidelines for Virginia (FWS and Virginia DGIF, 2018). Linear transect surveys, ranging from 30 to 75 meters in length, were performed at eight sites spaced every 500 meters within the impoundment and immediately upstream of the impoundment via surface supplied air. Abbreviated mussel surveys were also conducted in five reaches of riffle and/or run habitats ranging from 315 to 500 meters in length in: (1) Tinker Creek, (2) Wolf Creek, (3) the Roanoke River upstream of the impoundment, (4) the bypassed reach, and (5) downstream of the confluence of the tailrace and bypassed reach using viewscopes, snorkeling, and surface supplied air. Surveyors targeted habitat(s) suitable for the occurrence of freshwater mussels and searched those areas at an approximate rate of 1 minute per square meter in heterogeneous substrate and used snorkeling, viewscope, and/or surface supplied air methods.

A total of four Eastern elliptio mussels were observed and collected during the abbreviated surveys in Tinker Creek and the Roanoke River upstream of the impoundment. The invasive Asiatic clam was noted at all sites in relatively consistent densities within the mainstem Roanoke River (above and below the dam) with slightly higher densities where suitable mollusk habitat was present (i.e., heterogeneous substrate). The highest density of Asiatic clams in the project area was observed in Tinker Creek.

Aquatic Macroinvertebrates

In support of the license application, Appalachian conducted benthic macroinvertebrate and crayfish surveys in the project area, both upstream and downstream of the project dam, in

²⁰ Abbreviated surveys are conducted at mixed habitat sites and involve searching for mussels in suitable habitat throughout each site (FWS and Virginia DGIF, 2018). Surveyors targeted habitat(s) suitable for the occurrence of freshwater mussels and searched those areas at an approximate rate of 1 minute per square meter in heterogeneous substrates.

fall 2020 and spring 2021 following sampling methods derived from the National Rivers and Streams Assessment Field Operations Manual and Virginia DEQ Biological Monitoring Program Quality Assurance Project Plan (EPA, 2019; Virginia DEQ, 2008). Quantitative survey methods (i.e., kick net sampling over a fixed area) were used to sample riffle/run habitats at five sites while qualitative sampling methods targeted available microhabitats in pool areas at an additional five sites. Additional kick samples and seining efforts were performed following benthic macroinvertebrate sampling to target crayfish.

A total of 38 macroinvertebrate taxa were collected upstream of the project dam from two quantitative and three qualitative samples, respectively. A total of 45 macroinvertebrate taxa were collected downstream of the project dam from three quantitative and two qualitative samples, respectively. Virginia Stream Condition Index (Burton and Gerritsen, 2003) scores derived from the data ranged from 11.07 to 59.04 across all sites and seasons, with scores less than 60 indicative of “impaired” conditions. Observed crayfish species included native (Appalachian brook crayfish and Atlantic slope crayfish) and state-designated invasive species (Ozark crayfish, virile crayfish, and red swamp crayfish).

3.3.2.2 Environmental Effects

Mode of Operation

The operation of hydropower projects in a run-of-river mode, whereby the total outflow from a project approximates the inflow to the impoundment, generally provides a more stable upstream and downstream environment than other modes of operation. For example, compared to peaking and storage projects, run-of-river operation minimizes the degree of water level fluctuations and associated erosion and temperature fluctuations in impoundment surface waters (due to shorter water residence times).

Appalachian proposes to operate the Niagara Project in a run-of-river mode under all flow conditions, where inflow equals outflow and impoundment elevation is maintained at or near an elevation of 884.4 feet. During extreme flow conditions, such as rapidly changing inflows, Appalachian would continue to operate the project with a minimum impoundment elevation of 883.4 feet. The run-of-river operation may be temporarily modified for operating emergencies and for short periods upon mutual agreement among Appalachian, FWS, and Virginia DWR.

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that the project be operated in an instantaneous run-of-river mode, whereby inflow to the project equals outflow from the project at all times and water levels above the Niagara dam are not drawn down for the purpose of generating power. In addition, run-of-river operation may be temporarily modified for operating emergencies and for short periods upon mutual agreement among Appalachian, FWS, and Virginia DWR.

Our Analysis

Neither Appalachian nor the resource agencies (Interior and Virginia DWR) have demonstrated that the project is technologically capable of operating in a strict (instantaneous)

run-of-river mode, with total outflow from the project equaling inflow on an instantaneous basis. Moreover, the resource agencies have not described how operating the project in an instantaneous run-of-river mode would provide additional protection or benefits to aquatic resources compared to the existing condition.

In addition to being more practical from a compliance standpoint, operating the project such that the total outflow from the project approximates, rather than equals, inflow at any point in time would still be expected to result in relatively stable impoundment elevations, which in turn would help protect any freshwater mussel beds and fish spawning nests from becoming dewatered and limit project-related erosion along the impoundment shoreline. Operating the project in this manner (i.e., a non-instantaneous run-of-river mode) would also ensure that downstream flows are similar in magnitude and timing to natural river flows. Therefore, operating the project in a non-instantaneous run-of-river mode would provide similar benefits to aquatic resources upstream and downstream of the project as would the instantaneous run-of-river mode of operation (if operating the project in this mode is even feasible) recommended by the agencies.

While Appalachian proposes to operate the project such that impoundment is maintained at or *near* an elevation of 884.4 feet, it does not identify a specific range of impoundment elevations (bands) over which the impoundment would be maintained under normal operating conditions. In addition, while it would allow for short-term impoundment fluctuations of 1 foot during “extreme flow” conditions, it does not fully define what would constitute “extreme flows.” The recommended operation compliance monitoring plan, discussed below, would assist the Commission’s administration of compliance with the project operation.

Minimum Flows

The operation of hydropower projects can result in the diversion of water through a powerhouse and away from the natural river channel. Without flow augmentation (e.g., a minimum flow) or substantial leakage, portions of the bypassed reach—the stretch of river between the point of diversion and where the powerhouse discharge re-enters the natural river channel—can become dewatered, thereby potentially reducing habitat suitability and water quality for aquatic resources.

Appalachian proposes to release a continuous, year-round 30-cfs minimum flow, or project inflow, if less, into the bypassed reach for the protection of water quality and aquatic resources. The minimum flow would be provided through the existing Obermeyer gate at the project dam. In support of this new requirement, Appalachian would continue funding operation of the USGS gage located on the Roanoke River 200 feet downstream of the project powerhouse.

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that a continuous minimum flow of 10% of the inflow to the project, or 30 cfs (whichever is greater) be provided to the bypassed reach, to mimic the natural seasonal variation in flows.

In its reply comments, Appalachian states that its proposal to increase the minimum flow in the bypassed reach from 8 cfs to 30 cfs was informed by a relicensing study to evaluate aquatic habitat in the Niagara Project bypassed reach under a variety of flow conditions, and that

the proposed 30-cfs minimum flow appropriately balances aquatic habitat enhancement against power generation. Further, Appalachian states that Interior and Virginia DWR's recommendation to provide a percent of inflow would not be feasibly controllable or practical to operationally implement.

Virginia DEQ's certification condition I.D.1 requires that Appalachian provide a continuous minimum flow of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less) to the bypassed reach. Virginia DEQ states that the required flows would increase habitat and restore seasonal variability to the bypassed reach but would minimize generation loss and be easier to implement compared to adjusting minimum flow targets on a daily or monthly basis.

Our Analysis

As part of its *Bypassed Reach Flow and Aquatic Habitat Study*, Appalachian evaluated the efficacy of the existing 8-cfs bypassed reach minimum flow requirement on maintaining suitable habitat for aquatic species, as well as potential alternative minimum flow releases to the bypassed reach. A 2-dimensional (2-D) hydraulic model to compute water surface elevations, depth, velocity, and wetted area was built using the Innovyze Infoworks Integrated Catchment Model software, which is capable of simulating depth and velocities in a 2-D grid pattern over a wide range of flow conditions. In support of model development, test flows of 7, 24, 33, and 91 cfs were released through the Obermeyer gate to the bypassed reach during low-flow conditions. Corresponding water depths, surface elevations, and velocities were recorded under a steady-state condition. Substrate and mesohabitat mapping along with the 2-D model depth and velocity simulation results were then used in combination with aquatic species habitat suitability criteria (i.e., using depth, velocity, and habitat preferences) to evaluate potential available habitat under each modeled flow scenario in the bypassed reach. Evaluated fish species included Roanoke logperch and eight species guild representatives (table C-4). Total estimated wetted area in the bypassed reach was estimated for all modelled species and guilds at each of the four test flows described above. In addition, usable area was estimated for Roanoke logperch lifestages at three intermediate flows (20, 30, and 40 cfs).

Generally, the modeling results suggest that there are larger amounts of potential available habitat for species and life stages that prefer mixed and courser substrate types with cover (e.g., instream, overhead), such as adult Roanoke logperch, the shallow-slow, mixed substrate guild (represented by spawning redbreast sunfish), the deep-slow with cover guild (represented by adult redbreast sunfish), and the generic shallow-fast and shallow-slow species guilds (table C-4). In contrast, the modelling predicted no suitable habitat under any flow regime for the shallow-slow guild with submerged aquatic vegetation, represented by young-of-year silver redhorse, or the deep-slow guild with no cover (table C-4). Habitat modeling results for adult and juvenile Roanoke logperch indicate preferred habitat is primarily along the main flow path in the bypassed reach, which is consistent with where Roanoke logperch were primarily observed during fish surveys (figure C-4). In comparison to juvenile and adult Roanoke logperch, there is less predicted available habitat in the bypassed reach for young-of-year Roanoke logperch under all modelled flow regimes.

Between test flows of 7 cfs and 33 cfs, water depths increase by approximately 0.2 foot, velocities increase by approximately 0.3 foot per second (fps) and the total wetted area increases from 2.8 to 3.9 acres. In comparison, between test flows of 7 cfs and 91 cfs, water depths increase by approximately 0.5 foot, velocities increase by approximately 0.8 fps and the total wetted area increases to 4.6 acres. The results of the habitat suitability modelling indicate that in general, the amount of potential available habitat generally increases with increased flows to the bypassed reach. For some of the modelled fish guild and species lifestages, the largest incremental gain in predicted usable area occurs from the 7-cfs test flow to either the 24- or 33-cfs test flows, with less gain in usable area from either 24- or 33-cfs test flows to the 91-cfs test flow (table C-4). For example, estimated usable area for the generic shallow-slow guild increases by 109% from 7 cfs to 24 cfs, but only 13% from 24 cfs to 91 cfs. For other modelled groups, including adult Roanoke logperch, the generic shallow-fast guild, and the two deep-fast guilds (represented by adult silver redhorse and adult shorthead redhorse), usable area continues to increase at higher flows²¹ (table C-4, figure C-4). Interior notes that the state-listed orangefin madtom, which was not observed during Appalachian’s 2020 and 2021 fish surveys but is known to occur in the upper Roanoke River, best fits in the “Generic Shallow-Fast Guild.” For this guild, estimated usable area increases by 195% from 7 cfs to 33 cfs, and an additional 47% from 33 cfs to 91 cfs.

Usable area for adult Roanoke logperch increases by approximately 112% from the 7-cfs test flow to the 30-cfs test flow. Relative to the 30-cfs flow, there are additional 36% and 242% increases in usable area at 40 cfs and 91 cfs, respectively. At Virginia DEQ’s required seasonal flow of 45 cfs, usable area for Roanoke logperch adults would be approximately 7,000 square feet, or approximately 53% higher compared to 30 cfs (figure C-4). Compared to the 7-cfs flow, there are additional patches of higher predicted habitat suitability in several areas of the bypassed reach under higher flow conditions, including along river left (figure C-5). Additional areas of higher predicted suitability modelled under the high flow include below the project spillway.

In their recommendation, Interior and Virginia DWR do not specify what time step (e.g., daily, weekly, monthly) would be used to calculate 10% of the project inflow to be provided to the bypassed reach. Based on estimated mean monthly flow statistics in table C-1, 10% of the mean monthly flow would be in excess of 30 cfs for all months except August; however, the magnitude of the flow would vary by season. Excluding August, 10% of the mean monthly flow during the lower flow period of July through November ranges from 37 to 45 cfs. During the higher flow spring months of February through May, 10% of mean monthly flow ranges from 73 to 88 cfs. As described in section 2.1.4, *Current Project Operation and Environmental Measures*, the maximum hydraulic capacity of the project is 684 cfs; flows in excess of 684 cfs are be passed over the spillway. In the license application, Appalachian estimated that, while the number of days that inflows exceed the maximum hydraulic capacity varies from year to year, flows exceeded the hydraulic capacity on approximately 26% of the total number of days from 2016 through 2020 and more commonly during the spring months (38% of days from February through June).

²¹ Also see Appendix A of the license application – *Bypass Reach Flow and Aquatic Habitat Study Report, Attachment 4 – Useable Area Figures and Table*.

Virginia DEQ's certification condition would require Appalachian to provide seasonal minimum flows to the bypassed reach, but in contrast to Interior and Virginia DWR's recommendation, the minimum flows would be a continuous 45 cfs from January 1 through June 30, and 30 cfs from July 1 through December 31 (or inflow, whichever is less). Virginia DEQ determined its required minimum flows by calculating 10% of the lowest monthly median flow across periods of the year, which resulted in target flows ranging from 40 to 50 cfs during the relatively high-flow winter and spring months. Relative to the estimated historical flow statistics in table C-1, a 45-cfs flow would represent a range of 5 to 8% of the mean monthly flow during the months of January to June compared to 4 to 6% of the mean monthly flow at 30 cfs. As described above, predicted usable area for adult Roanoke logperch increases by 36% from 30 cfs to 40 cfs. With the exception of Roanoke logperch, Appalachian's study did not provide estimates of usable area for other modelled groups at flows between 33 cfs and 91 cfs. Habitat gains at 45 cfs would likely be at an intermediate level compared to estimates at 33 cfs and 91 cfs. Under Interior and Virginia DWR's recommended flows, habitat gains in the spring would be expected to be closer to those modelled at the 91-cfs flow.

Overall, an increase in the minimum flow to the bypassed reach from 8 cfs to 30 cfs, as proposed by Appalachian, would provide additional year-round habitat to the majority of the modelled target species and guilds. Virginia DEQ's certification condition requiring a seasonal minimum flow of 45 cfs would result in additional habitat during the winter and spring months. In contrast, Interior and Virginia DWR's recommended flow regime would provide additional flows in excess of 30 cfs for most months, resulting in increased habitat for some target fish species and guilds, including Roanoke logperch, with highest gains likely during the high-flow spring months from February through May. Under Appalachian's proposed, Virginia DEQ's required, and Interior and Virginia DWR's recommended minimum flows, the increase in the amount of available habitat would likely increase the production of benthic macroinvertebrates in the bypassed reach, which would increase the amount of prey available to fish in the bypassed reach and downstream areas.

Appalachian does not describe in the license application how minimum flows would be provided in the event of a power loss. Under the current license, the Minimum Flow Release Report, as amended in 2020, describes how, in the event of a power failure, the inflatable Obermeyer gate can be lowered by releasing air from the bladder via a manually operated valve to provide the required minimum flows to the bypassed reach.²² Continuing to ensure that minimum flows as required by any new license are provided in the event of a power failure would ensure that minimum flows to the bypassed reach are not interrupted.

Effects of Project Operation on Water Quality

The operation of hydropower projects can affect water quality in numerous ways, including a reduction in DO levels downstream of a powerhouse tailrace caused by releasing

²² See September 2, 2020 Order Approving Sluice Gate Replacement, Revised Exhibit F, Supplement to Article 406 Minimum Flow Release Report, and License Articles 404 and 405 Minimum Flow Monitoring Plan (https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20200902-3023).

water through the powerhouse that is drawn from impoundments or impoundment depths containing low DO concentrations. These potential effects are most pronounced during the summer when impoundment water temperature is high and DO stratification is most common, flows and spillage that re-aerate water passed downstream tend to be lowest, water temperature is highest (warm water cannot hold as much dissolved oxygen as cooler waters).

As described above, Appalachian proposes to operate the project in a run-of-river mode, where outflow equals inflow, and provide a 30-cfs minimum flow to the bypassed reach. No recommendations were received from the resource agencies or other stakeholders that expressly provided for, or had a stated purpose of, protecting or enhancing water quality at the project.

Our Analysis

As discussed above in section 3.3.2.1, *Affected Environment, Water Quality*, the project impoundment is shallow and experiences little stratification, only occurring in the project forebay when the project was not operating. Water temperature and DO concentrations were generally consistent with Virginia state standards across all sites during Appalachian's water quality study, with the primary exception of the upper bypassed reach, which occasionally experienced low DO concentrations during high temperature, minimum flow (i.e., 8 cfs) conditions. The upper bypassed reach site, a slow moving, stagnant pool, exhibited DO concentrations less than 4.0 mg/l during nighttime hours on several days in July and August 2021. When flows to the bypassed reach increased to 20 cfs, DO concentrations subsequently increased and were consistent with the Virginia state standard. Increasing the minimum flow to the bypassed reach from 8 cfs to 30 cfs, as proposed by Appalachian and recommended by Interior and Virginia DWR, would be expected to lead to fewer DO fluctuations and lower occurrences of low DO. The existing DO conditions in the project impoundment, tailrace, and Roanoke River downstream of the project were largely consistent with state standards during the 2020 and 2021 study and would be expected to remain so under Appalachian's proposed operation.

Operations Compliance and Monitoring

Interior and Virginia DWR recommend, under section 10(j), that Appalachian develop an operations and compliance monitoring plan for maintaining and monitoring run-of-river operation and minimum flow releases at the project. The plan would include: (1) a description of the mechanisms and structures that would be used in maintaining and monitoring minimum flow and run-of-river operation at the project; (2) a description of the project's operation (i.e., manual and automatic); (3) methods used for recording data on run-of-river operation and minimum flow releases to the bypassed reach; (4) an implementation schedule; and (5) a provision to maintain operation data for inspection by FWS and Virginia DWR. The agencies further recommend that relevant operational data such as headpond elevation and station generation be recorded at least hourly and records should be maintained digitally for the term of any new license issued for the project.

In its reply comments, Appalachian states that there is no demonstrated need for an operations compliance monitoring plan. It further states that it is unaware of non-compliance

situations with the existing license, and that the USGS gage, for which it would continue to provide funding, can be accessed remotely to monitor project flow releases.

Several of Virginia DEQ's certification conditions address project monitoring and compliance. Condition I.D.2 specifies that elevations and outflows be monitored at the USGS gage on a daily basis, while condition I.D.3 specifies formulas to be used to calculate project inflows. Certification condition I.E.1 would require Appalachian to develop a project monitoring and operations plan that follows the monitoring, inflow estimation, and reporting procedures in certification conditions I.D.2, I.D.3, and I.E.2. The plan would be submitted to Virginia DEQ, for approval, within 120 days of the issuance of any new license issued for the project, and include: (1) procedures for operating the project to insure compliance with all water withdrawal conditions of the certification; (2) procedures for estimating project inflow on a daily basis in accordance with calculations provided in certification condition I.D.3; (3) a procedure for estimating the previous day's inflow in the event that the USGS gage is damaged, disabled, or discontinued; and (4) procedures for recording, monitoring, and reporting required data. Condition I.E.2 would also require Appalachian to report any instances of non-compliance with minimum flow requirements.

When a drought emergency is declared by the Commonwealth of Virginia or by Roanoke County in accordance with the county's (or locality's) Drought Management Ordinance, condition I.E.3 would require Appalachian to implement either the provisions directed by the Commonwealth of Virginia, the drought management ordinance or the mandatory conservation measures as detailed in Attachment B of the certification, whichever is the most restrictive. The condition further requires Appalachian retain records documenting any mandatory measures implemented during the declared drought emergencies.

Our Analysis

The Commission often requires licensees to develop an operation compliance monitoring plan that describes the methodology, instrumentation, and reporting procedures a licensee intends to use to verify a project is being operated in accordance with the operational requirements of its license. Such plans ensure that all operational requirements for the protection and enhancement of environmental resources at the project are being met.

Under the current license, procedures for complying with minimum flows to the bypassed reach and downstream of the project are specified in the Minimum Flow Monitoring Plan, as required by Articles 404 and 405 of the current license. Flows downstream of the powerhouse are monitored via the downstream USGS gage, which measures river discharge at 15-minute intervals. Currently, flows to the bypassed reach are calculated rather than directly measured, using operational data from the project in conjunction with the USGS gage discharge data. While Appalachian states that it would continue to provide funding for the USGS gage, it does not specify how run-of-river operation or minimum flows would be monitored over the duration of a new license. In addition, as described in section 3.3.2.2, *Environmental Effects, Project Operation*, Appalachian proposes to maintain impoundment levels at or near 884.4 feet during normal operating conditions, but during extreme flow conditions, such as rapidly changing inflows, Appalachian would operate the project with a minimum impoundment elevation of

883.4 feet. A more thorough description of what constitutes “extreme flow” conditions would aid in the Commission’s administration of compliance with the project operation.

Therefore, the development of a plan describing the methodology, instrumentation, and reporting procedures of project inflows and outflows, tailrace and impoundment elevations, and releases to the bypassed reach would serve to ensure and document a record of compliance with run-of-river operation and flow requirements at the Niagara Project. There are additional provisions, not specified in Interior’s and Virginia DWR’s recommended or Virginia DEQ’s required plan, that would be beneficial for compliance with any license issued for the project, including: (1) a definition of “extreme flow” conditions; (2) specifying the range of impoundment elevations (bands) over which the impoundment would be maintained under both normal run-of-river and “extreme flow” operating conditions; (3) and establishing a schedule for reporting any operational deviations to the Commission.

During a declared drought emergency, it is possible that measures required by the Commonwealth of Virginia or Roanoke County could lead to conflicts with the Commission’s operating requirements (e.g., minimum flows). Any operating requirements of any license that conflict with drought operations could be temporarily modified as specified in a drought management ordinance or as directed by state or county government. However, similar to other planned deviations of any license requirements, Appalachian should report planned deviations associated with drought operations to the Commission.

Impoundment Refill Procedure

Interior and Virginia DWR recommend that Appalachian implement an impoundment refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of inflow (not including flow allocated to the bypassed reach) is passed downstream and the headpond is refilled using the remaining 10% of inflow to the project. The minimum flow to the bypassed reach would be maintained during refilling. The agencies further state that the recommended refill procedure may be modified on a case-by-case basis with the prior approval of FWS and the Virginia DWR.

In its reply comments, Appalachian states that there is no demonstrated need for an impoundment refill procedure, given its proposal to operate the project in a run-of-river mode and no planned (or recent historic) drawdowns. Appalachian further states that if a drawdown were required during a new license term to address major project maintenance or other unplanned circumstance, it recognizes this would necessitate a variance request, likely in the form of a non-capacity license amendment. Such requests would require agency consultation, during which the refill procedure could be developed in consultation with stakeholders at that time.

Our Analysis

Under run-of-river operation, flows downstream of the project are provided through the project turbines and approximate inflow under most conditions. The project does not store water under normal operating conditions; waters are either used for generation or spilled. Appalachian does not routinely draw down the Niagara Project impoundment, but drawdowns may be

required over the duration of a new license for maintenance and for emergencies. While Appalachian states that it may file a variance request for planned maintenance, emergency situations may necessitate an unplanned drawdown. The procedures that are used to refill an impoundment following a drawdown can significantly affect aquatic habitat and organisms in the impoundment and in the downstream reach. Retaining all inflows to refill the impoundment would adversely affect aquatic resources by dewatering aquatic habitat in the bypassed and downstream reaches, potentially stranding fish and other aquatic organisms. On the other hand, releasing all flows to downstream reaches would adversely affect aquatic life in the impoundment by sustaining the dewatered conditions. Releasing 90% of the project impoundment's inflow during impoundment refilling would ensure that downstream flows are kept at or near project inflow levels and that the impoundment is refilled in a timely manner. During an average annual flow of 573 cfs, we estimate that the refill procedure recommended by Interior and Virginia DWR would take 12.1 hours to refill the impoundment back to the 884.4-foot elevation. Minimizing the length of time that the impoundment is drawn down and that flows are reduced downstream would help maintain the existing aquatic habitat for fish and other aquatic species. However, it would also protect downstream aquatic habitat by maintaining a greater percentage of the available inflow downstream and by minimizing the potential for rapid flow fluctuations and dewatering of the stream channel if flows were rapidly and significantly reduced in order to quickly refill the impoundment. Given the small magnitude of typical maintenance drawdowns, delaying the duration of the refill by using 10% of the inflow would not likely have a substantial effect on aquatic habitat within the impoundment.

Fish Entrainment and Impingement

The passage of large volumes of water through trash racks and turbines can result in fish impingement and entrainment mortality at hydropower projects. Blade strikes are thought to be the primary source of mortality for fish entrained through hydropower projects (Franke et al., 1997; Pracheil et al., 2016). Fish size is an important factor in entrainment susceptibility and turbine mortality, whereby smaller fish are more likely to be entrained, but experience lower turbine mortality, although the physical properties of turbine units also play a role in turbine mortality (Winchell et al., 2000; Cada et al., 1997; Pracheil et al., 2016).

During the Commission's scoping for this project, we identified that the continued operation and maintenance of the Niagara Project may affect the entrainment and impingement mortality of resident fishes and the movement of diadromous fish (e.g., American eel). In its comments on the REA notice, Interior referenced ongoing efforts to improve fish passage for American eel and anadromous fish (e.g., American shad) in the Roanoke River downstream of the project and requested that the Commission include a reservation of authority to prescribe fishways under section 18 in any license issued for the Niagara Project.

Our Analysis

As described in section 3.3.2.1, *Affected Environment, Fish Communities*, no diadromous fish currently occur at the Niagara Project.

In support of the license application, Appalachian conducted a *Fish Impingement and Entrainment Study*. Target species including largemouth bass, smallmouth bass, catfishes,

sunfishes, Roanoke logperch, and other species observed during the fish community surveys were evaluated for the potential of entrainment and impingement based on swim speed, behavior, habitat preferences, life stages, seasonal behavioral changes, and other life history characteristics. With the exception of large channel catfish, most fishes would not be excluded by the project's 3.625-inch trashracks. However, the burst swimming speeds of most fish species commonly found in the project impoundment exceed the project's calculated approach velocity of 1.1 fps. Therefore, fish can generally avoid the project intakes based on their swimming abilities. Susceptibility to entrainment is variable depending on species and time period, due to differences in seasonal behavior patterns (e.g., spawning), storm and large flow events, and changes in size frequency distribution following recruitment. Total estimated entrainment rates at the Niagara Project, using the Electric Power Research Institute's (EPRI) database to derive estimated entrainment rates from projects with similar physical characteristics as the Niagara Project, were highest from April to October, with peaks in April, July, and October. Target species and groups with the highest estimated annual entrainment rates at maximum turbine discharge include catfishes (0.82 fish per hour [fph]), rock bass (0.82 fph), suckers and redhorses (0.50 fph), and sunfishes (0.47 fph), while species with relatively low entrainment rates include smallmouth bass (0.08 fph) and largemouth bass (0.16 fph). In addition, Appalachian performed a qualitative assessment to rank entrainment risk as low, moderate, or high using the seasonal entrainment rates estimated from the EPRI database, as well as swim burst speed comparison to intake velocities, size exclusion by trash racks, species periodicity, abundance, habitat utilization, and migratory behavior. Some species, including Roanoke logperch, largemouth bass, and smallmouth bass, were estimated to have low entrainment risk year-round, while other evaluated species, particularly those with higher entrainment rates based on the EPRI database as described above, had seasonally higher entrainment potential (table C-5). For example, entrainment potential for catfishes was categorized as moderate or moderate-high in May through July, but low the remainder of the year.

A turbine blade strike evaluation was performed using the FWS's Turbine Blade Strike Analysis model, site-specific information (i.e., turbine type, number of units, bar rack spacing, etc.), and length distributions for target species. Blade strike probabilities and associated survival rates were calculated for each of the nine size classes used in the entrainment rate analysis. For the fish sizes most likely to be entrained at the project (less than 6 inches), overall turbine survival ranged from 73.7% for fishes of 4.1 to 6 inches total length to 91.3% for fishes less than 2 inches total length.

Therefore, under existing project operation, entrainment mortality at the project appears to be minimal and would not be expected to adversely affect fish populations that inhabit the project impoundment.

3.3.2.3 Cumulative Effects on Aquatic Resources

Water Quality

During the 20th century, the Roanoke River Basin was developed for flood control and hydropower. As previously described, there are five dams and associated hydropower developments on the mainstem of the Roanoke River located downstream of the Niagara Project,

including: the Smith Mountain Lake Pumped Storage Project (FERC Project No. 2210), consisting of the Smith Mountain and Leesville developments; the multipurpose Corps' John H. Kerr reservoir, which was constructed in the early 1950s for flood control and hydroelectric generation; and the Roanoke Rapids – Gaston Project (FERC Project No. 2009), consisting of the Roanoke Rapids and Gaston developments. In addition, the basin has experienced, and continues to experience, industrial, agricultural, and residential development. Major population centers have expanded and/or developed in the upper portion of the basin (e.g., city of Roanoke). The Roanoke River receives municipal wastewater discharges and water withdrawals include those for drinking water and power plant cooling.

As described in section 3.3.2.1, *Affected Environment, Water Quality*, water quality conditions at the project under current operation are generally consistent with state water quality standards, including the project tailrace. Low DO conditions were occasionally observed in the upper bypassed reach during warm, low-flow periods in the summer, but low DO did not persist further downstream. Nevertheless, Appalachian's proposed and the certification's required increase in the minimum flow to the bypassed reach would help minimize the future occurrence of low DO and in turn, improve aquatic habitat in the bypassed reach.

Aquatic Habitat

The development of hydroelectric and water storage projects on the Roanoke River resulted in the conversion of a substantial amount of free-flowing (lotic) water into impounded (lentic) water. As a result, there has been a shift away from free-flowing, riverine habitats (e.g., riffles, runs, pools). Modifications to the physical and chemical characteristics of the river have included increased water depth; decreased water velocity; altered substrate composition, sediment budgets, and woody debris distribution; and modified DO and water temperature regimes. These changes in habitat type have led to the fish species composition in many parts of the Roanoke River watershed being converted from riverine to lacustrine (lake) assemblages.

Continuing to operate the Niagara Project in a run-of-river mode would ensure that this portion of the Roanoke River downstream of the project remains adequately watered and usable for resident fish species. In addition, Appalachian's proposal, and Virginia DEQ's certification requirement, to increase minimum flows to the bypassed reach would provide additional habitat for most fish species. Therefore, there is no indication that continuing to operate the project as recommended by staff would add to any cumulative effects on aquatic habitat that have occurred or may occur in the future due to any new activities in the Roanoke River.

Fisheries Resources

Historically, the Roanoke River supported, at a minimum, eight native diadromous fish species, including American shad, hickory shad, alewife, blueback herring, American eel, Atlantic sturgeon, shortnose sturgeon, and striped bass. While many of these species were restricted to the lower Roanoke River, others have historically migrated to the middle or upper watershed (e.g., American shad, American eel, and striped bass). Migratory routes to upstream spawning and rearing habitat were significantly altered during the advent of dam building and hydropower development on the Roanoke River in the 1950s and 1960s.

Turbine-related injuries and mortality associated with continued operation of the Niagara Project and other hydropower projects on the Roanoke River could contribute to cumulative effects on fishery resources in the Roanoke River. As described in section 3.3.2.2, *Environmental Effects – Fish Entrainment and Impingement*, most of entrained fish at the project would be less than 6 inches long and experience relatively low entrainment-related mortality rates. Overall, the continued effects of any entrainment and turbine mortality of resident fishes that may occur at the project would contribute minimally to cumulative effects on resident fish populations in the Roanoke River.

While the project dam would still represent an impediment to fish migration, no diadromous fish species currently occur in the Roanoke River in the vicinity of the Niagara Project. In its comments on the REA notice, Interior referenced ongoing efforts to improve fish passage for American eel and anadromous fish (e.g., American shad) in the Roanoke River downstream of the project. However, while a trap and transfer program provides upstream passage to American eel at the Roanoke Rapids and Gaston developments, no such facilities currently exist at the Corps' Kerr dam or at the Smith Mountain Lake Pumped Storage Project.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

The project's ecoregion was originally almost entirely forested, with Appalachian oak forest and mixed oak forest on drier upland sites, mesophytic forests on more mesic sites, bottomland oak forests in lower, wetter areas, and some cedar barrens in areas with exposed limestone outcroppings (Woods et al., 1999). The valley walls around the project facilities and impoundment consists of a combination of deciduous hardwood and coniferous vegetation that contributes to erosion mitigation and ecological diversity within the project area.

Wetland and Riparian Habitat

In 2020, Appalachian conducted a *Wetlands, Riparian, and Littoral Habitat Study* across 129.6 acres of terrestrial and aquatic habitats. These habitats included the impoundment, terrestrial areas adjacent to the project boundary, the bypassed reach, and the riverine section of the Roanoke River and its tributary streams within the project boundary. Combining the FWS National Wetland Inventory (NWI) database with field verification, Appalachian identified 73.81 acres of wetlands, constituting 57% of the study area. A total of 10.37 acres (8% of the study area) consisted of palustrine forested wetland; 3.33 acres (3%) were palustrine emergent marsh; 25.94 acres (20%) were palustrine with unconsolidated bottom; and 34.16 acres (26%) were riverine wetlands with unconsolidated bottom. Additionally, Appalachian identified 20 acres (15%) of bottomland riparian forests. Most of the remaining area (approximately 35.8 acres or 28% of the studied area) is mostly forested and undeveloped with a mixture of deciduous hardwoods and conifers, except for the CSX Railroad tracks and associated right-of-way along the northern streambank.

Invasive Species

The Virginia DCR maintains a list of invasive botanical species found within the State.²³ This list includes species that pose a threat to Virginia’s forests, marshes, wetlands, and waterways. Species are ranked based on the level of threat they present to natural communities and other species. As part of the relicensing process, Appalachian conducted a *Wetlands, Riparian, and Littoral Habitat Study* that includes a list of invasive plant species found within the project boundary. Appalachian identified several invasive plant species within the study area, including Japanese knotweed (*Reynoutria japonica*), tree of heaven (*Ailanthus altissima*), honeysuckle (*Lonicera japonica*), amur honeysuckle (*Lonicera maackii*), Johnsongrass (*Sorghum halepense*), and mimosa (*Albizia julibrissin*). These species are located along the margins of the Roanoke River, in disturbed areas, and in several habitat types within the study area.

Bald Eagles

The bald eagle (*Haliaeetus leucocephalus*) is protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, which prohibit the “take” of eagle eggs, nests, and offspring, as well as activities that substantially disturb normal breeding and feeding behaviors, except as permitted by regulation. Bald eagles typically forage over water and other open habitats and nest in mature trees and snags and on cliffs, rocks, and artificial structures, generally within 1 mile from water sources such as rivers, wetlands, or lakes. Nesting activity generally occurs from December through July in Virginia.²⁴

While no bald eagle nests have been observed or reported at the project, bald eagles occur in Roanoke County and there is a documented eagle nest (active as of 2014) located 1.25 miles downstream of the project. According to the Cornell Lab of Ornithology’s eBird database, individual adult bald eagles have been observed in the vicinity of the project area. Some of these observations occurred at the Roanoke River Overlook, a popular birding spot on Blue Ridge Parkway, about 400 feet southeast from the project dam. Notably, documented observations occurred during the breeding season (from December through July) across years 2020 to 2023.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act. FWS’s Information for Planning and Consulting (IPaC) database indicates the presence of 13 migratory Birds of Conservation Concern,²⁵ besides bald eagles, at the project: black-billed cuckoo (*Coccyzus*

²³ <https://www.invasive.org/species/list.cfm?id=176>

²⁴ <https://dwr.virginia.gov/wp-content/uploads/virginia-bald-eagle-guidelines-for-landowners.pdf>

²⁵ Birds of Conservation Concern are defined by FWS as migratory and nonmigratory birds of the U.S. that, absent conservation actions, may become candidates for listing under the ESA. See: <https://www.fws.gov/migratorybirds/pdf/management/birds-of-conservation-concern-2021.pdf>.

erythroththalmus), bobolink (*Dolichonyx oryzivorus*), Canada warbler (*Cardellina canadensis*), cerulean warbler (*Dendroica cerulea*), chimney swift (*Chaetura pelagica*), Eastern whip-poor-will (*Antrostomus vociferus*), golden-winged warbler (*Vermivora chrysoptera*), Kentucky warbler (*Oporornis formosus*), prairie warbler (*Dendroica discolor*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*). Breeding months for these species range from April through October. Further, eight of these migratory bird species were listed as Species of Greatest Conservation Need²⁶ in Virginia's Wildlife Action Plan:²⁷ black-billed cuckoo, Canada warbler, cerulean warbler, chimney swift, Eastern whip-poor-will, golden-winged warbler, Kentucky warbler, and wood thrush.

The breeding habitats for the identified species vary widely, reflecting their diverse ecological preferences. Migratory species that occur at the project boundary nest in moist thickets in woodland undergrowth (e.g., Canada warbler), humid deciduous forests and dense second growth (e.g., Kentucky warbler), wetlands (e.g., prothonotary warbler), and woodlands with mature trees (e.g. red-headed woodpecker).

3.3.3.2 Environmental Effects

Project Operation and Construction Effects on Wetland and Riparian Habitat

Hydropower project operation and maintenance can affect wetlands, riparian habitat, and associated wildlife by modifying the frequency and duration of downstream flows and the stability of impoundment water surface elevations. These modifications may alter the availability and quality of nearshore habitats for the species that rely on them. For instance, fluctuations in impoundment water levels can expose substrates and hydrophytic vegetation. This exposure can impact the emergent and submerged aquatic vegetation of the impoundment and promote the spread of invasive plant species that prefer exposed substrate for germination. In addition, construction activities, such as those related to improvements to recreation facilities (e.g., the project's canoe portage take-out and trail), can impact wetlands and riparian habitats through the removal of vegetation, increased runoff and soil erosion, and increased turbidity and sedimentation. Appalachian proposes to develop and implement a RMP for the project that may include enhancements to the existing canoe portage take-out and trail. Additionally, FWS and Virginia DWR recommend a minimum flow of 10% of the project inflow or 30 cfs (whichever is greater) to the bypassed reach, and Virginia DEQ's certification would require Appalachian to provide minimum flows to the bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31.

²⁶ <https://services.dwr.virginia.gov/WAP2/>

²⁷ <https://bewildvirginia.org/wildlife-action-plan/>

Our Analysis

Neither Appalachian's proposed or the agency-recommended minimum flow release are likely to affect the current wetland and riparian habitats, as they would both keep habitats within their natural range of conditions.

Additionally, continuing to operate the project in a run-of-river mode would maintain stable impoundment levels and minimize project effects on terrestrial habitat and wetlands along the shoreline of the impoundment, and the Roanoke River downstream of the project. There are no anticipated changes in project operation that would affect the extent or function of the existing floodplain.

Construction activities associated with improving existing project recreation facilities may temporarily disturb soil resources and remove vegetation that could impact wetland and riparian habitats within the project. The magnitude of the construction effects, however, would likely be minimal and of short duration (e.g., weeks or months) and any effects would be limited to previously disturbed areas.

Effects of project maintenance and proposed recreation enhancements on bald eagles

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that in the event bald eagles are documented at or in the vicinity of the project at any time during the license term, Appalachian should coordinate with the FWS and Virginia DWR to avoid impacts to this species.

Our Analysis

Bald eagles have been observed 400 feet southeast of the project boundary during the breeding season, and there is a documented eagle nest (active as of 2014) located 1.25 miles downstream of the project. If bald eagles establish nests or roosts within the project boundary, ground disturbance associated with the proposed recreation enhancements and routine maintenance of the project may disturb bald eagle nests or roosts. Developing a bald eagle protection plan, consistent with FWS's National Bald Eagle Management Guidelines,²⁸ would minimize project effects on bald eagles.

Migratory birds

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian avoid adverse impacts to migratory birds by avoiding vegetation maintenance or ground disturbance in "natural areas"²⁹ during the nesting season (i.e., between March 15 and August

²⁸ <https://www.fws.gov/media/national-bald-eagle-management-guidelines>.

²⁹ Interior and Virginia DWR did not define what constitutes a natural area. Therefore, staff interprets this term as an area within the project boundary that is not typically subject to routine vegetation maintenance.

15). In its reply comments, Appalachian states that the measure would be unduly restrictive given there has been no demonstrated project effects from vegetation maintenance on migratory birds, and that not mowing for an entire summer season is impracticable given routine mowing is necessary to manage facility grounds and to facilitate safe employee access.

Our Analysis

Among the 13 migratory Birds of Conservation Concern identified as potentially occurring within the project's boundary, the Canada warbler, Kentucky warbler, and prothonotary warbler are most likely to be affected by vegetation maintenance. These birds rely on wetland and riparian habitats during their breeding seasons. Alterations to these sensitive habitats due to maintenance activities could disrupt the availability of suitable breeding sites and food sources, potentially impacting their reproductive success and overall populations. However, vegetation maintenance or ground disturbance are unlikely to occur where these species breed, because migratory birds rarely nest in regularly maintained areas with low vegetation and high ground disturbance. Thus, avoiding vegetation maintenance outside of routinely maintained areas between March 15 and August 15 as recommended by Interior and Virginia DWR would minimize project effects on migratory birds.

Terrestrial Resources Protection Plan

Appalachian proposes to develop a terrestrial resources protection plan, in consultation with FWS and Virginia DWR, to include the following measures: (1) develop maps and supporting information from the licensing process that identify potentially sensitive areas, as well as the limits of the project boundary and lands owned by Appalachian; (2) standard protection measures implemented by Appalachian; (3) use of Appalachian's internal procedures for identifying and communicating activities that may disturb wildlife (including bats and bald eagles) or wildlife habitat, including identification of common operation and maintenance activities that are exempt from the consultation and coordination requirements of this plan; (4) a provision for Appalachian to preliminarily identify any federally proposed or listed species and proposed or designated critical habitat that may occur in the project boundary using the FWS project review process and IPaC tool (or other tools or processes that may replace these over the new license term); (5) a communication protocol for Appalachian's coordination with FWS and Virginia DWR in advance of non-exempt activities; and (6) a provision for Appalachian to notify FWS and Virginia DWR if unanticipated impacts occur to wildlife habitat (including riparian forest areas).

Neither Interior nor Virginia DWR recommend that Appalachian develop a standalone terrestrial resources protection plan.

Our Analysis

The terrestrial resources protection plan proposed by Appalachian does not contain any specific PM&E measures to address the issues identified by staff, FWS, and Virginia DWR. Additionally, it is unclear what measures would be included in such a plan if developed post-licensing. Because we recommend specific measures for terrestrial resources including a bald eagle protection plan and protection measures for migratory birds, monarch butterfly, and

Indiana, northern long-eared, and tricolored bats, a standalone terrestrial resources protection plan would be unnecessary.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

According to FWS's IPaC system, three federally listed endangered species have the potential to occur at the project: the Roanoke logperch (*Percina rex*), the Indiana bat (*Myotis sodalis*), and the northern long-eared bat (*Myotis septentrionalis*).³⁰ The official list also includes the tricolored bat (*Perimyotis subflavus*), a species proposed for listing as an endangered species.³¹ Additionally, the list includes the monarch butterfly (*Danaus plexippus*), which became a candidate for listing as threatened on December 17, 2020.³² No critical habitat for any federally listed threatened and endangered species occurs within project-affected land.

Roanoke Logperch

The Roanoke logperch, a large darter of the Percidae (perch) family, was listed as federally endangered on July 18, 1989.^{33,34} No critical habitat has been designated for the species. The species is endemic to streams and rivers of the Roanoke, Dan, and Chowan River basins of Virginia and North Carolina (FWS, 2022). It predominately occurs within the Piedmont, as well as the Ridge and Valley physiographic provinces in warm, medium-sized streams. There are 11 designated independent populations, or management units, currently occupied by Roanoke logperch; the Niagara Project is located within the Upper Roanoke River management unit. The most recent Species Status Assessment report for the Roanoke logperch identified four factors as threats to the species: (1) fine-sediment deposition; (2) chronic chemical pollution; (3) dams and other barriers; and (4) climate change (FWS, 2022).

Roanoke logperch have been found at a variety of depths and velocities but primarily occur over silt-free, loosely embedded sand, gravel, and rubble substrate (Burkhead, 1983; Rosenberger, 2002). During the reproductive period in late spring, males are primarily associated with shallow riffles, while spawning females are common in deep runs; adhesive eggs

³⁰ See Commission staff's February 16, 2024 memorandum on *List of Threatened, Endangered, Candidate, and Proposed Species Generated by ECOS-IPaC Website* for the Niagara Project (https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20240216-3037); see also, IPaC, FWS, <https://ipac.ecosphere.fws.gov/>. Staff filed a previous version of the official species list on November 8, 2023.

³¹ 87 Fed. Reg. 56,381 (2022).

³² 85 Fed. Reg. 81,813.

³³ 54 Fed. Reg. 34,468-34,472 (1989).

³⁴ On April 2, 2024, FWS proposed to remove the Roanoke logperch from the *Federal List of Endangered and Threatened Wildlife*. 89 Fed. Reg. 22,649-22,662 (2024).

are buried in gravel substrate (Burkhead, 1983). Young-of-year and juveniles occupy pool and backwater habitats during their first summer and transition to the riffle/run habitats occupied by adults during the fall (Burkhead, 1983; Rosenberger and Angermeier, 2003). Mark-recapture studies found that adults tended to remain within the same short (less than 160 feet) section of a riffle/run over the course of a summer-fall feeding season, but long-distance adult movement events of greater than 1.2 miles have been observed (Roberts et al., 2008), and results from recent genetic marker studies suggest that broader movement occurs extensively throughout a watershed unless prevented by a barrier like a dam (Roberts et al., 2016).

During the previous relicensing of the Niagara Project, three Roanoke logperch individuals were collected during the fall 1990 electrofishing surveys at a riffle/run site located upstream of the confluence of the Roanoke River and Tinker Creek. Three additional individuals, each approximately 110 millimeters in length, were collected from a 0.25-mile reach of riffle/run habitat located 0.5 mile downstream of the project.

As part of the *Fish Community Study*, Appalachian conducted ontogenetic surveys of Roanoke logperch in the project area, both upstream and downstream of the project dam. Survey methods and sampling season varied by lifestage. Snorkel transect surveys were conducted in early and late summer 2021 at eight sites in riffle/run habitat to sample for adults. Seining methods and visual surveys were used to target young-of-year Roanoke logperch in the late summer/fall 2021 at seven sites in low-velocity, shoreline habitat adjacent to riffles. A total of 61 Roanoke logperch were observed in the snorkel surveys (7 juveniles and 54 adults). The mean density for the entire project area was 32 fish per hectare. Mean densities were similar at mainstem Roanoke River sites above and below the project dam (23 and 24 fish per hectare, respectively), with higher mean densities in Tinker Creek (32 fish per hectare) and the project bypassed reach (58 fish per hectare). No young-of-year Roanoke logperch were collected in a total of 140 seine hauls or supplemental visual surveys performed in the project area.

Nighttime drift-net surveys were used to sample Roanoke logperch larvae at five sites between April and June 2022. Numerous morphometric measurements and DNA barcoding were used to identify larvae to the lowest taxonomic level. Surveys yielded 1,122 larval fish, including 105 individuals belonging to the genera *Percina*, three of which were identified as Roanoke logperch. Two of the Roanoke logperch larvae were collected from the most upstream sampling site on the Roanoke River while one individual was collected downstream of the dam near the Blue Ridge Parkway overpass.

Indiana Bat

The federally endangered Indiana bat is native to the northeastern and midwestern U.S., including Virginia. This species typically hibernates in caves and abandoned mineshafts from October through April, and forages and roosts between April and August in riparian, bottomland, or upland forest, and old fields or pastures with scattered trees. Males often remain active later into the season, though most hibernate by November. Females congregate in maternity colonies during early May to late June to bear and raise young, in hollow trees that are alive or dead and often exposed to direct sunlight in upland and riparian forests, pastures, and open wetlands (DeGraaf and Yamasaki, 2001).

Indiana bats roost in dead standing trees with loose bark; preferred species include shagbark hickory, mature white oaks, and other species with loose bark (DeGraaf and Yamasaki, 2001). Individuals may select several trees in a general area and often use one as a primary roost and others as alternate roosts. Optimum foraging habitat includes mature trees that overhang the water by more than 12 feet.

Threats to the survival of Indiana bats include human disturbance (largely at unprotected cave sites), predation by mammals, loss of foraging habitat (particularly old fields and hayfields), collisions at wind energy developments, and natural changes in cave environments that alter conditions. Indiana bats are known to be susceptible to white-nose syndrome, and have experienced severe mortality as a result.

Northern Long-eared Bat

The northern long-eared bat was listed as threatened by the FWS on May 4, 2015,³⁵ and reclassified as an endangered species on November 29, 2022³⁶ with an effective date of March 31, 2023.³⁷ The northern long-eared bat is a medium-sized bat species (3 to 3.7 inches in length) with longer ears than other species in the *Myotis* genus (FWS, 2023). The range of this species covers 37 states, mainly located in the central and eastern regions of the United States, as well as central and southern provinces of Canada, coinciding with the greatest abundance of forested areas.

The northern long-eared bat is found in a variety of forested habitats in the summer season. During this time, bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. In the fall season, northern long-eared bats leave their forested habitat to hibernate in caves, mines, and similar habitat. The bats arrive at hibernacula between August and September, enter hibernation between October and November, and emerge from hibernacula between March and April. Hibernacula and surrounding forest habitats play important roles in the bat's life cycle beyond the time when bats are overwintering, including for fall-swarming³⁸ and spring-staging³⁹ activities. Reproduction is limited to one pup per year in

³⁵ 80 Fed. Reg. 17,974 (2015).

³⁶ 87 Fed. Reg. 73,488 (2022).

³⁷ 88 Fed. Reg. 4,908 (2023).

³⁸ Fall-swarming occurs between summer and winter hibernation. The purposes of swarming behavior include introduction of juveniles to potential hibernacula, copulation, and gathering at stop-over sites on migratory pathways between summer and winter regions.

³⁹ Spring-staging occurs between winter hibernation and migration to summer habitat. During this time, bats begin to gradually emerge from hibernation and exit the hibernacula to feed but re-enter the same or alternative hibernacula to resume daily bouts of torpor (i.e., a state of mental or physical inactivity).

late spring. As such, bat populations can be slow to rebound from anthropogenic and naturally occurring mortality events.

Tricolored Bat

On September 14, 2022, FWS proposed to list the tricolored bat as endangered,⁴⁰ based on the range-wide impacts of white-nose syndrome that have caused estimated declines of more than 90% in affected colonies. Tricolored bats are known to occur in 39 states, including Virginia (FWS, 2021).⁴¹ No critical habitat is being designated because current or threatened destruction, modification, or curtailment of the species' habitat or range is not having large range-wide effects on the species.

Male and female tricolored bats converge at cave and mine entrances between mid-August and mid-October to swarm and mate. During the winter, tricolored bats hibernate in caves and mines, although in some areas where caves are sparse, tricolored bats may hibernate in road-associated culverts and sometimes in tree cavities and abandoned water wells.

During the spring, summer, and fall (i.e., non-hibernating seasons), tricolored bats disperse and primarily roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees. Female tricolored bats exhibit high site fidelity, returning year after year to the same summer roosting locations. Female tricolored bats form maternity colonies and switch roost trees regularly (e.g., between 1.2 days and 7 days at roost trees in Indiana). Females typically give birth to two young between May and July. Limited reproductive potential severely limits the ability of bat populations to respond quickly to perturbations. Forested areas within the Niagara Project boundary may contain suitable habitat for tricolored bat summer roosting, foraging activities, and hibernacula.

Monarch Butterfly

The monarch butterfly is a candidate for listing as a threatened or endangered species under the ESA.⁴² Although no consultation is required under the ESA for candidate species, we include an analysis of potential project effects on the monarch butterfly as part of our NEPA analysis.

Adult monarch butterflies rely on diverse food sources during breeding and migration, including milkweed species (genus *Asclepias*) and nectar-rich flowers. Monarch butterflies are also dependent on milkweed species as host plants during egg-laying and larval development. In eastern North America, the monarch butterfly migrates between Mexico and Canada over a

⁴⁰ 87 Fed. Reg. 56,381 (Sep.14, 2022).

⁴¹ See <https://guides.nynhp.org/tri-colored-bat/> and <https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus>.

⁴² 85 Fed. Reg. 81,813 (2020)

period of two to three successive generations and is present in Virginia during the summer months. The Niagara Project is located within the range of the monarch butterfly.

3.3.4.2 Environmental Effects

Roanoke Logperch

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian develop a Roanoke logperch enhancement plan to outline how Appalachian would work with FWS and Virginia DWR to enhance Roanoke logperch habitat. The plan would be developed in consultation with FWS and Virginia DWR with the goal to provide funds annually to be used for restoration projects to benefit Roanoke logperch. The agencies further recommend that the plan be provided to FWS and Virginia DWR for review within 6 months of license issuance.

In its reply comments, Appalachian states that it believes the plan is unwarranted due to the presence of multiple life stages of Roanoke logperch both upstream and downstream of the project, higher abundance and wider distribution of the species compared to previous studies, and lack of evidence of larval Roanoke logperch entrainment at the project. Appalachian states that continued operation of the project is not likely to adversely affect Roanoke logperch and that its proposal to increase the bypassed reach minimum flow from 8 cfs to 30 cfs will enhance habitat. Further, Appalachian cites FWS's December 2022 recommendation to delist the Roanoke logperch (FWS, 2022) as another reason why an enhancement plan is not needed.

Our Analysis

As described in section 3.3.4.1 *Affected Environment, Roanoke Logperch*, Roanoke logperch are known to use a variety of depths and velocities, with substrates mostly consisting of sand, gravel, and boulders, with some embeddedness. These habitat features are consistent with the type of habitat that may be used by logperch on a seasonal basis. During the 2020 and 2021 fish surveys, Roanoke logperch were observed upstream and downstream of the project dam, including the bypassed reach, where the species had not previously been observed. As described in section 3.3.2.2, *Environmental Effects, Minimum Flows to the Bypassed Reach*, Appalachian's proposal to increase the minimum flow to the bypassed reach from 8 cfs to 30 cfs would further enhance habitat for the Roanoke logperch. Virginia DEQ's certification condition I.D.1, to provide bypassed reach minimum flows of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less) would provide additional habitat for adult and juvenile Roanoke logperch during the high-flow winter and spring months. Although Appalachian did not specifically evaluate habitat suitability for spawning Roanoke logperch, the seasonal 45-cfs flow would also overlap with the species' spring spawning period.

Appalachian's *Fish Impingement and Entrainment Study* indicates that the potential for entrainment and impingement of Roanoke logperch at the project is low, as the species is unlikely to occur in the impoundment near the intakes. Although no Roanoke logperch larvae were collected from the impoundment during the larval drift survey, larvae of almost all members of the *Percina* genus drift downstream on river currents for several days after hatching (Buckwalter et al., 2019), although drift distances for Roanoke logperch larvae are not well known. Genetic analysis of Roanoke logperch indicated that over their lifetime, Roanoke

logperch may disperse up to 50 miles (Roberts et al., 2013); however, median lifetime dispersal distance is 3.7 to 15 miles (Roberts et al., 2016). In their comments on the REA Notice, Drs. Paul Angermeier and Eric Hallerman of Virginia Tech state that, based on their professional opinion, larvae likely drift downstream for at least 0.6 mile from where their eggs are deposited. Hence, larvae spawned in Tinker Creek or the Roanoke River upstream of the Niagara Project may drift into the project impoundment and die due to lack of suitable habitat or be susceptible to entrainment through the project's turbines.

Turbine-passage mortality among fish early life stages can be very difficult to estimate directly (EPRI, 1992), and most larvae of riverine fishes die before they reach the juvenile stage (Houde, 2002), thereby making it difficult to discern larval entrainment losses and natural losses. However, those early life stages that are spawned upstream tend to drift downstream and may be entrained in the turbine intake flow and weakly swimming early larvae are the most susceptible stages among resident fish species (Cada, 1991). In their comments, Drs. Angermeier and Hallerman extrapolate estimated volumetric densities of Roanoke logperch larvae from the upstream larval drift sampling site to estimate that 31,110 Roanoke logperch larvae could annually drift into the Niagara Project impoundment, of which they further estimate that approximately 5% (1,556) would normally be expected to survive to reach adulthood but would likely be killed due to the presence of the project. However, they acknowledge that their estimate is based on several assumptions, including that all larvae from the site drifted downstream into the impoundment.

It is likely that, of the larvae drifting downstream, only a portion would be affected by project operation through entrainment. Larvae that would die due to the lack of suitable habitat in the project impoundment would do so even if the Niagara Project were not operational. As described above, juvenile and adult Roanoke logperch are unlikely to occur in the impoundment near the intakes and at low risk for entrainment and impingement. While flows to the bypassed reach would still be reduced relative to natural river flows, the proposed 30-cfs minimum flow, as well as the seasonal (January 1 through June 30) 45-cfs minimum flow required by the certification, would enhance habitat for Roanoke logperch relative to the current minimum flow of 8 cfs. Therefore, the continued operation of the Niagara Project, as proposed with additional staff recommended measures, may affect but is not likely to adversely affect existing populations of the Roanoke logperch in the upper Roanoke River watershed.

FWS and Virginia DWR do not identify specific measures or restoration projects that would be included in an enhancement plan or how much funds would be allocated annually for such projects. In the absence of specific measures, it is unclear what benefits Interior's and Virginia DWR's recommended enhancement plan would have on the Roanoke logperch.

Indiana, Northern Long-eared, and Tricolored Bats

Uplands within the project boundary may provide suitable summer roosting and feeding habitat for Indiana, northern long-eared, and tricolored bats. Appalachian proposes recreation enhancements to the Tinker Creek canoe launch, the boat take-out facility, the portage route, and a possible relocation of the existing boat put-in facility, which may require removal of trees

during the lifetime of the license. Also, routine project maintenance, including occasional hazard tree removal, could affect summer roosting habitat for these bat species.

Appalachian did not propose any specific measures to protect Indiana, northern long-eared, and tricolored bats, but instead proposes to develop a terrestrial resources protection plan as described in section 3.3.3.2, *Environmental Effects, Terrestrial Resources Protection Plan*. The plan would include provisions for identifying federally listed or proposed species and critical habitats and activities that could disturb wildlife including bats, communication protocols with the resource agencies, and activities that would be exempt from consultation and coordination with the agencies.

Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian implement a protocol to prevent any harm to listed bats where Appalachian can either avoid tree-removal activities related to the Niagara Project from April 1 to November 14; or conduct bat emergence surveys to determine if bats are using potential roost trees that need to be removed. For the latest survey guidelines, Interior and Virginia DWR recommend that Appalachian follow the protocol in “Appendix E Phase 4 Emergence Surveys” from “Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines”⁴³ and state that if no bats are seen during the exit surveys, tree(s) may be removed within 24 hours. In the event of public safety concerns or other emergencies (i.e., the presence of hazard trees that pose a threat to the safe operation of the project), Interior and Virginia DWR recommend that Appalachian informs the FWS and the Virginia DWR of the emergency action and provides details of the action after completion.

Our Analysis

Indiana and Northern Long-eared Bats

Suitable summer habitat for Indiana and northern long-eared bats is present within the project boundary. Proposed recreation enhancements at the Niagara Project would result in some tree removal, and additional occasional tree removal may be necessary in the future as part of routine maintenance over the life of the project. Including a time-of-year restriction on tree clearing during the bats’ active season, as recommended by Interior and Virginia DWR, would minimize effects to Indiana and northern long-eared bats over the term of any license issued for the project without the need for conducting bat exit surveys. Therefore, we conclude that relicensing the Niagara Project, with Interior’s and Virginia DWR’s 10(j) recommendation for a time-of-year restriction on tree-clearing activity between April 1 and November 14, is not likely to adversely affect Indiana and northern long-eared bats.

On February 15, 2024, Commission staff accessed the IPaC system to use FWS’s Northern Long-eared Bat Rangewide Determination Key (DKey) to evaluate the project’s effects and seek concurrence on our conclusion that the project may affect, but is not likely to adversely

⁴³ <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

affect, the northern long-eared bat. We received an electronic concurrence letter through the IPaC system and placed the letter on the record the following day.⁴⁴

Tricolored Bat

Based on FWS's and Virginia DWR's range information, tricolored bats may also occur within the project boundary or be affected by the project.⁴⁵ Recreation enhancements and project maintenance activities that may affect the tricolored bat are the same as those noted above for Indiana and northern long-eared bats. Interior's and Virginia DWR's section 10(j) recommendations to include a time-of-year restriction on tree clearing from April 1 through November 14 would minimize effects to tricolored bat habitat and individuals during the tricolored bat pup season. Because recreation enhancements and project maintenance would involve little tree removal in upland habitat, we conclude that relicensing the Niagara Project, with the recommended time-of-year restriction on tree clearing, is not likely to jeopardize the continued existence of the tricolored bat.

Monarch Butterfly

Appalachian does not propose any specific measures for the protection of the monarch butterfly. Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian does not conduct vegetation management activities during the monarch butterfly breeding season (spring through early fall) where the monarch caterpillar host plant, milkweed (*Asclepias* sp.), is present. Based on the growing season for milkweed species in Virginia⁴⁶ and that monarch butterfly reproduction is dependent upon the presence of milkweed species, staff estimate that the monarch butterfly breeding season in the project area would be April 1 through September 30. In its reply comments, Appalachian states that the measure would be unduly restrictive, and that not mowing for an entire summer season is impracticable because routine mowing is necessary to manage facility grounds and to facilitate safe employee access.

Our Analysis

Milkweed species and monarch butterflies have been recorded within less than 1 mile from the project boundary. As described above, Appalachian proposes recreation enhancements and project maintenance that could affect monarch butterfly habitat, although little maintenance

⁴⁴ See Commission staff's February 16, 2024 memorandum on *Concurrence Letter for the Project Under the Northern Long-eared Bat Rangewide Determination Key*. Generated by ECOS-IPaC Website on February 15, 2024 at https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20240216-3034; see also, IPaC, FWS, <https://ipac.ecosphere.fws.gov/>.

⁴⁵ See <https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus> and <https://dwr.virginia.gov/wildlife/information/tri-colored-bat>.

⁴⁶ See <https://plants.usda.gov/> (fact sheets for common milkweed, butterfly milkweed, and swamp milkweed).

of upland habitat within the project boundary that may support milkweed species would be expected.

Overall, project effects on monarch butterfly due to project construction and maintenance would be expected to be limited in scope and extent. Current vegetation maintenance activities in the vicinity of the Niagara Project facilities (such as mowing) are conducted on a routine basis during the growing season. Therefore, it is unlikely that extensive stands of milkweed are present for monarch butterfly reproduction or foraging within the managed areas of the project. In areas within the Niagara Project boundary outside of routinely maintained areas, potential monarch butterfly habitat would not likely be disturbed during the growing season. Interior and Virginia DWR's recommendations would provide further assurance that any milkweed stands that grow in currently non-maintained areas are not disturbed during monarch butterfly reproduction, and that the effects of the Niagara Project on monarch butterflies would be minimal.

3.3.4.3 Cumulative Effects on Threatened and Endangered Species

Roanoke Logperch

Developmental activities have had, and continue to have, varying effects on the Roanoke River and the aquatic community that it supports, including the Roanoke logperch. As described in section 3.3.4.1, *Affected Environment, Roanoke logperch*, populations of Roanoke logperch are vulnerable due to the operation of hydroelectric projects, the presence of other dams and barriers that isolate populations, and water withdrawals, among other activities that occur in the watershed. The Niagara dam, as well as other dams in the watershed, would continue to represent a habitat barrier between individual populations of logperch. As described in 3.3.4.2, *Environmental Effects, Roanoke logperch*, Roanoke logperch larvae produced upstream of dams may become entrained or may be unable to find suitable habitat if they drift into impoundments/reservoirs. Similarly, adults and juveniles downstream of the dam would be blocked from habitats further upstream.

As described in section 3.3.4.1, *Affected Environment, Roanoke logperch*, Roanoke logperch were documented upstream and downstream of the Niagara dam during the 2020 and 2021 survey efforts. Overall, the results of the study indicate that the species is more abundant within the project area compared to when surveys were last conducted in the 1990s. In addition, the species had not previously been documented in the Niagara Project's bypassed reach. Appalachian's proposed increase to the minimum flow in the bypassed reach from 8 cfs to 30 cfs, along with the certification condition that would require seasonal (January 1 through June 30) flows of 45 cfs, would further enhance Roanoke logperch habitat in the bypassed reach, while its proposal to continue to operate the project in a run-of-river mode would result in minimal disruption to the hydrologic regime downstream of the bypassed reach. Therefore, the relicensing of the Niagara Project with the proposed measures described above would result in an overall positive cumulative effect on Roanoke logperch habitat access in the Roanoke River relative to the existing operation.

3.3.5 Recreation Resources

3.3.5.1 Affected Environment

Regional and Local Recreation

The Niagara Project is located within the Roanoke Region of Virginia where 120 miles of the 2,175-mile-long Appalachian Trail wind through and approximately 2-3 million people hike per year. The Roanoke River, which runs 410 miles through southern Virginia and northeastern North Carolina is an important recreation resource in the region providing opportunities for canoeing, kayaking, tubing, viewing wildlife, and fishing. The Roanoke River Blueway water trail provides about 45 miles of recreational access to the river.

The Roanoke Valley Greenway is a network of over 400 miles of paved and natural surface trails that offers recreational opportunities including hiking, biking, and scenic viewing throughout the Roanoke Valley. There are six greenways within the project vicinity including the Wolf Creek Greenway, Mill Mountain Greenway, Garden City Greenway, Tinker Creek Greenway, Glade Creek Greenway, and Roanoke River Greenway.

The Blue Ridge Parkway includes 469 miles of roadway and over 369 miles of hiking trails that connect Shenandoah National Park in Virginia to Great Smoky Mountains National Park in North Carolina (National Park Service, 2021) and abuts the eastern edge of the Niagara Project boundary.

Approximately 3 miles downstream of the project dam on the west side of the river is Rutrough Point, which includes a parking area and boat ramp facility. Explore Park, managed by Roanoke County, is located 1 mile downstream of the project and includes 1,100 acres of land providing outdoor activities including hiking, tubing, mountain biking, fishing, camping, and an adventure course.

Approximately 2 miles upstream of the Niagara Project is Tinker Creek, a tributary to the Roanoke River. The Town of Vinton maintains a boat launch area on Tinker Creek, located 0.33 mile upstream of the confluence with the Roanoke River. The area includes a concrete boat ramp; canoe rack; informational kiosk; a paved parking lot with five allotted spaces for boaters, including one space for individuals with disabilities; and a picnic area. The facility is partially located within the project boundary and provides access to the project's impoundment. Appalachian's 2019 Recreation Study (Recreation Study) ⁴⁷ found that the facilities were well maintained although there was some erosion along the embankment at the base of the boat ramp.

The 0.35-mile-long Roanoke River Trail on the west side of the river begins at Roanoke River Overlook, off Blue Ridge Parkway Road. The trailhead provides short term parking for 35 vehicles. The Roanoke River Trail and the Roanoke River Overlook are within Blue Ridge Parkway and are owned and maintained by the Park Service. The trail is steep and consists of three segments; the upper segment is paved with asphalt, the second segment is a gravel surface,

⁴⁷ License Application, Appendix G.

and the last segment consists of 200 timber steps leading down to the river. Appalachian's Recreation Study found that recreationists use the trail to gain access to the project's bypassed reach to recreate along the shoreline including the launching of boats, and that while bringing a boat down the trail is difficult, it is doable. The Recreation Study indicates that boaters use this area as a boat put-in due to the difficulty of accessing the river from the north side. The study results documented that informal trails have been created by recreationists who want to access the project's bypassed reach.

The 2018 Virginia Outdoors Plan states that between 2011 and 2017 freshwater fishing recreation increased by 10%, canoeing/kayaking by 9%, tubing by 8%, and paddle boarding by 6% (Rhur, et al., 2018). The 2018 Virginia Outdoors Plan identified that the "Most-Needed Outdoor Recreation Opportunities" for the Roanoke Valley-Alleghany region is access to natural areas (59%) (table C-6).

Project Recreation

Project recreation facilities include a boat take-out and portage trail on the north side of the river that are only accessible to individuals boating down the river and by pedestrians accessing the area via the project access road gate⁴⁸ located 0.4 mile north of the boat take-out facility. The boat take-out is approximately 300 feet upstream of the project dam and is constructed of earth-filled timber steps leading up a steep embankment with a hand hold made of rope on one side. The Recreation Study indicated that the boat take-out is not well marked and that using the steps is difficult due to the steep slope and fluctuating water levels. Both sides of the boat take-out are used for informal bank fishing, although such opportunities are limited given the restricted access to the project area.

The 1,600-foot-long portage trail follows the project access road, of which an 800-foot-long portion runs parallel to a railroad track owned and operated by CSX. Once the project access road ends, the portage trail extends an additional 272 feet,⁴⁹ traversing a worn path through a natural mulch and grassy area to a non-project boat put-in facility (figure C-6). This portion of the portage route and the boat put-in are within the Blue Ridge Parkway. The Recreation Study found that the signs along the portage trail are worn and should be replaced and relocated for improved visibility for recreationists.

The boat put-in facility is not well defined and consists of large flat rocks that boaters must cross to enter the river. The Recreation Study found that the boat put-in area was commonly covered in debris, likely due to high river flows. Bank fishing near the put-in was documented along the shoreline although opportunities are limited due to access limitations. The only formal access to the boat put-in area is from the portage trail. However, discussions with recreationists during on-site visitor use monitoring indicated that access to the portage put-in

⁴⁸ The project access road gate is locked limiting vehicle access to project personnel. While the locked gate restricts vehicles from continuing down the road there is space on either side for pedestrians to pass the gate and walk down the hill.

⁴⁹ Distance estimated by Commission staff.

area can also be gained from steep informal paths from a nearby residential area and from the Blue Ridge Parkway.

Recreational Visitation and Use

As part of its Recreation Study, Appalachian evaluated current recreational use via on-site monitoring and visitor use surveys, documented the condition and accessibility features of recreational facilities in the project area, and evaluated opportunities and constraints of project operation to providing downstream boating flows.

Recreation Use

On-site visitor use was monitored at the Roanoke River Trail, Tinker Creek canoe launch, and Rutrough Point by documenting the number of vehicles present, number of individuals observed, and which activities visitors were engaged in (table C-7). Use of the boat put-in facility was documented by monitors who observed recreational activity from the Roanoke River Trail and from a trail camera placed at the boat put-in area. The trail camera was in place from May through October 2021; 70 individuals were observed during this time (table C-8). The most popular recreational activities were non-motorized boating (e.g., canoe, kayak, etc.) and fishing (65% and 17%, respectively) with April, May, and June being the most popular months to visit.

User Surveys

Monitors collected on-site visitor surveys at the Roanoke River Trail 19 times from March through May 2021,⁵⁰ and at Rutrough Point and Tinker Creek canoe launch 13 times in May through October 2021.⁵¹ Additionally, an online survey was available from April 2020 through October 2021. The most popular recreational activities in the project area were non-motorized boating (e.g., canoe, kayak, etc.) and fishing (65% and 17%, respectively) with April, May, and June being the most popular months to visit. Most respondents rated the overall recreational experience as acceptable (65%). Common themes from the survey comments included users wanting improvements to the portage facilities, increased public access, recreational flow releases, and trash pick-up.

⁵⁰ The Roanoke River Trail was closed for construction beginning May 24, 2021, therefore on-site surveys did not occur past that date.

⁵¹ The Recreation Study was designed to collect in-person surveys at each site on 2 days per month in May through October 2020 (14 times total at each site). Due to shelter-in-place requirements in response to the COVID-19 pandemic the in-person surveying efforts were rescheduled to occur in 2021.

Recreational Flow Release

Within approximately 40 miles of the project there are 44 different whitewater opportunities available to boaters⁵² that provide experiences from class I to V.⁵³ Two river gages near the project⁵⁴ provide real time river flow data via the USGS river flow monitoring website.⁵⁵ Additionally, the National Oceanic and Atmospheric Administration's Advanced Hydrologic Prediction Service provides predicted river flows up to 5 days out.⁵⁶ Boaters can use the online flow information to determine whether river flow at the project would provide an enjoyable boating experience. Ideal river flow for non-motorized boating on the Roanoke River range from 150 to 250 cfs with the river becoming unsafe for boating at around 400 cfs (Roanoke Mountain Adventures, n.d.). Flows vary seasonally, with the highest mean flows occurring in April and the lowest mean flows occurring in August (figure C-3). On average, the maximum hydraulic capacity of the project (i.e., 684 cfs) plus the minimum 8-cfs bypassed reach flow (total flow of 692 cfs) is exceeded approximately 20% of the time annually.

Appalachian conducted a desktop evaluation study to assess the potential for project operation to support controlled flow releases to enhance boating opportunities starting in the project's bypassed reach downstream to Rutrough Point (approximately 3 miles). Appalachian concluded that to providing controlled recreational flow releases would require the project to operate in a peaking or pulse mode, which would be non-compliant with the run-of-river, minimum flow requirements, and impoundment limits of its current license.

⁵² American Whitewater, River Index;

<https://www.americanwhitewater.org/content/River/view/river-index>

⁵³ The American version of the International Scale of River Difficulty includes six classifications of whitewater rivers. Class I-beginner, class II-advanced beginner, class III-intermediate, class IV-advanced, class V-expert, class VI-extreme. These classifications define the challenge level of a river as well as the experience level of a boater (i.e., a class IV boater would be comfortable running a class I, II, III, or IV river).

https://www.americanwhitewater.org/content/Wiki/safety:start?#vi._international_scale_of_river_difficulty.

⁵⁴ USGS Gage No. 02055080 is located approximately 3 miles upstream of the project and USGS Gage No. 02056000 is located downstream at the confluence of the river with the bypassed reach.

⁵⁵ USGS National Water Information System; <https://waterdata.usgs.gov/monitoring-location/02055080> and <https://waterdata.usgs.gov/monitoring-location/02056000>.

⁵⁶ Hydrograph, Roanoke River at Roanoke; <https://water.weather.gov/ahps2/hydrograph.php?gage=RONV2>

3.3.5.2 Environmental Effects

Recreation Management Plan

Appalachian proposes to develop and implement an RMP in consultation with project stakeholders that would include: (1) descriptions and locations of recreation facilities in the project area, (2) new informational signage at the Tinker Creek canoe launch about the Niagara Project portage facilities and other local recreation opportunities, (3) improvements to the boat take-out facility (e.g., replacement of steps, bank stabilization); (4) improvements to the portage route (e.g., grading, additional gravel); (5) a conditional requirement to relocate the existing boat put-in facility upstream within the project boundary near the project tailrace if Park Service-owned lands are no longer an option for this facility; (6) updated project signage related to recreation amenities as well as emergency contact information; (7) participation in and promotion of river cleanups led by other organizations; and (8) development of a website with information about downstream flows and recreational opportunities in the project area.

In addition to Appalachian's proposed measures, the Blueway Committee recommends that the RMP include: (1) maps of recreation facilities within or adjacent to the project boundary; (2) descriptions of ownership and management of each facility; and (3) coordination and consultation measures for development of non-project recreation facilities within the project boundary.

The Roanoke Outside Foundation recommends that certain stakeholders be included in the development of the RMP, including: (1) Park Service; (2) Roanoke County; (3) Town of Vinton; (4) City of Roanoke; (5) Blueway Committee; (6) Roanoke Valley Greenway Commission; (7) Roanoke Outside Foundation; (8) FORVA; (9) Virginia Department of Conservation and Recreation; (10) Virginia DWR; and (11) FWS.

Roanoke County and the Town of Vinton recommend that the RMP include an implementation schedule and completion date for all proposed recreation improvements. Roanoke County and the Town of Vinton also state that the ongoing development and expansion of recreational access within the region (e.g., Roanoke Valley Greenway, Roanoke Valley Blueway, etc.) is expected to attract additional residents and recreational visitors to the region thus increasing demand for recreational amenities. Therefore, they recommend that Appalachian develop a recreational monitoring plan to survey recreational use from April through October every 5 years to assess ongoing use and demand of recreational opportunities in the project area. Roanoke County states that conducting recreational surveying every 5 years would also provide an opportunity for Appalachian to modify or add recreation assets to the project.

In its reply comments, Appalachian states that conducting recreational monitoring every 5 years is unnecessary, and a financial burden given the limited recreation facilities available at the project and instead proposes conducting recreational monitoring every 10 to 20 years.

Our Analysis

Regional recreation opportunities have been expanding as a result of local efforts to develop recreational corridors by connecting natural areas (e.g., greenways, blueways, etc.).

The population of Roanoke County increased by 4.9% between 2010 and 2020 (United States Census Bureau, n.d.) and is projected to increase by 3.2% between 2020 and 2030 and by 4% between 2030 and 2040 (University of Virginia Weldon Cooper Center for Public Service, 2022). Additionally, over recent years there has been an increase of participation in water-based recreation activities (Rhur, 2018) and improved recreational access to the Roanoke River via the development of local greenways and blueways. The continued development and expansion of region-wide recreation opportunities has widespread support among state and local agencies and public stakeholder groups.

While the Recreation Study results indicate current use of recreational facilities in the project area is well below capacity, the anticipated population increase along with the continued expansion of local recreational access would likely result in an increase in demand and use for recreational amenities within the Roanoke Valley-Alleghany Region. Developing, distributing, and analyzing visitor surveys is costly and time intensive and conducting the survey process every 5 years for the duration of a license (30 to 50 years) would be burdensome. Recreationalists' needs and opinions are unlikely to noticeably change every 5 years over such a long period at a project with few recreation amenities, such as the Niagara Project. However, conducting periodic recreational surveys would help determine whether an increase in recreational demand and use is occurring and if so, whether additional recreational amenities are warranted. Conducting an initial recreation survey 5 years after the recommended recreation facility improvements have been completed would provide timely feedback from users and would allow any additional recreation facility improvements to be completed in a timely manner. Additionally, conducting a recreation survey every 10 years after the initial survey would provide useful information about the potential change in recreation use in the project area over an extended period.

An RMP is developed by a licensee to describe its commitment to develop and manage project recreation facilities throughout a project's license term. An RMP is most effective when it is detailed and is developed in cooperation with interested stakeholders. Incorporating the additional elements recommended by stakeholders (i.e., maps of recreation facilities within or adjacent to the project boundary, descriptions of ownership and management of each facility, coordination and consultation measures for development of non-project recreation facilities within the project boundary, including specific stakeholders during the development of the RMP, and conducting periodic recreational surveys) into Appalachian's proposed RMP would provide comprehensive documentation of Appalachian's responsibilities related to recreation and would aid in future decision making related to recreation facilities at the project.

Portage Facilities

Appalachian's online survey results from the Recreation Study indicate strong support for improvements to the portage facilities including enhancements to the take-out area (e.g., stable

up-slope infrastructure, stronger handrails, etc.), providing a means to transport boats along the portage trail (e.g., cart, trolley, boat dragging lane, etc.), and providing formal access to the river in addition to the existing portage trail (i.e., to the existing put-in or from a new put-in on the south side of the river).

Take-out Facility and Portage Route

As part of the RMP, Appalachian would improve the boat take-out facility by replacing the stairs leading up the embankment, installing a handrail, stabilizing the embankment, and adding directional signage. Additionally, Appalachian would improve the portage trail by grading the surface and laying additional gravel where needed and installing wayfinding signage.

No agencies or stakeholders filed comments or recommendations on Appalachian's proposed enhancements to the boat take-out facility.

Put-in Facility

As part of the RMP, Appalachian would relocate the existing boat put-in facility upstream within the project boundary near the project tailrace if Park Service lands are no longer an option for this facility.

The Park Service states that the existing boat put-in location on the north side of the river is unsafe and hazardous for boaters due to changing water levels, recurring washouts, and accumulation of debris, and accessing the site is difficult for Park Service maintenance and law enforcement staff. The Park Service states that due to the challenging conditions of the boat put-in recreationists instead choose to enter the river on the south side at the base of the Roanoke River Trail. The Park Service recommends that any future boat put-in facility be designed to accommodate changing water levels and washouts and specifies that construction of infrastructure on Park Service lands should be avoided. The Park Service recommends a boat put-in facility be developed within the project boundary.

The Park Service states that although Appalachian requested permission to construct physical improvements to the existing boat put-in facility by obtaining a Special Use Permit (SUP),⁵⁷ a SUP is not an appropriate instrument for granting long-term use of park land. The Park Service states that Appalachian is responsible for installing and maintaining safe recreational boating access, and a means exists to do so safely on Appalachian's property without the need for infrastructure on federal lands. Additionally, the Park Service indicates that, if the boat put-in facility is constructed within the Niagara Project boundary, it offered to collaborate with Appalachian to develop signage that discourages boaters from accessing undeveloped areas on Park Service land.

In conjunction with the Park Service, Roanoke County, the Town of Vinton, the Roanoke Outside Foundation, the Blueway Committee, Interior, and Virginia DWR also recommend that,

⁵⁷ Park Service letter filed on August 28, 2023. Accession No. 20230828-5185.

in consultation with the stakeholders,⁵⁸ Appalachian construct a boat put-in facility within the project boundary within 2 years of license issuance.

In its reply comments, Appalachian states that constructing a boat put-in facility within the project boundary would be challenging because the steep riprap covered shoreline would require extensive modification. The facility would also need to withstand the high volumes of turbulent water being released from the powerhouse.

Our Analysis

In its RMP, Appalachian proposes to improve the boat take-out facility by replacing the steps, installing a handrail, stabilizing the embankment, and installing new safety and directional signage. The boat take-out facility is difficult for boaters to locate due to lack of signage and is unsafe for boaters to use because of the dilapidated state of the stairs and instability of the embankment. Replacement of the stairs and installation of a handrail would provide boaters with additional stability when exiting the river and installing additional signage would improve the ability of boaters to locate the boat take-out and help prevent boaters from potentially passing the take-out and traveling close to or over the spillway. Stabilizing the embankment would also help prevent boaters and anglers from potentially slipping and falling into the river.

Approximately 272 feet⁵⁹ of the portage trail and the boat put-in facility are on Blue Ridge Parkway property. The current boat put-in location is not formally defined (e.g., no physical structure or obvious location such as a beach to launch boats) resulting in recreationists determining the best location to place boats in the river. The shoreline in this area consists of large flat rocks that become slippery when wet and are often covered in debris left from upstream high flows creating a public safety hazard.

Due to the extent of the project boundary, the maximum distance a boat put-in facility could be sited from a Niagara Project facility (i.e., the powerhouse) is approximately 200 feet. Constructing a boat put-in facility within the project boundary would eliminate the need for a boat put-in facility on Park Service land, would improve Appalachian's ability to implement facility improvements, and would clarify responsibility for operation and maintenance of the facility. Although Appalachian had expressed concern with relocating the boat put-in within the project boundary because of the challenging terrain of the embankment (e.g., steep, susceptible to erosion, etc.) and proximity to the powerhouse, the boat put-in could be constructed with sturdy material (e.g., concrete ramp) intended to withstand the continual water currents from the bypassed reach and the powerhouse. Providing a formal boat put-in facility would allow boaters to easily locate safe access into the river without the need to traverse along slippery rock surfaces risking injury.

⁵⁸ Identified stakeholders include, but are not limited to, Park Service, Blueway Committee, Roanoke County, Town of Vinton, City of Roanoke, Roanoke Outside Foundation, Roanoke Valley Greenway Commission, FORVA, FWS, and Virginia DWR.

⁵⁹ *Supra* note 43.

Recreational Flow Release

Roanoke County, Roanoke River Blueway Committee, and Roanoke Outside Foundation expressed concern that the impoundment storage volume curve was developed using old data (collected in 1989) to assess the feasibility of providing recreation flow releases. Roanoke Outside Foundation is concerned that the impoundment storage capacity⁶⁰ could have changed over the past 30 years due to sedimentation and if so, how that could affect the study's conclusions. Roanoke County and Roanoke Outside Foundation recommend that Appalachian update the field and mapping surveys used to calculate the project's water volume and use the updated data to continue evaluating the possibility of providing controlled recreational flow releases.

Additionally, the Town of Vinton recommends that Appalachian continue evaluating the possibility of controlled recreational flow releases downstream of the project dam to Explore Park's Rutrough Point.⁶¹

In its reply comments, Appalachian states that to accommodate recreation flow releases it would have to deviate from run-of-river operation and operate the impoundment over a wider range of elevations, potentially affecting upstream riparian, aquatic, aesthetic, and natural resources. Appalachian also states that sediment accumulation in the impoundment would not impact project flows. Additionally, Appalachian states that project outflows typically exceed 300 cfs, thereby supporting downstream paddling and that publishing flow information online, as proposed within the RMP, would enhance the public's ability to take advantage of available flows. Therefore, Appalachian is not proposing to provide recreational flow releases.

Our Analysis

A field survey conducted by Appalachian (1991) found that the impoundment storage volume had decreased less than 4% since 1972. The survey concluded that sediment accumulation rates through the upcoming license term (1994 – 2024) would proceed at a further reduced rate.⁶² Therefore, sediment build-up in the impoundment alone would not appear to measurably impact any ability of the project to provide controlled recreation flow releases.

Under its current license the project operates in run-of-river mode meaning Appalachian does not have the ability to provide controlled releases downstream. Nevertheless, based on the results of the Recreational Flow Release Desktop Evaluation conducted by Appalachian, short-term recreational flow releases ranging from 305 to 684 cfs could be provided as a flow pulse for

⁶⁰ Appalachian states that the gross storage capacity of the project impoundment is 425-acre-feet, and the surface area is 62 acres. License application, section A.2.1.9, table A.2-1, page A-6.

⁶¹ The Town of Vinton did not provide a timeline for how long Appalachian should continue evaluating providing controlled recreational flow releases at the Niagara Project.

⁶² License application, section E.8.1.4, page E-36.

somewhere between 1 hour and 3.5 hours depending on the number of units generating and the available impoundment storage volume. However, deviating from run-of-river operation could result in adverse impacts to upstream riparian, aquatic, aesthetic, and natural resources. Additionally, providing controlled recreational flow releases when recreation use is high (summer to early fall) would occur when river flow is already low due to lack of rainfall and introducing additional water level variations could intensify any adverse impacts to river resources.

Based on a local rafting outfitter the flow recommended for an optimal boating experience within the project area ranges from 150 to 250 cfs for beginners to 250 to 400 cfs for intermediate rafters (Roanoke Mountain Adventures, n.d.). Data from USGS gage No. 02056000 downstream of the project show that annual median flows between 1994 and 2020 were within the optimal boating range approximately 5 months out of the year, July through November, or 42% of the time annually. Therefore, boaters are able to boat the Roanoke River downstream of the project at levels considered to be optimal without altering the current mode of operation.

3.3.6 Aesthetic Resources

3.3.6.1 Affected Environment

The Niagara Project is located along the western border of Blue Ridge Parkway. Blue Ridge Parkway was designated an All-American Road in 1996⁶³ and is known for its spectacular scenic views of landscapes, waterfalls, and foliage displays. The 469-mile-long route offers 382 overlooks for visitors to pull over and enjoy the sprawling landscape. In the 2018 Virginia Outdoors Plan, driving for pleasure is recognized as a top recreation activity; thus, protecting and maintaining the visual experience along the Blue Ridge Parkway is important.

Project facilities can be viewed by pedestrians and motorists from the west side of the Blue Ridge Parkway bridge approximately 500 feet downstream of the powerhouse. Visitors can also view the project from the Roanoke River Trail on the south side of the river and from the portage trail and boat put-in area on the north side of the river.

3.3.6.2 Environmental Effects

Appalachian proposes to increase the minimum flow into the bypassed reach from 8 cfs to 30 cfs, which would result in slightly increased wetting of the bypassed reach during low-flow months. Virginia DEQ's certification condition would require Appalachian to provide minimum flows to the bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31.

⁶³ A byway is designated as an All-American Road if it meets criteria for at least two intrinsic qualities that are nationally significant (i.e., archeological, cultural, historic, natural, recreational, and scenic) and has one-of-a-kind features that do not exist elsewhere (United States Department of Transportation Federal Highway Administration, n.d.).

Our Analysis

Appalachian conducted an Aesthetic Flow Study to document the aesthetic qualities of the project. The study documented views of the dam from three key observation points (KOPs): (1) the Roanoke River Outlook parking area (KOP-1), (2) a bench midway down the Roanoke River Trail, (KOP-2) and (3) the bottom of the steps at the end of the Roanoke River Trail (KOP-3). Additionally, the visitor survey, conducted as part of the recreation study, requested visitor opinions regarding views of the project.

Photos and videos were collected 10 times under a range of flow conditions (table C-9). The study found that during fall through spring (October through April) when leaves have fallen from the trees creating an open viewshed aesthetically pleasing views of the spillway and bypassed reach were available from all three KOPs. During spring and summer (May through September) views of the bypassed reach and powerhouse from KOP-2 were obstructed due to vegetative growth. Overall, the study concluded that the optimal time for viewing the spillway and bypassed reach is October through early November when leaves are changing colors and falling, creating an unobstructed viewshed.

The results of the visitor survey indicate that recreationists enjoy views of the project from the Roanoke River Trail and Blue Ridge Parkway regardless of flow conditions or time of year. Appalachian's proposal to increase the minimum flow from 8 cfs to 30 cfs would increase the amount of water consistently present in the bypassed reach which could improve the aesthetic experience for visitors. Virginia DEQ's certification condition would provide for additional minimum flows (45 cfs) from January 1 through June 30. Additionally, the measures proposed by Appalachian and Commission staff, as described in section 2.2, *Applicant's Proposal*, and section 2.3, *Staff Alternative*, respectively, would result in minor changes to the landscape within the project area.

3.3.7 Cultural Resources

3.3.7.1 Affected Environment

Section 106 of the NHPA requires that the Commission take into account the effects of its action on historic properties and afford the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the undertaking.⁶⁴ Historic properties are those that are listed or eligible for listing in the National Register of Historic Places (National Register). The regulations implementing section 106 of the NHPA also require that the Commission seek concurrence with the Virginia State Department of Historic Resources, which functions as the Virginia SHPO, on any finding involving effects or no effects on historic properties and consult with interested Indian Tribes or Native Hawaiian organizations that attach religious or cultural significance to historic properties that may be affected by an undertaking. In this document, we also use the term "cultural resources" for properties that have not been determined eligible for listing in the National Register. Cultural resources represent things,

⁶⁴ The undertaking is the potential issuance of a new license for the Niagara Project.

structures, places, or archaeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic.

Area of Potential Effects

Pursuant to section 106 of the NHPA, the Commission must take into account whether any historic property could be affected by the issuance of a license within a project's area of potential effects (APE). The APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist."⁶⁵ For the Niagara Project, the APE includes the lands within the project boundary and lands outside of the project boundary where project-related activities conducted in accordance with any license issued by the Commission could cause changes in the character or use of historic properties.

In a letter filed September 9, 2020 (September 9 letter), Appalachian requested concurrence on its proposed APE from the Virginia SHPO, Advisory Council, Park Service, Bureau of Indian Affairs, the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, the Pamunkey Indian Tribe, the Eastern Band of Cherokee Indians, the Cherokee Nation, and the Archaeological Society of Virginia. The Virginia SHPO and the Pamunkey Indian Tribe concurred with the proposed definition of the APE.⁶⁶ No other comments on the proposed APE were received by Appalachian.

Tribal Consultation

The Commission initiated Tribal consultation with the Catawba Indian Nation, the Delaware Nation, and the Monacan Indian Nation by letter issued April 25, 2018, and with the Pamunkey Indian Tribe by letter issued April 19, 2019. The Delaware Nation responded to Commission staff indicating that the Delaware Nation concurs with the proceeding, would like to be consulted on the project, and should be contacted immediately if any discoveries arise. The Monacan Indian Nation responded to Commission staff indicating that the Monacan Indian Nation is not opposed to the relicensing of the project nor does it intend to initiate formal consultation. No responses were received from the Catawba Indian Nation or the Pamunkey Indian Tribe.⁶⁷

In response to Appalachian's September 9 letter requesting concurrence on its proposed APE, the Catawba Indian Nation responded that it had no immediate concerns with regard to traditional cultural properties, sacred sites, or archaeological sites within the boundaries of the proposed project area and asked to be notified if Native American artifacts and/or human remains are located during any ground disturbance. The Delaware Nation stated that the

⁶⁵ 36 C.F.R. §800.16(d) (2022).

⁶⁶ See letter from Appalachian filed September 13, 2021, accession number 20210913-0010.

⁶⁷ See Commission staff's Telephone Memos filed September 10, 2018 and July 26, 2019.

proposed project does not endanger cultural or religious sites of interest to the Nation and requests that the licensee stop project activities and notify the Delaware Nation should an archaeological site or artifacts be inadvertently uncovered. The Monacan Indian Nation responded that it did not wish to actively participate in this consultation because it anticipates project impacts to be minimal, but requested to be contacted if: sites associated with Native American history may be impacted by the project, adverse effects associated with the project are identified, human remains are encountered during the project, unanticipated Tribal remains are encountered during the project, other Tribes consulting on the project cease consultation, or the project size or scope becomes larger or more potentially destructive than currently described. The Pamunkey Indian Tribe indicated that it wished to continue to consult on the project.⁶⁸ Appalachian did not receive a response from the Eastern Band of Cherokee Indians or Cherokee Nation.⁶⁹

In a letter filed September 13, 2021, Appalachian provided the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe with a draft of an archaeological assessment and geomorphological investigation (*Cultural Resources Study*) conducted in support of the license application. On February 28, 2022, Appalachian provided the license application to the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe. No other comments or concerns were received by Appalachian or the Commission from Tribes regarding the Niagara Project.

Cultural History Overview

The first evidence of human occupation in Virginia dates to the Paleoindian period (10,500 to 8000 B.C.E.), shortly after the last ice age, when small, highly transient bands subsisted by hunting megafauna and smaller game and gathering wild plants. Paleoindian artifacts, including some of the oldest artifacts in Virginia, have been found in high concentrations in the Smith Mountain Lake and Leesville Lake area, approximately 25 miles southeast of the Niagara Project. During the Archaic period (8000 to 1000 B.C.E.), human population and settlement increased, as did means for food storage and increased reliance on riverine resources. The Woodland period (1000 B.C.E. to C.E. 1600) was marked by continued increased population, sedentism, and agricultural activity.

Euro-Americans arrived in the present-day City of Roanoke in the early 18th century and established small settlements in the region in the late 18th and early 19th centuries; however, growth was slow until the 1880's when investors announced plans to extend the Shenandoah Valley Railroad and build a railroad terminal in Roanoke. By the early 20th century, Roanoke was an important regional center and modern city.

⁶⁸ See letter from Appalachian filed September 13, 2021, accession number 20210912-0010.

⁶⁹ Because the project appears to be outside the interest areas of the Eastern Band of Cherokee Indians and the Cherokee Nation (Royce, 1884; Native Land Digital, 2024a; and Native Land Digital, 2024b) and neither Tribe responded to Appalachian's September 9 letter, Commission staff did not initiate Tribal consultation with either Tribe.

In 1906, the Roanoke Railroad and Electric Company built a concrete dam and powerhouse (now part of the Niagara Project) on the Roanoke River to power its street railway until it sold the project to Appalachian in 1924. Several changes to the Niagara Project were made since its construction, including replacement of the generating equipment in the powerhouse, installation of a drop sluice gate at the main spillway, replacement of four steel penstocks with two larger penstocks, reconstruction of the powerhouse floor and upstream wall, and repairs to the main spillway dam.

Cultural Resources Investigations

Archaeological Resources

Previous cultural resource studies conducted in the vicinity of the project have recorded a number of archaeological sites within a half of a mile of the project ranging from Archaic period sites to 20th century house sites. A 1991 Phase 1A archaeological investigation conducted in support of the previous relicensing proceeding recorded a potential archaeological site adjacent to the project boundary and determined that there were no historic or prehistoric archaeological sites at the project. Geomorphological boring tests conducted as part of the *Cultural Resources Study* confirmed that there was no potential for archaeological resources at this site.

The *Cultural Resources Study* also found that there is limited potential for undisturbed archaeological resources due to urban and industrial development, including construction, operation, and maintenance of the Niagara Project, and terrain within the APE consisting of a narrow terrace along the river that is covered in alluvial deposits down to groundwater. There are no recorded archaeological resources that are listed or eligible for listing in the National Register within the APE.

Architectural Resources

During the previous relicensing proceeding, the Virginia SHPO determined that the Niagara powerhouse and dam were not eligible for inclusion in the National Register. In a letter dated October 2, 2020,⁷⁰ the Virginia SHPO requested that the Niagara Project's eligibility for the National Register be reevaluated because of the time elapsed since it was last evaluated. The *Cultural Resources Study* re-evaluated the Niagara powerhouse and dam and recommended that the Niagara Project not be considered eligible for listing in the National Register due to the extensive alterations made to the project since construction in 1906.

The *Cultural Resource Study* documented three properties within the APE that are eligible or potentially eligible for inclusion on the National Register: (1) the Blue Ridge Parkway Historic District (eligible); (2) the Blue Ridge Parkway Bridge (eligible); and (3) the Virginian Railroad (potentially eligible). The Blue Ridge Parkway crosses the Roanoke River via the Blue Ridge Parkway Bridge approximately 500 feet downstream of the Niagara powerhouse at the eastern edge of the Niagara Project APE. The Blue Ridge Parkway was

⁷⁰ See letter from Appalachian filed September 13, 2021, accession number 20210912-0010.

constructed by the Civilian Conservation Corps between 1935 and 1942; construction continued sporadically until the Blue Ridge Parkway was completed in 1987. The Blue Ridge Parkway Bridge is a contributing resource to the Blue Ridge Parkway Historic District. The Virginian Railroad is located partially within the project APE along the north bank of the Roanoke River. The railroad alignment within the APE was constructed in 1909 as part of the merger of the Tidewater Railway and Deepwater Rail Company to transport coal from West Virginia to port near Norfolk, Virginia. The Virginia SHPO stated that the Virginian Railroad alignment was potentially eligible for the National Register under Criterion A (contributing to the major pattern of American history).

3.3.7.2 Environmental Effects

Project-related effects on cultural resources within the APE can result from modifications to project facilities or project operation; project-related ground-disturbing activities; construction, modification, or maintenance of project recreation facilities and use of such facilities by visitors; project-induced shoreline erosion;⁷¹ and vandalism.

Appalachian proposes to develop and implement a RMP for the project that may include enhancements to the existing canoe portage take-out and trail and consult with the Virginia SHPO in the event that previously unidentified cultural resources are encountered during project construction or maintenance activities. In section 5 of this EA, Commission staff recommend that Appalachian construct a formal boat put-in facility downstream of the powerhouse within the project boundary.

Appalachian was designated as the non-federal representative to initiate section 106 consultation with the Virginia SHPO in a notice issued by the Commission on March 26, 2019. In accordance with section 106, Appalachian consulted with the Virginia SHPO to determine the effects of project operation on cultural resources. Virginia SHPO concurred with the proposed definition of the APE. In a letter filed with the Commission on September 13, 2021, Appalachian transmitted the *Cultural Resources Study* to and requested concurrence from the Virginia SHPO, Advisory Council, the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe on the recommendations contained in the *Cultural Resources Study*.

Our Analysis

Although there are properties partially within the project boundary that are eligible or potentially eligible for listing on the National Register, the applicant is not proposing measures that would affect these historic properties. Constructing a formal boat put-in facility within the project boundary as recommended by staff would involve some ground disturbance to install a boat ramp or other launching structure. However, constructing a boat put-in facility is not likely to disturb archaeological resources because there are no recorded archaeological resources within the APE and the area below the project tailrace has been previously disturbed. Therefore, the

⁷¹ Project-induced shoreline erosion does not include shoreline erosion attributable to flood flows or natural phenomena, such as wind-driven wave action, erodible soils, and loss of vegetation due to natural causes.

proposed continued project operation and the construction of a boat put-in are not expected to adversely affect historic resources.

During the term of any license issued, however, archaeological or historic resources could be discovered during project-related activities that require ground disturbance. In the event of an unanticipated discovery, stopping any ground-disturbing activity and consulting with the Virginia SHPO, as proposed by Appalachian, would ensure these resources are protected. Further, the licensee should notify the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe in the event of an unanticipated discovery.

3.3.8 Air Quality

3.3.8.1 Affected Environment

The Niagara Project is located near the Town of Vinton, Virginia and approximately 6 miles downstream of the City of Roanoke. Land cover and land use along the Roanoke River within the project boundary is primarily deciduous forest, with areas of, low- and medium-intensity development, and pastureland. Railroad tracks, operated by CSX Corporation, run parallel to the Roanoke River, including along the north shore of the project impoundment. An air monitoring station, part of the Blue Ridge Region Air Monitoring Network, is located in the Town of Vinton and measures levels of fine particulate matter (PM), carbon monoxide (CO), sulfur dioxide, and nitrogen dioxide.⁷²

The Clean Air Act of 1970 and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by the EPA for six criteria air pollutants: CO, sulfur dioxide, ozone, PM, nitrogen dioxide, and lead. There are two types of NAAQS: (1) primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly; and (2) secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The status of criteria pollutants in an area is described by three main categories (EPA, 2024a): (1) “attainment” (areas in compliance with the NAAQS); (2) “non-attainment” (areas not in compliance with the NAAQS); or (3) “unclassifiable” (where EPA is unable to determine the status based on the available information). Unclassifiable areas are treated as attainment areas for the purpose of permitting a stationary source of pollution. Areas that have been designated non-attainment but have still demonstrated compliance with the ambient air quality standard(s) are designated “maintenance” for that pollutant. Areas that have never been designated non-attainment for a pollutant and NAAQS are considered attainment areas.

Section 176(c) of the Clean Air Act (CAA) prohibits federal agencies from taking actions in nonattainment and maintenance areas unless the emissions from the actions conform to the state or tribal implementation plan for the area. Federal actions that cause emissions only in

⁷² See <https://www.deq.virginia.gov/our-programs/air/monitoring-assessments/air-monitoring>.

areas not designated as nonattainment or maintenance, such as attainment or unclassified areas, are not required to evaluate conformity with a state or tribal implementation plan for the action. No portions of Roanoke County are designated as non-attainment or maintenance areas for any pollutants (EPA, 2024b) and no implementation plans have been developed for the area. As such, evaluation of conformity with such plans is not applicable for the project.

3.3.8.2 Environmental Effects

Construction activities associated with project recreation facilities, such as construction of a new boat put-in location, would use various construction equipment. The use of this equipment would result in temporary localized emissions of criteria pollutants through fugitive dust and vehicle exhaust. Additionally, wind can mobilize soil that has been disturbed or has lost its protective vegetation, including soil stockpiled in material storage areas.

In its May 23, 2019 scoping comments, EPA requested that the EA include a discussion of air resources at the project, including identification of any areas designated as non-attainment for criteria air pollutants.

Our Analysis

As described above, no areas within the project boundary or portions of Roanoke County are designated as non-attainment or maintenance areas for any criteria air pollutants.

As noted earlier, developing an erosion and sediment control plan with procedures and BMPs to reduce erosion, contain sediment, and stabilize soils during and after completion of any construction activities, would help to minimize the generation of fugitive dust emissions. Moreover, construction-related emissions would be temporary and localized and would dissipate with time and distance from areas of active construction. Further, construction emissions would subside once construction is complete. Therefore, continued operation and maintenance of the Niagara Project, including any construction associated with recreation enhancements, would not cause or significantly contribute to violations of any applicable ambient air quality standards, or significantly affect local or regional air quality.

3.3.9 Environmental Justice

In conducting NEPA reviews of hydroelectric projects, the Commission follows Executive Orders 12898 and 14096, which direct federal agencies to identify, analyze, and address disproportionate and adverse human health or environmental effects of their actions on environmental justice communities.⁷³ Executive Order 14008 also directs agencies to develop programs, policies, and activities to address the disproportionate and adverse “human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as

⁷³ Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994); Exec. Order No. 14,096, 88 Fed. Reg. 25251 (Apr. 21, 2023).

well as the accompanying economic challenges of such impacts.”⁷⁴ Environmental justice is “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”⁷⁵ The term “environmental justice community” includes communities that have been historically marginalized and overburdened by pollution.⁷⁶

Commission staff used *Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices)*,⁷⁷ which provides methodologies for conducting environmental justice analyses throughout the NEPA process for this project. Additionally, consistent with EPA recommendations, Commission staff used EPA’s Environmental Justice Screening and Mapping Tool (EJScreen) as an initial screening tool to better understand locations that require further review or additional information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors.⁷⁸

Consistent with *Promising Practices*, and Executive Orders 12898 and 14096, we reviewed the project to determine if its resulting impacts would be disproportionate and adverse

⁷⁴ Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7629 (Jan. 27, 2021).

⁷⁵ See EPA, EJ 2020 Glossary (Feb. 2024), <https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf>. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. *Id.* Meaningful involvement of potentially affected environmental justice community residents means: (1) people have an appropriate opportunity to participate in decisions about a proposed activity that may affect their environment and/or health; (2) the public’s contributions can influence the regulatory agency’s decision; (3) community concerns will be considered in the decision-making process; and (4) decision makers will seek out and facilitate the involvement of those potentially affected. *Id.*

⁷⁶ Environmental justice communities include, but may not be limited to minority populations, low-income populations, or indigenous peoples. See EPA, EJ 2020 Glossary (Feb. 2024), <https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf>.

⁷⁷ Federal Interagency Working Group on Environmental Justice & NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (Mar. 2016) (*Promising Practices*), https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf.

⁷⁸ EPA, *Purposes and Uses of EJScreen* (Jan. 9, 2024), <https://www.epa.gov/ejscreen/purposes-and-uses-ejscreen> (“Screening tools should be used for a ‘screening-level’ look. Screening is a useful first step in understanding or highlighting locations that may be candidates for further review.”).

on minority and low-income populations and also whether impacts would be significant.⁷⁹ *Promising Practices* provides that agencies can consider any of a number of conditions in this determination and the presence of any of these factors could indicate a potential disproportionate and adverse impact.⁸⁰ For this project, a disproportionate and adverse effect on an environmental justice community means the adverse effect is predominantly borne by such population. Relevant considerations include the location of project facilities and the project's human health and environmental impacts on identified environmental justice communities, including direct, indirect, and cumulative impacts.

3.3.9.1 Affected Environment

Meaningful Engagement and Public Involvement

In addition to the information provided above, the Council on Environmental Quality's (CEQ) Environmental Justice Guidance Under the National Environmental Policy Act (CEQ, 1997) and *Promising Practices*, recommend that federal agencies provide opportunities for effective community participation in the NEPA decision-making process by: identifying potential effects and mitigation measures in consultation with affected communities; improving accessibility of public meetings, crucial documents, and notices; and using adaptive approaches to overcome potential barriers to effective participation. In addition, Executive Orders 13985 and 14096, strongly encourage independent agencies to "consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs,"⁸¹ and "provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns who are potentially affected by Federal activities."⁸²

The opportunities for public involvement during the Commission's review process are described in section 1.4, *Public Review and Comment*.

All documents that form the administrative record for this proceeding, with the exclusion of privileged or critical energy infrastructure information, are available to the public electronically on the FERC's website (<https://elibrary.ferc.gov/eLibrary/search>). We recognize

⁷⁹ An agency may determine that impacts are disproportionate and adverse, but not significant within the meaning of NEPA and in other circumstances an agency may determine that an impact is *both* disproportionate and adverse and significant within the meaning of NEPA. See *Promising Practices* at 33.

⁸⁰ There are various approaches for determining whether an impact will cause a disproportionate and adverse impact, and one recommended approach is to consider whether an impact would be "predominantly borne by minority populations or low-income populations." See *id.* at 44-46.

⁸¹ Exec. Order No. 13985, 86 Fed. Reg. 7009, 7011 (Jan. 20, 2021).

⁸² Exec. Order No. 14,096, 88 Fed. Reg. 252514 (Apr. 21, 2023).

that not everyone has internet access or is able to file electronic comments. Anyone may comment to FERC about the proceeding, either in writing or electronically.⁸³ All substantive environmental comments received prior to issuance of this EA have been addressed within this document. No entity provided comments or recommendations regarding the effects of the project on environmental justice communities in response to the Commission’s notice that the application was ready for environmental analysis.

Identification of Environmental Justice Communities

According to CEQ’s *Environmental Justice Guidance* and *Promising Practices*, minority populations are those groups that include: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Following the recommendations set forth in *Promising Practices*, FERC uses the **50 percent** and the **meaningfully greater analysis** methods to identify minority populations. Using this methodology, minority populations are defined in this EA where either: (a) the aggregate minority population of the block groups in the affected area exceeds 50 percent; or (b) the aggregate minority population in the block group affected is 10 percent higher than the aggregate minority population percentage in the county. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. Using *Promising Practices*’ **low-income threshold criteria** method, low-income populations are identified as census block groups where the percent low-income population in the identified block group is equal to or greater than that of the county. Here, Commission staff selected Roanoke County and the City of Roanoke, Virginia, in which the project action is located, as the comparable reference communities to ensure that affected environmental justice communities are properly identified. Two reference communities were selected as block groups from both Roanoke County and Roanoke City are within or partially within a 1-mile radius of the project, as described below. The City of Roanoke, while located within the boundaries of Roanoke County, is an independent city and not part of the county.

Table C-10 identifies the minority populations (by race and ethnicity) and low-income populations within the county and city affected by the relicense application (Roanoke County and Roanoke City), and U.S. census block groups⁸⁴ within 1-mile of the project. For this project, staff chose a 1-mile radius around the project boundary (figure C-7). Staff determined

⁸³ The Office of Public Participation (OPP) provides members of the public, including environmental justice communities, landowners, Tribal citizens, and consumer advocates, with assistance in FERC proceedings—including navigating Commission processes and activities relating to the project. For assistance with interventions, comments, requests for rehearing, or other filings, and for information about any applicable deadlines for such filings, members of the public are encouraged to contact OPP directly at 202-502-6595 or OPP@ferc.gov for further information.

⁸⁴ Census block groups are statistical divisions of census tracts that generally contain between 600 and 3,000 people. U.S. Census Bureau. 2023. Glossary: Block Group. Available online at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4.

that a 1-mile radius is sufficient to encompass and address any potential impacts that may arise from the proposed action given the limited scope of the proposed relicensing, including limited construction activities and the concentration of project-related effects within the project boundary. To ensure we are using the most recent available data, we use U.S. Census American Community Survey File# B03002 for the race and ethnicity data and Survey File# B17017 for poverty data at the census block group level.⁸⁵

As presented in table C-10, there are minority and low-income communities within the project area. Within the study area, staff identified 24 total block groups in proximity to the project with seven block groups located in Roanoke County, Virginia and 17 block groups located in Roanoke City, Virginia. Of the 24 total block groups, staff identified one census block group in which the populations qualify as environmental justice communities with minority populations meaningfully greater than the minority population within their surrounding counties (table C-10 and Figure C-7). The one identified group is Census Tract 0026.00, Block Group 1 in Roanoke City. Staff identified 15 block groups that meet the threshold for environmental justice communities on the basis of low-income population. The identified block groups are Census Tract 0310.00, Block Group 1; Census Tract 0311.01, Block Groups 1, 2, and 3; Census Tract 0311.02, Block Group 2; Census Tract 0312.01, Block Group 1; Census Tract 0006.01, Block Groups 3 and 4; Census Tract 0006.02, Block Group 1; Census Tract 0026.00, Block Group 1; Census Tract 0027.00, Block Groups 1, 2, and 5; and Census Tract 0028.00, Block Groups 1, 3 and 4.

3.3.9.2 Environmental Effects

The actions and PM&E measures proposed by Appalachian are described in section 2.2, *Applicant's Proposal*, and staff's recommended alternative is described in section 2.3, *Staff Alternative*.

No entity provided comments or recommendations regarding the effects of the project on environmental justice communities in response to the Commission's notice that the application was ready for environmental analysis.

Our Analysis

Operating the project in accordance with the staff-recommended alternative would be expected to improve water quality and aquatic habitat in the project area. Specifically, as discussed in section 3.3.2.2, *Aquatic Resources – Environmental Effects*, operating the project in a run-of-river mode would be expected to result in relatively stable impoundment elevations, which in turn would help minimize effects on environmental resources and limit project-related erosion along the impoundment shoreline. In addition, increased flows to the bypassed reach, as

⁸⁵ U.S. Census Bureau, American Community Survey 2022 ACS 5-Year Estimates Detailed Tables, File# B17017, *Poverty Status in the Past 12 Months by Household Type by Age of Householder*, <https://data.census.gov/table/ACS5Y2022.B17017?q=B17017>; File #B03002 *Hispanic or Latino Origin By Race*, <https://data.census.gov/table/ACS5Y2022.B03002?q=b03002>.

required by Virginia DEQ's certification condition and recommended by staff, would improve DO levels in the waters in the bypassed reach and enhance habitat for macroinvertebrates and fishes. Those who recreate in the Roanoke River, including anglers who are residents within the environmental justice communities, would be expected to benefit from improved water quality and potentially improved fish production.

Appalachian proposes to develop and implement a RMP in consultation with project stakeholders that would include enhancements to the boat take-out facility (e.g., replacement of steps, bank stabilization). Additionally, as described in section 2.3, *Staff Alternative*, staff recommend that Appalachian construct a new boat put-in facility downstream of the project powerhouse and within the project boundary. Construction of the new boat put-in facility would cause temporary disturbances in the form of noise, dust, and heavy equipment traffic. This construction is expected to be of a short duration, would be limited in scope, and is unlikely to substantially affect auditory or visual resources, or traffic within the 16 identified environmental justice communities, given the semi-rural nature of and the distance of residential homes from the project area. Over the long term, access to the Roanoke River for recreation would be improved (e.g., increased safety, facility maintenance, etc.) by the construction of a formal boat put-in facility.

As described throughout this EA, the proposed project would have a range of impacts on the environment and on individuals living in the vicinity of the project, including environmental justice populations. As highlighted in table C-10, there are 16 environmental justice communities within a 1-mile boundary of the project. Based on the foregoing analysis, impacts associated with traffic, visual, air quality, and construction noise would be temporary and less than significant. In consideration of the limited scope of the proposed project, the lack of a significant effect on environmental justice communities, and the staff-recommended environmental protection and enhancement measures, the project would not result in a disproportionate and adverse impact on the environmental justice communities.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Niagara Project's use of the Roanoke River for hydropower generation to see what effect various proposed or recommended environmental measures would have on the cost to operate and maintain the project and on the project's power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corporation*,⁸⁶ the Commission compares the current cost to produce project power to an estimate of the cost to provide the same amount of energy and capacity⁸⁷ for the region using the most likely alternative source of power (cost of alternative power). In keeping with the policy described in *Mead Corporation*, our economic analysis is based on current

⁸⁶ See *Mead Corporation*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

⁸⁷ We use the term "capacity benefit" to describe the benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

electric power cost conditions and does not anticipate or estimate changes in fuel costs that could occur during a project's license term.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the annualized cost of providing the individual measures considered in the EA; (2) the cost of the most likely alternative source of project power; (3) the total annual project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of the current alternative source of project power and the total annual project cost. If the difference between the cost to produce an equivalent amount of power from an alternative source and the total annual project cost is positive, the project produces power at a cost less than the cost of producing power from the most likely least-cost source of alternative power. If the difference between the alternative source of power's annual cost and the total annual project cost is negative, the project costs more to produce power than the cost to produce an equivalent amount of power from the most likely least-cost source of alternative power. This estimate helps support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

The power and economic benefits of the Niagara Project, and the comparison of the cost of each alternative for the project, are discussed in Appendix E. Appendix F presents the cost of the environmental enhancement measures considered in our analysis for the Niagara Project. All costs are in 2023 dollars. We convert all costs to equal annual (levelized) costs over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Niagara Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our evaluation of the environmental and economic effects of the proposed action and its alternatives, the staff alternative is the preferred alternative for the Niagara Project. We recommend this alternative because: (1) issuing a new license for the project would allow Appalachian to continue to operate the project and provide a beneficial and dependable source of electric energy; (2) generation from the Niagara Project, with an installed capacity of 2.4 MW of electric capacity, comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action

alternative; and (4) the recommended measures would protect and enhance aquatic, terrestrial, recreation, aesthetic, and cultural resources at the project.

In the following section, we make recommendations as to which environmental measures proposed by Appalachian, or recommended by agencies or other entities, should be included in any new license issued for the project. In addition to Appalachian's proposed environmental measures listed below, we recommend additional staff-recommended environmental measures to be included in any new license issued for the project, and present these staff-recommended measures as draft license articles in Appendix J.

5.1.1 Measures Proposed by the Applicant

Based on our environmental analysis of Appalachian's proposal in section 3.0, *Environmental Analysis*, and the costs discussed in section 4.0, *Developmental Analysis*, we conclude the following operation and environmental measures proposed by Appalachian would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including the following measures in any license issued for the Niagara Project:

- Develop and implement an RMP in consultation with project stakeholders that includes:
 - descriptions and locations of recreation facilities in the project area;
 - new signage at the Tinker Creek canoe launch about the Niagara Project portage facilities and other local recreation opportunities;
 - improvements to the boat take-out facility (e.g., replacement of steps, bank stabilization);
 - improvements to the portage route (e.g., grading, additional gravel);
 - a conditional requirement to relocate the existing boat put-in facility to the south side of the river near the project tailrace if Park Service-owned lands are no longer an option for this facility;
 - updated project signage related to recreation amenities as well as emergency contact information;
 - participation in and promotion of river cleanups led by other organizations; and
 - development of a website with information about downstream flows and recreational opportunities in the project area; and
- Consult with the Virginia State Historic Preservation Office (Virginia SHPO) if previously unidentified cultural resources are encountered during the term of any new license issued for the project to ensure the proper treatment of these resources and discontinue all ground-disturbing activities until the proper treatment of the resources is established.

5.1.2 Additional Measures Recommended by Staff

Under the staff alternative, the project would be operated with Appalachian's proposed measures, as identified above, all certification conditions described in section 2.2.3, *Modifications to Applicant's Proposal – Mandatory Conditions*, and the following additions or modifications:

- Develop an erosion and sediment control plan to minimize effects of turbidity and sedimentation related to enhancements of the existing boat take-out facility and construction of a new boat put-in facility;
- Operate the project in a run-of-river mode under all flow conditions, where inflow *approximates* outflow at any given point in time and the impoundment is maintained at or near the elevation of 884.4 feet (883.4 feet under extreme flow conditions, as defined in an operation compliance and monitoring plan);
- Develop an operation compliance monitoring plan that incorporates the monitoring and operations plan specified by the certification (conditions I.D.2, I.D.3, I.E.1, and I.E.2) and describes the methodology, instrumentation, and reporting procedures that would be used to verify the project is being operated in accordance with the operational requirements of any new license issued for the project;
- Following a drawdown of the impoundment for maintenance or emergency purposes, pass at least 90 percent of inflow downstream of the powerhouse and use the remaining 10 percent of inflow to refill the impoundment to protect aquatic habitat;
- Develop a bald eagle protection plan, consistent with FWS's National Bald Eagle Management Guidelines, to ensure the protection of eagles that roost or nest at the project;
- Avoid the removal of trees with diameters that are equal to or greater than 3 inches at breast height from April 1 through November 14, to protect Indiana, northern long-eared, and tricolored bats;
- Avoid vegetation maintenance (i.e., removal and trimming) or ground disturbance outside of routinely maintained areas between March 15 and August 15, to protect nesting migratory birds;
- Avoid vegetation maintenance during the monarch breeding season (April 1 through September 30) where routine vegetation maintenance does not occur, to protect the monarch butterfly and its host plant (milkweed);
- Construct, operate, and maintain a boat put-in facility within the project boundary;

- Develop and implement an RMP as proposed by the applicant with modifications, including:
 - a description of project recreation facilities (i.e., boat take-out, portage trail, and boat put-in) including ownership, operation, and maintenance responsibilities;
 - a provision to conduct recreation use monitoring at recreation facilities at and near the project 5 years and 10 years post license issuance; and
 - a list of stakeholders that would be included in the development of the RMP; this list would include, but not be limited to: (1) Park Service; (2) Roanoke County; (3) Town of Vinton; (4) City of Roanoke; (5) Blueway Committee; (6) Roanoke Valley Greenway Commission; (7) Roanoke Outside Foundation; (8) Friends of the Rivers of Virginia (FORVA); (9) Virginia DCR; (10) Virginia DWR; and (11) FWS.
- In addition to consulting with the Virginia SHPO, the licensee would notify the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe if previously unidentified cultural resources are encountered during the term of any new license issued for the project and discontinue all ground-disturbing activities until the proper treatment of the resources is established.

In Appendix G, we discuss the basis for our staff-recommended measures and the rationale for modifying Appalachian’s proposal.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Continued operation of the Niagara Project would result in some unavoidable fish mortality due to impingement and entrainment. However, given the low approach velocity at the project intake (1.1 fps), most fish susceptible to impingement would be large and could avoid impingement due to their strong swimming ability. Fishes entrained at the project would be small and would likely experience low blade strike mortality. Further, as younger individuals in a population typically have high rates of natural mortality, even in the absence of hydropower operations, and because fish populations have generally evolved to withstand losses of these smaller and younger individuals, the expected consequences on the sustainability of the resident fish population at the project is minimal. As a result, we do not expect any long-term or population-level impacts of entrainment and impingement mortality.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, a hydroelectric license issued by the Commission should include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and

the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency.

In response to the February 7, 2023, notice soliciting comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions, Interior and Virginia DWR each timely filed 10 section 10(j) recommendations for the project on April 5, 2023 and April 10, 2023, respectively. Table C-11 lists Interior's and Virginia DWR's 10(j) recommendations and indicates whether the recommendations are included under the staff alternative, as well as the basis for our preliminary determinations concerning measures that we consider inconsistent with the FPA. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

We have preliminarily determined that two of Interior's and Virginia DWR's recommendations that are within the scope of section 10(j) may be inconsistent with the purposes and requirements of the FPA or other applicable law.

Instantaneous Run-of-River Operation

Under section 10(j) of the FPA, Interior and Virginia DWR recommend that the project be operated in a year-round instantaneous run-of-river mode, whereby inflow to the project equals outflow from the project at all times and water levels above the dam are not drawn down for the purpose of generating power. Commission staff's analysis in section 3.2.2.2, *Environmental Effects, Mode of Operation*, suggests that even if it were feasible to operate the project in an instantaneous run-of-river mode, as recommended by Interior and Virginia DWR, doing so would provide little to no incremental benefits to aquatic resources in the project vicinity relative to current operation where outflows approximate inflows at any given point in time. We concluded, in Appendix G, that the benefits associated with Interior and Virginia DWR's recommended mode of operation (instantaneous run-of-river) would not be worth the additional costs of attempting to operate the project in this manner. Therefore, we are making the preliminary determination that Interior's and Virginia DWR's 10(j) recommendation to operate the project in an instantaneous run-of-river mode may be inconsistent with the comprehensive development and public interest standards of sections 10(a) and 4(e) of the FPA.

Minimum Flows to the Bypassed Reach

Interior and Virginia DWR recommend that a continuous minimum flow of 10% of the inflow to the project, or 30 cfs (whichever is greater) be provided to the bypassed reach, to mimic the natural seasonal variation in flows. As discussed in section 3.2.2.2, *Environmental Effects, Minimum Flows*, Appalachian's proposal to provide a continuous minimum flow of 30 cfs to the bypassed reach would enhance habitat for fish and macroinvertebrates in comparison to the 8-cfs minimum flow required under the current license. While Interior and Virginia DWR's recommended flows would provide additional habitat for some target fish species and guilds during higher flow periods (e.g., spring) as compared to Appalachian's 30-cfs minimum flow proposal, we concluded, in Appendix G, that the benefits associated with providing a minimum flow of up to 10% of project inflow recommended by Interior and Virginia DWR under section

10(j) would not be worth the opportunity cost of the measure, which is \$56,545. Therefore, we are making the preliminary determination that Interior's and Virginia DWR's 10(j) minimum flow recommendation may be inconsistent with the comprehensive development and public interest standards of sections 10(a) and 4(e) of the FPA.

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission 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 the project. We reviewed eight qualifying comprehensive plans that are applicable to the Niagara Project.⁸⁸ No inconsistencies were found.

6.0 FINDING OF NO SIGNIFICANT IMPACT

If the Niagara Project is relicensed as proposed with the additional staff-recommended measures, the project would operate while providing enhancements and protective measures for aquatic resources, terrestrial resources, threatened and endangered species, recreational resources, and any previously unidentified cultural resources in the project area.

Based on our independent analysis, issuance of a new license for the project, as proposed with additional staff-recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

7.0 LITERATURE CITED

The literature cited in this EA is presented as Appendix H.

8.0 LIST OF PREPARERS

The list of preparers of this EA is presented as Appendix I.

⁸⁸ (1) National Marine Fisheries Service and U.S. Fish and Wildlife Service. 2016. Roanoke River Diadromous Fishes Restoration Plan. Raleigh, North Carolina. May 2016. (2) National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993. (3) U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986. (4) 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. (5) Virginia Department of Conservation and Recreation. The 2007 Virginia outdoors plan (SCORP). Richmond, Virginia. (6) Virginia Department of Environmental Quality. 2015. Commonwealth of Virginia State Water Resources Plan. Richmond, Virginia. October 2015. (7) Virginia State Water Control Board. 1986. Minimum instream flow study – final report. Annandale, Virginia. February 1986. (8) National Park Service. 2013. Blue Ridge Parkway Final General Management Plan/Environmental Impact Statement. Asheville, North Carolina. January 2013.

APPENDIX A: STATUTORY AND REGULATORY REQUIREMENTS

Federal Power Act

Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 United States Code (U.S.C.) § 811, states that the Commission is to require construction, maintenance, and operation by a licensee of such fishways as may be prescribed by the Secretaries of the U.S. Department of Commerce or the U.S. Department of the Interior (Interior). By letter filed April 5, 2023, Interior requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

Section 10(j) Recommendations

Under section 10(j) of the FPA, 16 U.S.C. § 803(j), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

On April 5, 2023 and April 10, 2023, respectively, Interior and Virginia Department of Wildlife Resources (Virginia DWR) timely filed 10 recommendations under section 10(j), as summarized in . In section 5.3, *Fish and Wildlife Agency Recommendations*, we discuss how we address the agency's recommendations and how they comply with section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Section 10(a) Recommendations

Under section 10(a) of the FPA, each hydroelectric license issued by the Commission must be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

Pursuant to section 10(a), Interior and Virginia DWR recommend, within 2 years of license issuance, Appalachian construct a new hard surfaced (or appropriately constructed) boat put-in facility on Appalachian-owned land within the Niagara Project boundary at or near the downstream end of the existing rip-rapped area to provide a safe and convenient access for public recreational users. Their recommendations state that the exact location should be determined in consultation with the Park Service and other stakeholders. In addition to, or as an alternative to, the above recommendation Virginia DWR also recommends under section 10(a)

that Appalachian work with localities to enhance recreational access and opportunities at other sites on the Roanoke River in the region.

Clean Water Act

Under section 401 of the Clean Water Act (CWA), 33 U.S.C. § 1341(a)(1), a license applicant must obtain either a water quality certification (certification) from the appropriate state pollution control agency verifying that any discharge from a project would comply with applicable provisions of the CWA or a waiver of certification by the appropriate state agency. The failure to act on a request for certification within a reasonable period of time, not to exceed 1 year, after receipt of such request constitutes a waiver.

On, April 4, 2023, Appalachian applied to the Virginia Department of Environmental Quality (Virginia DEQ) for a section 401 certification for the Niagara Project. Virginia DEQ received the application on the same day.⁸⁹ Virginia DEQ issued a Virginia Water Protection Permit⁹⁰ (certification) to Appalachian on March 7, 2024⁹¹ and Appalachian filed a copy with the Commission on March 12, 2024. The conditions of the certification are included in Appendix K.

Endangered Species Act

Section 7 of the Endangered Species Act (ESA), 16 U.S.C. § 1536, requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. According to the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Conservation (IPaC) system, the federally listed Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), and Roanoke logperch (*Percina rex*) are known to occur in the vicinity of the Niagara Project.⁹² Additionally, the IPaC list includes the monarch butterfly (*Danaus plexippus*), which became a candidate for listing as threatened on December 17, 2020; and the tricolored bat (*Perimyotis subflavus*), which was

⁸⁹ On April 5, 2023, Appalachian filed a copy of the certification request and an email confirmation of receipt from Virginia DEQ.

⁹⁰ While Virginia DEQ refers to the permit issued pursuant to section 401 of the CWA as a Water Protection Permit, it is Commission practice to refer to a section 401 permit as a "water quality certification" or "certification."

⁹¹ In Appalachian's March 12, 2024 filing, it states that Virginia DEQ originally issued the certification to Appalachian on January 17, 2024. Appalachian requested an administrative correction and Virginia DEQ re-issued the certification on March 7, 2024.

⁹² See Commission staff's November 6, 2023 memorandum on *List of Threatened, Endangered, Candidate, and Proposed Species Generated by ECOS-IPaC Website* for the Niagara Project (https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20231108-3047).

proposed as an endangered species on September 14, 2022. No critical habitat for any federally listed threatened and endangered species occurs within lands affected by the project.

Our analysis of project effects on the aforementioned listed, proposed for listing, and candidate species is presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations are included in section 5.1, *Comprehensive Development and Recommended Alternative* and Appendix G.

By letter generated through IPaC's Northern Long-Eared Bat Rangewide Determination Key on February, 15, 2024, FWS concluded that relicensing the project with staff's seasonal tree-clearing restriction measure may affect, but is not likely to adversely affect, the northern long-eared bat.⁹³ Additionally, staff concludes that relicensing the Niagara Project, with staff's recommended measures, is not likely to adversely affect the Indiana bat and not likely to jeopardize the continued existence of the tricolored bat. Based on the available information, staff also concludes that relicensing the Niagara Project, as proposed with additional staff recommended measures, may affect, but is not likely to adversely affect the Roanoke logperch. Commission staff will seek concurrence from the FWS on its findings that relicensing the Niagara Project is not likely to adversely affect the Indiana bat and Roanoke logperch.

Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's 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 6 months of its receipt of the applicant's certification.

In an e-mail dated September 1, 2017 and filed with Appalachian's license application, Virginia DEQ indicates that the Niagara Project is not located within Virginia's coastal zone, and that it does not anticipate any project effects on the uses and resources of the coastal zone. Therefore, no consistency certification is needed.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), 54 U.S.C. § 306108, requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

Commission staff designated Appalachian as its non-federal representative for the

⁹³ See Commission staff's February, 15, 2024, memorandum on *U.S. Fish and Wildlife Service (FWS) Determination Letter Under the Northern Long-eared Bat Rangewide Determination Key* for the Niagara Project (https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20231108-3047).

purposes of conducting section 106 consultation under the NHPA on March 26, 2019. Appalachian consulted with the Virginia State Department of Historic Resources, which functions as the Virginia State Historic Preservation Office, and potentially affected Tribes, to identify historic properties, determine National Register eligibility, and assess potential adverse effects on historic properties within the project's area of potential effects (APE). Based on this consultation, two properties were identified within the APE that are eligible for inclusion on the National Register, the Blue Ridge Parkway Historic District and the Blue Ridge Parkway Bridge, and one property was identified as potentially eligible, the Virginian Railroad. Based on staff's analysis in section 3.3.7, *Cultural Resources*, we conclude that relicensing the project would not adversely affect any historic properties.

APPENDIX B: ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Issuing a Non-power License

A non-power license is a temporary license that the Commission would terminate when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this time, no agency has suggested a willingness or ability to take over the project. No party has sought a non-power license, and we have no basis for concluding that the Niagara Project should no longer be used to produce power.

Federal Government Takeover

Federal takeover and operation of the Niagara Project would require congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate, and no federal agency has expressed interest in operating the project.

Project Retirement

As the Commission has previously held, decommissioning is not a reasonable alternative to relicensing in most cases.⁹⁴ Decommissioning can be accomplished in different ways depending on the project, its environment, and the particular resource needs.⁹⁵ For these reasons, the Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to decommission a project, or a participant in a relicensing proceeding demonstrates that there are serious resource concerns that cannot be addressed with appropriate license measures and that make decommissioning a reasonable alternative.⁹⁶

⁹⁴ See, e.g., *Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Pub. Util. Dist. No. 1 of Pend Oreille Cnty.*, 112 FERC ¶ 61,055, at P 82 (2005); *Midwest Hydro, Inc.*, 111 FERC ¶ 61,327, at PP 35-38 (2005).

⁹⁵ In the unlikely event that the Commission denies relicensing a project or a licensee decides to surrender an existing project, the Commission must approve a surrender “upon such conditions with respect to the disposition of such works as may be determined by the Commission.” 18 C.F.R. § 6.2 (2023). This can include simply shutting down the power operations, removing all or parts of the project (including the dam), or restoring the site to its pre-project condition.

⁹⁶ See generally *Project Decommissioning at Relicensing*; Policy Statement, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994); see also *City of Tacoma, Wash.*, 110 FERC ¶ 61,140 (2005) (finding that unless and until the Commission has a specific

Appalachian does not propose decommissioning, nor does the record to date demonstrate there are serious resource concerns that cannot be mitigated if the project is relicensed; as such, there is no reason, at this time, to include decommissioning as a reasonable alternative to be evaluated and studied as part of staff's NEPA analysis.

decommissioning proposal, any further environmental analysis of the effects of project decommissioning would be both premature and speculative).

APPENDIX C: TABLES AND FIGURES

Table C-1. Historical monthly flow statistics at the Niagara Project for years 1994 through 2022 estimated from the USGS Gage No. 02056000 (source: USGS (2023) and staff).

Month	Flow (cfs)					
	Minimum	90% Exceedance	Median	Mean	10% Exceedance	Maximum
January	100	172	416	646	1,140	14,200
February	115	195	496	853	1,796	12,400
March	110	231	594	801	1,482	12,600
April	190	258	538	794	1,311	10,400
May	161	231	429	738	1,350	23,100
June	109	159	324	580	1,040	13,500
July	91	151	246	376	562	18,800
August	80	126	212	289	482	4,580
September	81	129	190	407	610	16,800
October	87	126	207	353	585	10,400
November	99	138	218	443	792	16,100
December	102	147	333	593	1,204	7,770
Annual	110	172	321	573	1,029	23,029

Table C-2. Species composition of the impoundment fish community based on boat electrofishing surveys conducted by Appalachian in September and October 2021. (Source: *Fish Community Study Report*, as modified by staff).

Common name	Number collected	Percent of total catch
Redbreast sunfish	26	40
Golden redhorse	12	18.5
Bluegill	11	16.9
Largemouth bass	6	9.2
Sunfish sp.	3	4.6
Bluntnose minnow	3	4.6
White sucker	1	1.5
Redear sunfish	1	1.5
Smallmouth bass	1	1.5
V-lip redhorse	1	1.5

Table C-3. Species composition of the fish community at riffle/run sites upstream and downstream of the Niagara dam based on backpack electrofishing surveys conducted by Appalachian during September and October 2021. (Source: *Fish Community Study Report*, as modified by staff).

Common name	Upstream		Downstream	
	Number collected	Percent of total catch	Number collected	Percent of total catch
Rosefin shiner	87	60.4	47	12.3
Roanoke darter	9	6.3	13	3.4
Central stoneroller	5	3.5	139	36.5
Rock bass	4	2.8	2	0.5
Bull chub	4	2.8	0	0
Chub sp.	4	2.8	2	0.5
Margined madtom	4	2.8	28	7.3
White sucker	3	2.1	0	0
Fantail darter	3	2.1	23	6.0
Bluegill	3	2.1	1	0.3
Satfin shiner	2	1.4	5	1.3
Johnny darter	2	1.4	2	0.5
Riverweed darter	2	1.4	41	10.8
Northern hog sucker	2	1.4	4	1.0
Redbreast sunfish	2	1.4	4	1.0
Chainback darter	2	1.4	0	0
Cutlip minnow	1	0.7	10	2.6
Sunfish sp.	1	0.7	4	1.0
Smallmouth bass	1	0.7	3	0.8
Roanoke logperch	1	0.7	0	0
Bluntnose minnow	1	0.7	0	0
Blacknose dace	1	0.7	1	0.3
Spotfin shiner	0	0	2	0.5
Green sunfish	0	0	2	0.5
Blacktip jumprock	0	0	29	7.6
Spottail shiner	0	0	11	2.9
Swallowtail shiner	0	0	1	0.3
Mimic shiner	0	0	7	1.8

Table C-4. Habitat suitability modelling results for the Niagara bypassed reach, including estimated usable area for modelled species and species guilds (source: license application, as modified by staff).

	Usable Area (square feet)										
	Roanoke logperch			Shallow-Slow Guild			Shallow Fast Guild	Deep-Slow Guild		Deep-Fast Guild	
Bypassed reach flow (cfs)	Adult	Subadult	YOY*	<i>Mixed substrate (no boulder): Spawning redbreast sunfish</i>	<i>Fines/gravel with aquatic vegetation: YOY silver redbreast</i>	<i>Course substrate: Generic shallow-slow guild</i>	<i>Course substrate: Generic shallow-fast guild</i>	<i>Cover: Adult redbreast sunfish</i>	<i>No cover: Generic deep-slow guild</i>	<i>Fine substrate/cover: Adult silver redbreast</i>	<i>Course-mixed substrate: Adult shorthead redbreast</i>
7	2,160	1,791	604	27,513	0	34,153	4,799	34,029	0	1,177	5,633
20	3,493	3,507	665	--	--	--	--	--	--	--	--
24	4,037	3,913	711	31,276	0	63,612	12,009	42,730	0	2,998	7,568
30	4,582	4,582	746	--	--	--	--	--	--	--	--
33	5,176	4,833	799	32,105	0	71,360	14,135	45,715	0	3,611	8,445
40	6,261	5,252	847	--	--	--	--	--	--	--	--
91	15,673	7,617	1,619	35,023	0	80,700	20,708	58,754	0	6,795	14,868

*YOY = young-of-year.

Table C-5. Qualitative monthly turbine entrainment potential for target species and species groups at the Niagara Project (source: Appalachian, as modified by staff).

Target Species	Qualitative Rating of Monthly Entrainment Potential*											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Largemouth bass	L	L	L	L	L	L	L	L	L	L	L	L
Smallmouth bass/ Spotted bass	L	L	L	L	L	L	L	L	L	L	L	L
Black crappie	L	L	L	L	L	L	L-M	L-M	L	L	L	L
Rock bass	L	L	L	L-M	L	L	L	L	L	M	L-M	L
Sunfish species	L	L	L	L-M	L	L	L	L	L-M	L	L	L
Shiners, chubs, and minnows	L	L	L	L	L	L	L-M	L	L	L	L	L
Bullheads and madtoms	L	L	L	L	L	L	L	L	L	L	L	L
Catfishes	L	L	L	L	M-H	M	M	L	L	L	L	L
Suckers and redhorses	L	L	L	L	L	L	L	L	L	M	L	L
Darters	L	L	L	L	L-M	L	L	L	L	L	L	L
Roanoke logperch	L	L	L	L	L	L	L	L	L	L	L	L

* L = low, L-M = low-moderate, M = moderate, M-H = moderate-high, H = high

Table C-6. Most desired outdoor recreation opportunities in the Roanoke Valley-Alleghany region (% of households) (source: Virginia Outdoors Plan, 2018 as modified by staff).

Activity	Region	State
Natural areas	58	54
Trails	49	43
Water access	45	43
Parks	40	49
Historic areas	37	39
Scenic drives (driving for pleasure)	31	29
Playing fields, sports, and golf facilities	17	22

Table C-7. On-site visitor use monitoring data (source: license application as modified by staff)

Year	Site	Date	Individuals observed (n)
2020	Rutrough Point	May 25	2
		July 3	3
		September 5	1
		September 26	5
		Total	11
		Mean	3
	Tinker Creek canoe launch	May 25	0
		July 3	0
		September 5	0
		September 26	0
		Total	0
		Mean	0
	Roanoke River Trail	January 1	0
		February 7	0
		March 2	2
		March 25	4
		May 1	4
		September 5	1
		September 26	7
		Total	18
		Mean	3
2021	Rutrough Point	May 1	2
		May 11	5
		May 31	14
		June 7	5
		June 19	11
		July 3	20 ^{+a}
		July 23	6
		August 14	7

Year	Site	Date	Individuals observed (n)
		August 19	1
		September 5	16
		September 24	7
		October 2	7
		October 4	2
		Total	40
		Mean	7
	Tinker Creek canoe launch	May 1	5
		May 11	0
		May 31	0
		June 7	2
		June 19	2
		July 3	0
		July 23	2
		August 14	20 ^b
		August 19	0
		September 5	10
		September 24	1
		October 2	4
		October 4	1
		Total	47
		Mean	2
	Roanoke River Trail	March 20	2
		March 29	2
		April 10	4
		April 12	0
		April 24	5
		Total	13
		Mean	3

^a A specific user count was not provided, therefore the count of 20 was used for calculations

^b A volunteer cleanup event this day likely resulted in a noticeable increase of visitors

Table C-8. Visitor use activity at the boat put-in facility documented via trail camera, May through October 2021 (source: license application as modified by staff)

Activity	Count	Percent
Placing boat(s) in water	21	30
Observing nature	21	30
Fishing	28	40
Total	70	100

Table C-9. Aesthetic Flow Study data collection.

Date	Bypassed flow (cfs)	Flow over spillway (Y/N)	Units operating
11/15/2019	24	N	1
01/01/2020	332	Y	0
01/30/2020	31	N	2
02/07/2020	11,716	Y	2
03/02/2020	28	N	2
03/25/2020	2,638	Y	2
05/01/2020	3,317	Y	0
07/11/2020	32	N	1
09/05/2020	30	N	1
09/26/2020	765	Y	0
04/24/2021	24	N	2

Table C-10. Minority and low-income populations within one mile of the project boundary (Source: U.S. Census Bureau, 2022, as modified by staff).

Geographic Area	Total Population (count)	White (%) ^a	Black or African American (%) ^a	American Indian & Alaska Native (%) ^a	Asian (%) ^a	Native Hawaiian & Other Pacific Islander (%) ^a	Some Other Race (%) ^a	Two or More Races (%) ^a	Hispanic or Latino (any race) (%) ^a	Total Minority Population (%) ^a	Households in Poverty (%) ^b
Virginia	8,624,511	60	18.6	0.1	6.8	<0.1	0.5	4	10	40	10.1
Roanoke County*	96,653	84	6.1	0.1	3.5	<0.1	0.3	2.5	3.5	16	7.3
Census Tract 0311.01, Block Group 1	1,380	88.4	0	0	3	0	0	4.9	3.7	11.6	15.7
Census Tract 0310.00, Block Group 1	1,599	91.8	5.1	0	0.4	0	0	2.7	0	8.2	9
Census Tract 0311.02, Block Group 1	2,273	90.9	6	0	0	0	0	0.7	2.4	9.1	6
Census Tract 0311.01, Block Group 2	1,897	88.7	4	0.4	0	0	0	3.3	3.6	11.3	14.2
Census Tract 0311.01, Block Group 3	1,171	91.7	2.8	0	0.8	0	4.3	0.4	0	8.3	3
Census Tract 0311.02, Block Group 2	1,324	90.2	0.6	0.2	0	0	0	5.1	3.9	9.8	19.3
Census Tract 0312.01, Block Group 1	2,157	95.8	0.5	0	3.4	0	0	0.3	0	4.2	16.1
City of Roanoke*	99,213	57	28.7	<0.1	3.2	<0.1	0.4	3.6	6.9	43	18.4
Census Tract 0026.00, Block Group 3	1,030	18.5	69.1	0	0	0	0	3.5	8.8	81.5	15.6
Census Tract 0026.00, Block Group 2	615	68.8	9.3	0	4.7	0	0	9.4	7.8	31.2	10.2
Census Tract 0027.00, Block Group 5	986	69.1	30.9	0	0	0	0	0	0	30.9	27.9

Geographic Area	Total Population (count)	White (%)^a	Black or African American (%)^a	American Indian & Alaska Native (%)^a	Asian (%)^a	Native Hawaiian & Other Pacific Islander (%)^a	Some Other Race (%)^a	Two or More Races (%)^a	Hispanic or Latino (any race) (%)^a	Total Minority Population (%)^a	Households in Poverty (%)^b
Census Tract 0027.00, Block Group 3	614	100	0	0	0	0	0	0	0	0	0
Census Tract 0027.00, Block Group 2	521	97.5	0	0	0	0	2.5	0	0	2.5	30.2
Census Tract 0026.00, Block Group 1	1,128	57.9	23.4	0.3	0	0	1.2	14.2	3.1	42.1	45.8
Census Tract 0027.00, Block Group 1	2,439	65.2	30.1	<0.1	0	0	0	0	4.6	34.8	25.5
Census Tract 0006.01, Block Group 3	917	60.4	4.6	0	1.6	0	0	20.9	12.4	39.6	53.9
Census Tract 0006.02, Block Group 2	1,230	72	13.7	0	3.7	3.6	0	4.8	2.3	28	6.8
Census Tract 0028.00, Block Group 4	1,313	76.8	17.8	0	0	0	0	3.6	1.8	23.2	31.8
Census Tract 0006.02, Block Group 1	1,093	69.4	5.8	0	2.2	0	0	2.2	20.4	30.6	26.7
Census Tract 0006.02, Block Group 3	1,157	84.3	9.2	0	0	0	0	2	4.5	15.7	8
Census Tract 0028.00, Block Group 3	1,316	84.1	5.2	0	0	0	0	8	2.7	15.9	25.3
Census Tract 0028.00, Block Group 1	1,017	86.9	9.1	0	0	0	0	0	3.9	13.1	18.4
Census Tract 0028.00, Block Group 2	1,493	94.3	2.2	0	0	0	0	3.5	0	5.7	8.4
Census Tract 0006.01, Block Group 4	1,311	79.3	4	0	3.4	0	0	7.9	5.4	20.7	31.1

Geographic Area	Total Population (count)	White (%)^a	Black or African American (%)^a	American Indian & Alaska Native (%)^a	Asian (%)^a	Native Hawaiian & Other Pacific Islander (%)^a	Some Other Race (%)^a	Two or More Races (%)^a	Hispanic or Latino (any race) (%)^a	Total Minority Population (%)^a	Households in Poverty (%)^b
Census Tract 0027.00, Block Group 4	526	57.2	13.3	0	0	0	0	29.5	0	42.8	14.8

* Reference community

^a Percent of Total Population (Table B03002 – Hispanic or Latino Origin by Race. 2022 ACS 5-Year Estimates Detailed Tables. United States Census Bureau, 2018-2022 American Community Survey 5-Year Estimates. Accessed January 25, 2024. <https://data.census.gov/table?d=ACS+5-Year+Estimates+Detailed+Tables&tid=ACSDT5Y2022.B03002>).

^b Percent of Households (Table B17017 – Poverty Status in the Past 12 Months by Household Type and Age of Householder. 2022 ACS 5-Year Estimates Detailed Tables. United States Census Bureau, 2018-2022 American Community Survey 5-Year Estimates. Accessed January 25, 2024. <https://data.census.gov/cedsci/table?d=ACS%205-Year%20Estimates%20Detailed%20Tables&tid=ACSDT5Y2022.B17017>).

Gray shading denotes an environmental justice community.

Table C-11. Analysis of fish and wildlife agency recommendations for the Niagara Project (source: staff).

Recommendation	Agency	Within the Scope of Section 10(j)	Levelized Annual Cost	Recommend Adopting?
1. Operate the project in an instantaneous run-of-river mode, whereby inflow to the project equals outflow from the project at all times and water levels above the dam are not drawn down for the purpose of generating power.	Interior, Virginia DWR	Yes	\$0	No. ^a We recommend operating the project in a run-of-river mode, but where inflow to the project approximates, rather than equals, outflow at any given point in time. See discussion in section 5.3.
2. Provide a continuous minimum flow of 10% of the inflow to the project, or 30 cfs (whichever is greater) to the bypassed reach.	Interior, Virginia DWR	Yes	\$372 ^{b,c}	No. ^a Instead, we recommend the certification condition that requires a continuous minimum flow of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less). See discussion in section 5.3.
3. Develop an operations and compliance monitoring plan for maintaining and monitoring run-of-river operation and minimum flow releases at the project.	Interior, Virginia DWR	Yes	\$20,068 ^b	Yes.
4. Implement an impoundment refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of project inflow (not including flow allocated to the bypassed reach) is passed downstream and the headpond is refilled using the remaining 10% of project inflow.	Interior, Virginia DWR	Yes	\$0	Yes.

Recommendation	Agency	Within the Scope of Section 10(j)	Levelized Annual Cost	Recommend Adopting?
<p>5. Develop a Roanoke logperch enhancement plan, in consultation with Interior and Virginia DWR, to outline how Appalachian would work with the agencies to enhance Roanoke logperch habitat and provide annual funds for restoration projects.</p>	<p>Interior, Virginia DWR</p>	<p>No. Providing funding is not a specific fish and wildlife measure. In addition, measure lacks specificity with regard to what specific actions would meet the intent of the recommendation.</p>	<p>\$2,537^b</p>	<p>No. Not a specific measure relating to, or mitigating, potential project effects.</p>
<p>6. Implement a protocol to avoid adverse impacts to Indiana bat, northern long-eared bat, and tricolored bat, that (1) avoids any tree removal activities from April 1 through November 14 or (2) conducts bat emergent surveys to determine if bats are utilizing potential roost trees (i.e., trees = 3 inches diameter breast height) slated to be removed from April 1 through November 14.</p>	<p>Interior, Virginia DWR</p>	<p>Yes</p>	<p>\$0</p>	<p>Yes. Adopted option 1, which would provide the necessary protection to Indiana bat, northern long-eared bat, and tricolored bat at a lower cost compared to option 2 (conducting surveys).</p>
<p>7. Notify FWS, Virginia DWR, and the Commission of any activity that may affect a listed species in a manner not considered in the new license.</p>	<p>Interior, Virginia DWR</p>	<p>No. Notification alone is an administrative matter and not a specific fish and wildlife measure.</p>	<p>\$0</p>	<p>No. The Commission typically includes in its licenses a standard article providing such protection.</p>

Recommendation	Agency	Within the Scope of Section 10(j)	Levelized Annual Cost	Recommend Adopting?
8. No vegetation removal/trimming or ground disturbance in natural areas ⁹⁷ between March 15 and August 15 to avoid adverse impacts to migratory birds during the nesting season.	Interior, Virginia DWR	Yes	\$0	Yes.
9. In the event bald eagles are documented at or in the vicinity of the project at any time during the license term, coordinate with the FWS and Virginia DWR to avoid impacts to this species.	Interior, Virginia DWR	No. Consultation alone is an administrative matter and not a specific fish and wildlife measure.	\$372 ^b	Yes.
10. No vegetation management activities should be conducted during the breeding season (spring through early fall) where the monarch caterpillar host plant, milkweed, is present.	Interior, Virginia DWR	Yes	\$0	Yes.

^a Preliminary findings that recommendations found to be within the scope of section 10(j) are inconsistent with the comprehensive planning standard of section 10(a) of the FPA, including the equal consideration provision of section 4(e) of the FPA, are based on staff's determination that the costs of the measures outweigh the expected benefits.

^b Cost estimated by staff.

^c In addition to the levelized annual cost, there would be an opportunity cost of \$56,545 associated with 991 MW of foregone generation (*see* Appendix F).

⁹⁷ As noted above in section 3.3.3, *Terrestrial Resources*, staff interprets this term as an area within the project boundary that is not typically subject to routine vegetation maintenance.

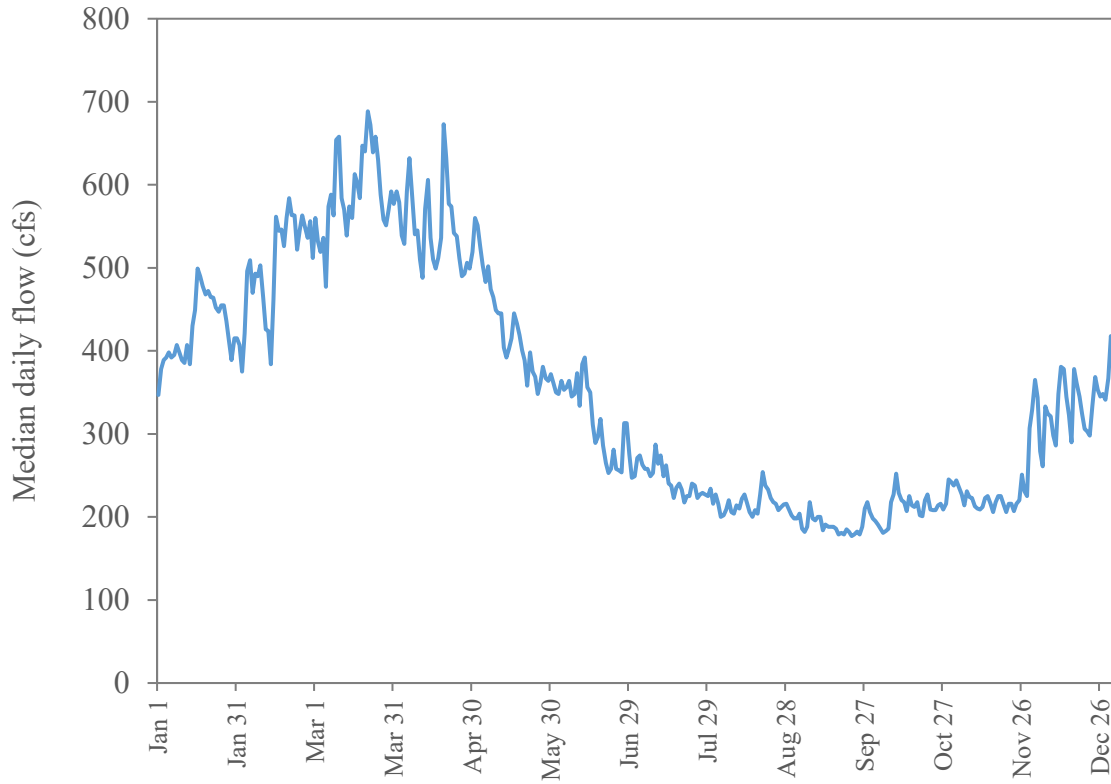


Figure C-3. Annual hydrograph of median daily flows at the Niagara Project based on data from USGS gage 02056000, 1994–2022 (source: USGS, 2023 and staff).

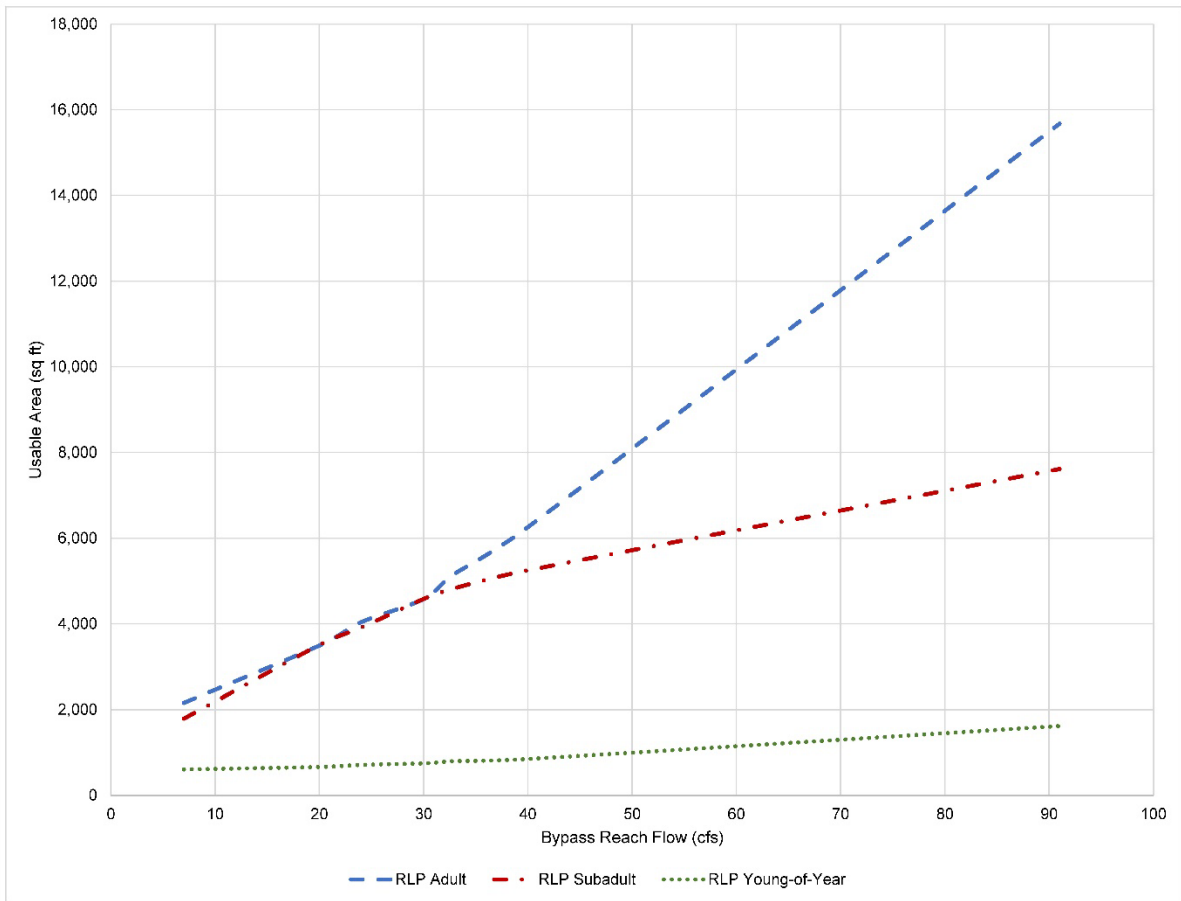


Figure C-4. Predicted usable area (square feet) by flow for Roanoke logperch adults, subadults, and young-of year (source: license application, Appendix A - Bypass Reach Flow and Aquatic Habitat Study Report).

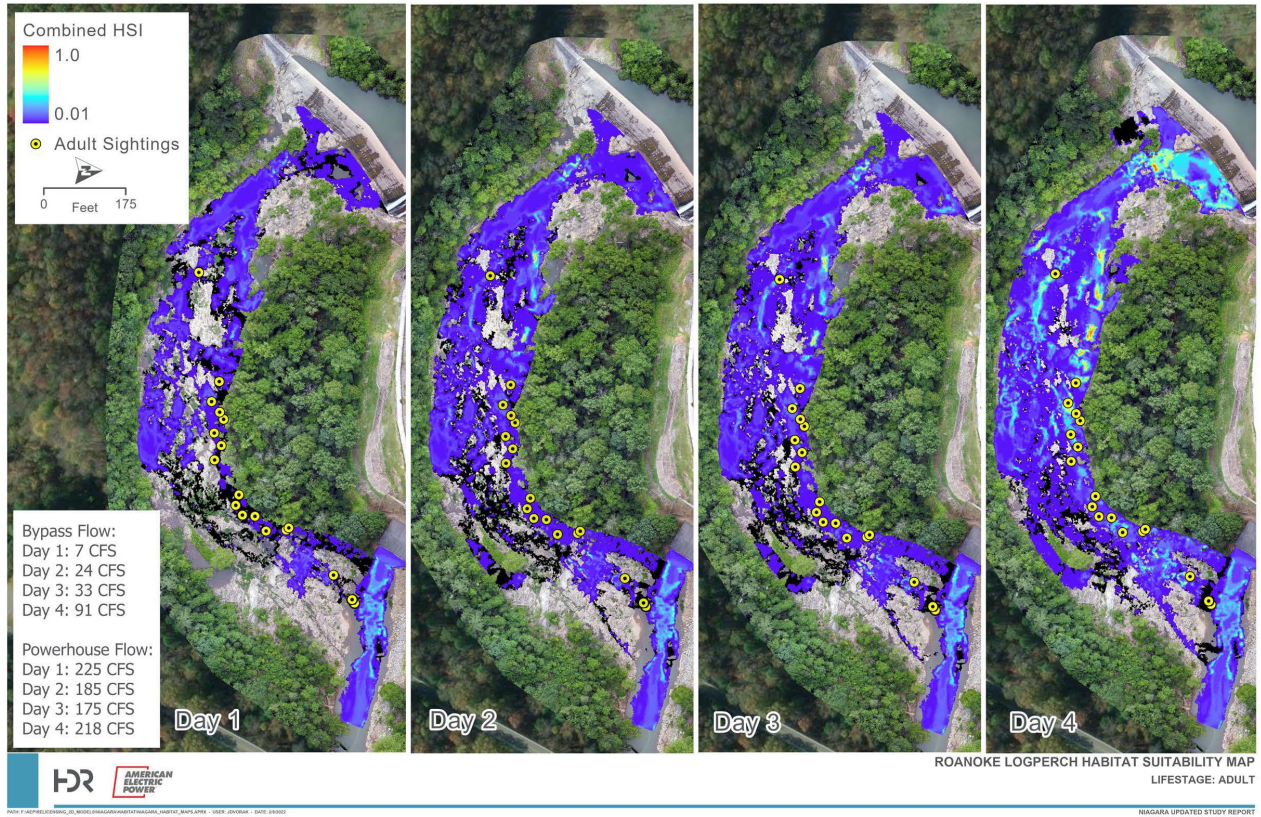


Figure C-5. Predicted habitat suitability for Roanoke logperch under four bypassed reach flows and locations where adult Roanoke logperch were observed in fish surveys (source: license application).

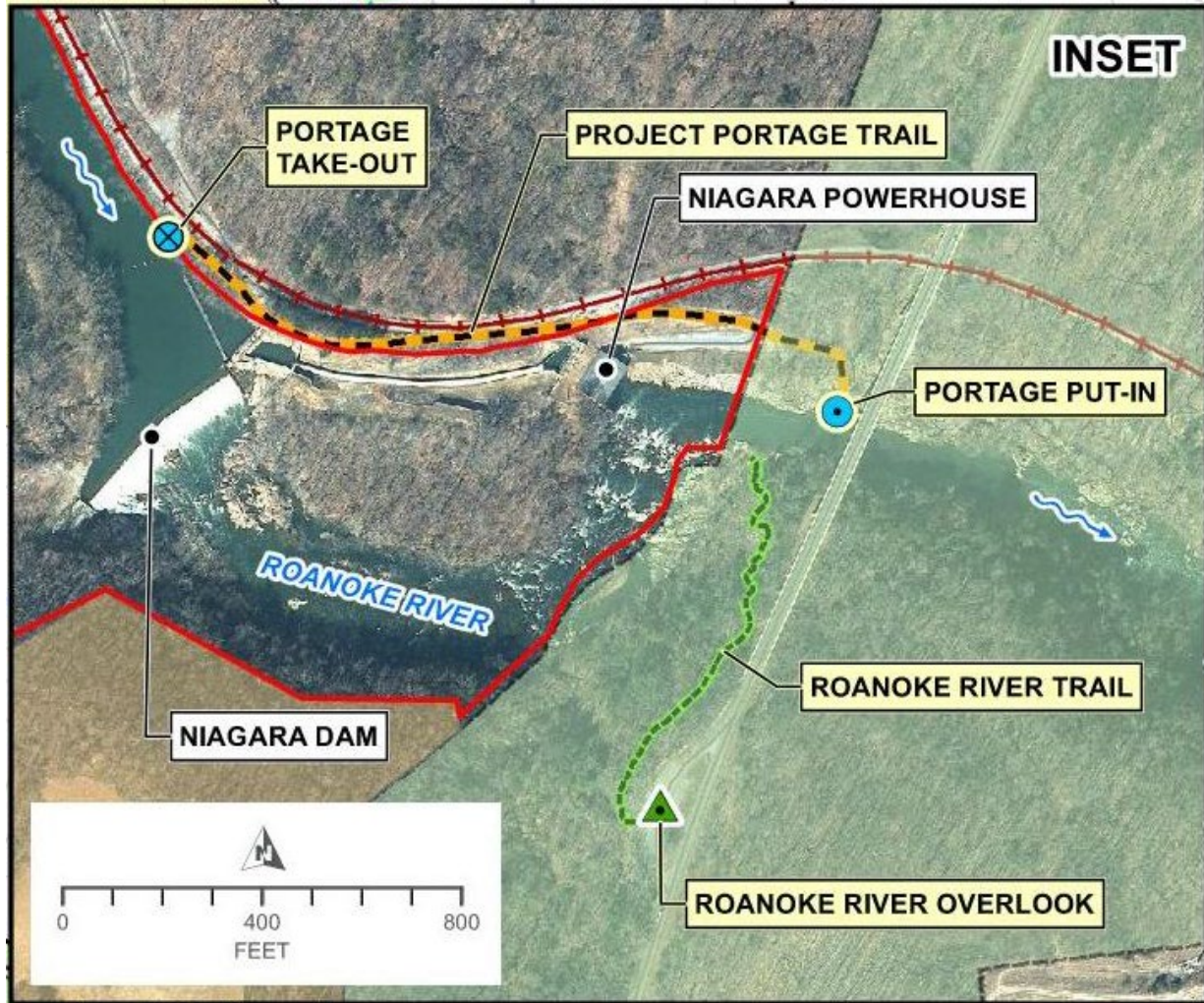


Figure C-6. Recreational facilities within and adjacent to the project boundary (source: inset of figure E.11-1 of the license application).

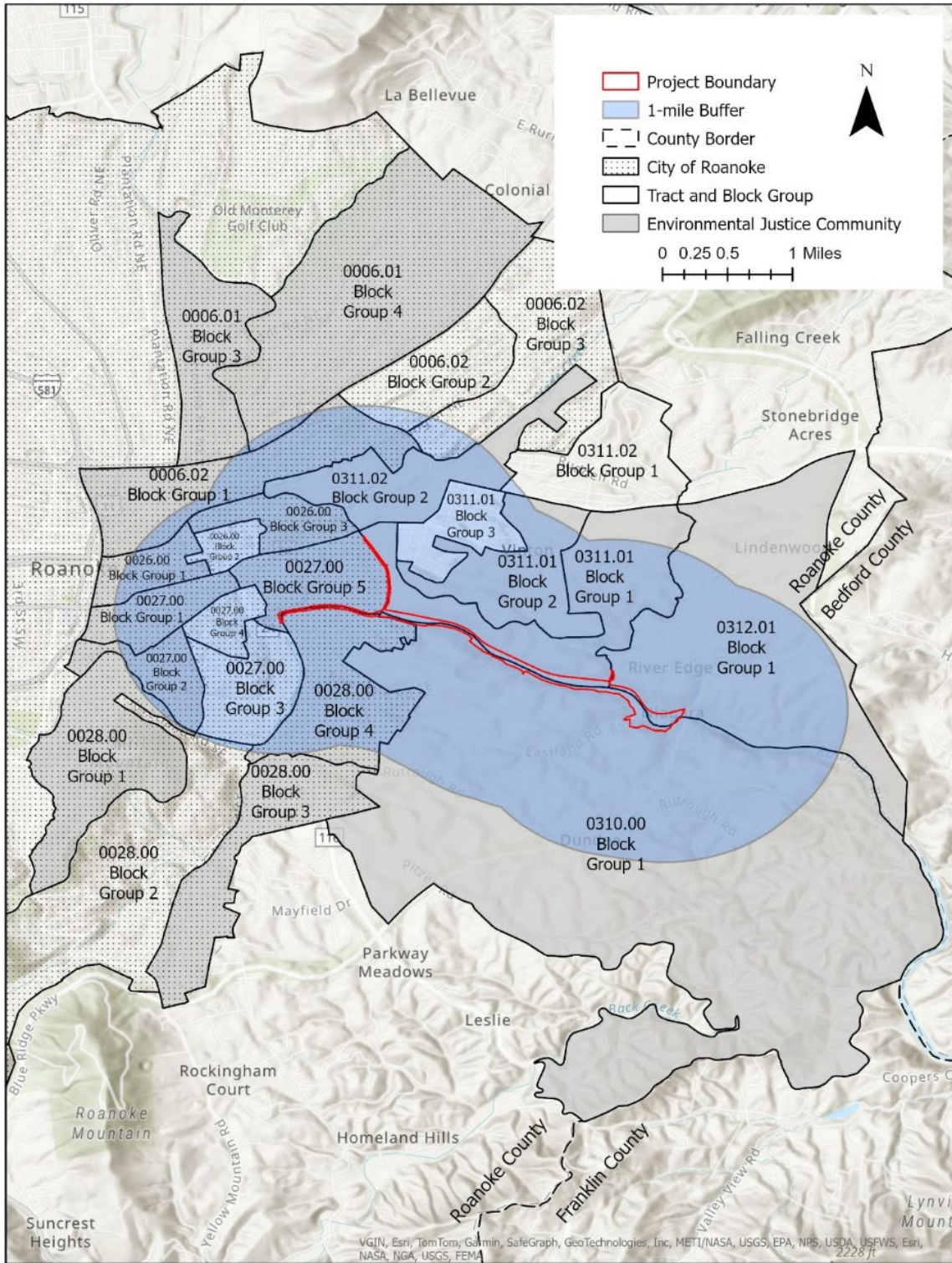


Figure C-7. Block groups and environmental justice communities within 1-mile of the Niagara Project boundary (source: staff).

APPENDIX D:

GLOSSARY OF TERMS

Bank Erosion Hazard Index (BEHI): A method for quantifying the potential or risk for stream bank erosion through assessment of physical and geomorphic properties of the streambank.

Capacity benefit: The benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

Census block groups: Statistical divisions of census tracts that generally contain between 600 and 3,000 people (U.S. Census Bureau, 2022a).

Correlation factor: A number used in blade strike analyses to adjust the predicted turbine strike results to more closely match empirical results.

Cyclopean concrete: A mixture of concrete and large size stones and/or boulders.

Drawdown zone: The area of the impoundment within the operating range of project turbines.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA, 2022a).

Environmental justice community: Disadvantaged communities that have been historically marginalized and overburdened by pollution. The term also includes, but may not be limited to, minority populations, low-income populations, or indigenous peoples (EPA, 2022a).

Fugitive dust: Small particles of matter, often made predominantly of soil, that are suspended in the air by wind or human activities.

Guild: Group of species with similar roles or functions (e.g., habitat).

Hibernacula: Where a bat hibernates during the winter, such as in caves, mines, and other structures.

Lacustrine: Relating to or associated with lakes.

Lotic: Relating to or associated with moving water.

Minority: Individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ, 1997 at 25).

Minority population: Block groups within the area of study where: (1) the aggregate minority population of the block group in the affected area exceeds 50%; or (2) the aggregate minority population in the block group affected is 10% higher than the aggregate minority population percentage in the county.

Recreation day: each visit by a person to a facility for recreational purposes during any portion of a 24-hour period.

Rule curve: A common method for managing water levels in storage reservoirs that sets time-dependent limits (often seasonally based) on reservoir elevations.

Swarming: The time between summer and winter hibernation for bats. The purpose of swarming behavior may include the introduction of juveniles to potential hibernacula, copulation, and gathering at stop-over sites on migratory pathways between summer and winter regions.

Swim speeds: Researchers use several metrics to quantify the swimming performance of fish including: sustained swim speed, prolonged swim speed, critical swim speed, and burst swim speed. The sustained swim speed is the speed a fish can maintain indefinitely without becoming fatigued. The prolonged swim speed is the speed a fish can maintain for a specific period of time (e.g., up to 200 minutes) that varies among studies. The critical swim speed is a subset of the prolonged swim speed. The duration of time that researchers use to evaluate the critical speed varies among studies. The burst swim speed is the fastest swimming speed, which can only be maintained for approximately 20 seconds.

Total Maximum Daily Load (TMDL): A set of total pollutant standards given to specific river systems using background water quality concentrations and point source and non-point source loadings. The standards are used to create a maximum water quality limit the water body is able to assimilate (i.e., how much of a specific parameter can be taken up by natural processes).

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; and those requiring a federal permit, license, or approval. 36 C.F.R. § 800.16. For purposes of this NEPA document, the undertaking is the potential issuance of a new license for the Niagara Project.

Virginia Stream Condition Index: A multimeric index of biological integrity used to translate macroinvertebrate community data into a numerical value of biological condition of a stream relative to reference (unimpaired) streams in the region. Scores range between 0 (most impaired) and 100 (unimpaired).

White-nose syndrome: A fungal infection that agitates hibernating bats, causing them to rouse prematurely and burn fat supplies. Mortality results from starvation or, in some cases, exposure.

APPENDIX E: DEVELOPMENTAL RESOURCES

Power and Economic Benefits of the Project

Table E-1 summarizes the assumptions and economic information used in the analysis. Most of this information is provided by the applicant in its license application. Some is developed by Commission staff. The values provided by the applicant are typically reasonable for the purposes of our analysis. If they are not, it is noted below. Cost items common to all alternatives include taxes and insurance, estimated capital investment required for major modifications, relicensing costs, normal operation and maintenance cost, and Commission fees. All costs are adjusted to 2023 dollars.

Table E-1. Parameters for the economic analysis of the Niagara Project (source: staff and Appalachian).

Economic Parameter	Value
Installed Capacity	2.4 MW
Average annual generation	8,557 MWh
Period of analysis	30 years
Taxes	\$62,127/year
Insurance	Included in operation and maintenance
Interest rate	5.5%
Net investment	\$2,214,597
Relicensing cost	\$1,893,850
Operation and maintenance	\$298,609
Estimated Commission annual charges ^a	\$7,826
Alternative source of power's cost ^{b,c}	
¹⁾ Energy cost	\$52.71/MWh
²⁾ Capacity benefit cost	\$179.08/kilowatt-year

^a The Commission collects an annual administration charge for all licensed projects (<https://www.ferc.gov/media/2023-estimated-administrative-annual-charge>) which is based on the authorized installed capacity of the project.

^b The alternative source of power's cost is based on the current cost of providing the same amount of generation and capacity benefit from a natural gas-fired combined cycle plant, as reported by The U.S. Energy Information Administration (EIA), Annual Energy Outlook 2023, for the Division 5, South Atlantic Region. The alternative source of power's cost is reported in table E-2 and is a combination of the cost of energy and capacity benefit.

^c In keeping with Commission policy as articulated in Mead, we use the most likely alternative source of power's cost.

Comparison of Alternatives

Table E-2 summarizes the installed capacity, annual generation, capacity benefit, current alternative source of power's cost, total annual project cost, and difference between the alternative source of power cost and total annual project cost for each of the alternatives considered in this EA: no action alternative, the applicant's proposal, and the staff alternative.

Table E-2. Summary of the annual cost of alternative power and annual project cost for three alternatives for the Niagara Project (source: staff).

	No-Action Alternative	Applicant's Proposal	Staff Alternative
Installed capacity (MW)	2.4	2.4	2.4
Annual generation (MWh)	8,557	8,037	7,907
Capacity benefit (MW) ^a	1.24	1.24	1.24
Current alternative source of power cost (\$) ^b	673,099	645,689	638,837
Total annual project cost (\$) ^c	651,245	724,327	729,805
Difference between the alternative source of power cost and total annual project cost (\$) ^d	21,854	(78,638)	(90,968)

^a We estimated the capacity benefit based on the ratio of the median flow available for generation for each of 12 months and the hydraulic capacity of the project.

^b The alternative source of power's cost is based on the alternative source of power for the Division 5, South Atlantic Region, as identified in table E-1 above.

^c Project costs include the cost of environmental measures listed in Appendix F with the exception of minimum flow release opportunity costs and the costs identified in table E-1. All project costs were adjusted to 2023 dollars.

^d A number in parentheses denotes that the difference between the alternative source of power's cost and the total project cost is negative; thus, the project's cost to produce power is greater than the alternative source of power cost.

No-action Alternative

Under the no-action alternative, the project has an installed capacity of 2.4 MW, a capacity benefit of 1.24 MW, and an average annual generation of 8,557 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit is \$673,099. The total annual project cost is \$651,245. Subtracting the total

annual project cost from the alternative source of power's current cost, the project's cost to produce power and capacity is \$21,854 less than that of the alternative source of power's cost.

Applicant's Proposal

Under the applicant's proposal, the project would have a total installed capacity of 2.4 MW, a capacity benefit of 1.24 MW, and an average annual generation of 8,037 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit would be \$645,689. The total annual project cost would be \$724,327. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce power and capacity would be \$78,638 more than that of the alternative source of power's cost.

Staff Alternative

Under the staff-recommended alternative, the project would have a total installed capacity of 2.4 MW, a capacity benefit of 1.24 MW, and an average annual generation of 7,907 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit would be \$638,837. The total annual project cost would be \$729,805. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce power and capacity would be \$90,968 more than that of the alternative source of power's cost.

APPENDIX F:

COST OF ENVIRONMENTAL MEASURES

Enhancement / Mitigation Measure	Entity	Capital Cost ^a	Annual Cost ^a	Levelized Annual Cost ^b
Geologic and Soil Resources				
1. Develop an erosion and sediment control plan.	Staff	\$5,411 ^c	\$2,164 ^c	\$2,537
Aquatic Resources				
2. Operate the project in an instantaneous run-of-river mode under all flow conditions, with total outflow from the project equaling inflow on an instantaneous basis.	Appalachian, Interior, Virginia DWR	\$0	\$0	\$0
3. Operate the project in a run-of-river mode under all flow conditions, where inflow <i>approximates</i> outflow at any given point in time.	Staff	\$0	\$0	\$0
4. Provide a continuous minimum flow of 30 cfs to the bypassed reach.	Appalachian	\$5,411	\$0 ^{c,d}	\$372
5. Provide a continuous minimum flow to the project's bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less).	Virginia DEQ, Staff	\$5,411	\$0 ^{c,e}	\$372
6. Provide a continuous minimum flow of 10% of the inflow to the project, or 30 cfs (whichever is greater) to the bypassed reach.	Interior, Virginia DWR	\$5,411 ^c	\$0 ^{c,f}	\$372

Enhancement / Mitigation Measure	Entity	Capital Cost^a	Annual Cost^a	Levelized Annual Cost^b
7. Continue to provide funding for the USGS gage No. 2056000 (Roanoke River at Niagara, VA).	Appalachian	\$0	\$17,532	\$17,532
8. Develop an operations and compliance monitoring plan for maintaining and monitoring run-of-river operation and minimum flow releases at the project.	Interior, Virginia DWR	\$5,411 ^c	\$19,696 ^{c,g}	\$20,068
9. Develop a monitoring and operations plan in accordance with certification conditions I.D.2, I.D.3, I.E.1, and I.E.2.	Virginia DEQ	\$5,411 ^c	\$19,696 ^{c,g}	\$20,068
10. Develop an operation compliance monitoring plan that incorporates the monitoring and operations plan specified by the certification (conditions I.D.2, I.D.3, I.E.1, and I.E.2) and describes the methodology, instrumentation, and reporting procedures that would be used to verify the project is being operated in accordance with the operational requirements of any new license issued for the project	Staff	\$5,411 ^c	\$19,696 ^{c,g}	\$20,068
11. Implement an impoundment refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of project inflow (not including flow allocated to the bypassed reach) is	Interior, Virginia DWR, Staff	\$0	\$0	\$0

Enhancement / Mitigation Measure	Entity	Capital Cost^a	Annual Cost^a	Levelized Annual Cost^b
passed downstream and the headpond is refilled using the remaining 10% of project inflow.				
Terrestrial Resources				
12. Develop and implement a terrestrial resources protection plan in consultation with FWS and Virginia DWR.	Appalachian	\$16,233	\$5,411	\$6,528
13. In the event bald eagles are documented at or in the vicinity of the project at any time during the license term, coordinate with the FWS and Virginia DWR to avoid impacts to this species.	Interior, Virginia DWR	\$0	\$0	\$0
14. Develop a bald eagle protection plan, consistent with FWS's National Bald Eagle Management Guidelines, to ensure the protection of eagles that roost or nest at the project.	Staff	\$5,411 ^c	\$0	\$372
15. To protect migratory birds, avoid removal/trimming of vegetation or ground disturbance outside of routinely maintained areas between March 15 and August 15.	Interior, Virginia DWR, Staff	\$0	\$0	\$0
16. To protect monarch butterfly and its host plant (milkweed), avoid vegetation management activities during the monarch breeding season (spring	Interior, Virginia DWR	\$0	\$0	\$0

Enhancement / Mitigation Measure	Entity	Capital Cost^a	Annual Cost^a	Levelized Annual Cost^b
through early fall) outside of routinely maintained areas.				
17. To protect monarch butterfly and its host plant (milkweed), avoid vegetation management activities during the monarch breeding season (April 1 through September 30) outside of routinely maintained areas.	Staff	\$0	\$0	\$0
Threatened and Endangered Species				
18. Develop a Roanoke logperch enhancement plan.	Interior, Virginia DWR	\$5,411 ^c	\$2,164 ^{c,h}	\$2,537
19. To protect Indiana, northern long-eared, and tricolored bats, avoid any tree removal activities associated with the operation or maintenance of the Niagara Project from April 1 through November 14.	Interior, Virginia DWR, Staff	\$0	\$0	\$0
20. To protect Indiana, northern long-eared, and tricolored bats, conduct bat emergent surveys to determine if bats are utilizing potential roost trees (i.e., trees = 3 inches diameter breast height) slated to be removed from April 1 through November 14.	Interior, Virginia DWR	\$5,411 ^c	\$0	\$372
Recreation				
21. Develop a recreation management plan.	Appalachian	\$5,411 ^c	\$1,082 ^c	\$1,455

Enhancement / Mitigation Measure	Entity	Capital Cost^a	Annual Cost^a	Levelized Annual Cost^b
22. Construct, operate, and maintain a boat put-in facility within the project boundary.	Appalachian, National Park Service (Park Service), Roanoke County, Town of Vinton, Roanoke Outside Foundation, Blueway Committee, Interior, Virginia DWR, Staff	\$27,055 ^{c,i}	\$1,082 ^{c,i}	\$2,944
23. Provide controlled recreational flow releases.	Roanoke County, Roanoke Outside Foundation	\$108,220	\$10,822	\$18,268
24. Improve boat take-out facility (e.g., timber steps, bank stabilization).	Appalachian, Staff	\$6,493	\$2,164	\$2,611
25. Improve gravel portion of the portage route (e.g., clearing, grading, adding crushed stone).	Appalachian, Staff	\$8,658	\$2,164	\$2,760
26. Replace existing project information and directional signage associated with the recreational facilities.	Appalachian, Staff	\$12,986	\$1,082	\$1,976
27. Install additional signs providing emergency contact information.	Appalachian, Staff	\$2,164	\$1,082	\$1,231
28. Site clean-up and landscaping.	Appalachian, Staff	\$4,329	\$2,164	\$2,462

Enhancement / Mitigation Measure	Entity	Capital Cost^a	Annual Cost^a	Levelized Annual Cost^b
29. Develop a website with information about downstream flows and recreational opportunities in the project area.	Appalachian, Staff	\$21,644	\$1,082	\$2,571
30. Conduct recreational use monitoring every 5 years.	Roanoke County, Town of Vinton	\$8,335 ^c	\$2,083 ^c	\$2,656
31. Conduct recreational use monitoring every 10 to 20 years.	Appalachian	\$8,335 ^c	\$4,166 ^c and \$8,332 ^c	\$880
32. Conduct recreational use monitoring 5 years post-license issuance then every 10 years.	Staff	\$8,335 ^c	\$2,083 ^c and \$4,116 ^c	\$1,453
Cultural Resources				
33. Consult with the Virginia SHPO if previously unidentified cultural resources are encountered during the term of any new license issued for the project to ensure the proper treatment of these resources and discontinue all ground-disturbing activities until the proper treatment of the resources is established.	Appalachian	\$0	\$0	\$0
34. In addition to consulting with the Virginia SHPO, the licensee would notify the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe if previously unidentified cultural	Catawba Indian Nation, Delaware Nation, Monacan Indian Nation,	\$0	\$0	\$0

Enhancement / Mitigation Measure	Entity	Capital Cost ^a	Annual Cost ^a	Levelized Annual Cost ^b
resources are encountered during the term of any new license issued for the project and discontinue all ground-disturbing activities until the proper treatment of the resources is established.	Pamunkey Indian Tribe, Staff			

^a Unless otherwise noted all cost estimates are from Appalachian, escalated to 2023 dollars.

^b All capital and annual costs are converted to equal annual (levelized) costs over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

^c Cost estimated by staff.

^d Appalachian’s proposal to provide a minimum bypassed reach flow of 30 cfs or inflow, whichever is less, would decrease electricity production by 520 MWh per year relative to current conditions. Using an energy cost of \$52.71/MWh from table E-1 as a proxy for the value of lost generation, 520 MWh of lost generation would be valued at a lost opportunity cost of \$29,761/year.

^e Providing a continuous minimum flow to the project’s bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less) would decrease electricity production by 650 MWh per year relative to current conditions. Using an energy cost of \$52.71/MWh from table E-1 as a proxy for the value of lost generation, 650 MWh of lost generation would be valued at a lost opportunity cost of \$37,201/year.

^f Interior and Virginia DWR do not specify the time step that would be used to calculate 10% of the project inflow (e.g., daily, weekly, monthly). We estimated the annual opportunity cost of foregone generation associated with providing the recommended flows using 10% of the monthly mean flows (based on flow data from 1994 to 2022), which would decrease electricity production by 991 MWh per year relative to current conditions. Using an energy cost of \$52.71/MWh from table E-1 as a proxy for the value of lost generation, 991 MWh of lost generation would be valued at a lost opportunity cost of \$56,545/year.

^g The estimated value considers administrative costs of producing a plan (\$2,164) and continued funding of the USGS gage as estimated by Appalachian (\$17,532).

^h The estimated value only considers administrative costs of producing a plan and not the cost of implementing its measures because the magnitude of such costs is unknown at this time.

ⁱ Appalachian only proposes this action if Park Service property is no longer available. However, the cost of the measure remains the same regardless of the reason for implementation.

APPENDIX G: COMPREHENSIVE DEVELOPMENT

In section 5.1, we identify which measures we recommend be included in any new license issued for the Niagara Project. Below, we discuss the basis for our recommendations.

Measures Recommended by Staff

Erosion and Sediment Control

Appalachian proposes to develop and implement a recreation management plan that may include enhancements to the boat take-out facility (e.g., replacement of steps, bank stabilization). Additionally, as described below, staff recommends modifications to the existing location of the boat put-in facility downstream of the tailrace that may require some excavation activities that would temporarily disturb soil and botanical resources. The proposed modifications to the take-out facility and construction of a new boat put-in facility within the project boundary could potentially affect water quality if erosion of disturbed soils run off into the Roanoke River causing temporarily increased turbidity. To reduce these impacts, staff recommends that Appalachian develop an erosion and sediment control plan to utilize best management practices in the construction areas such as erosion control fencing, soil stabilization mats, and revegetating disturbed areas using weed-free seed. Minimizing sediment transport from construction areas to the Roanoke River would help preserve water quality in the river and protect fish and other aquatic biota. We estimate that the levelized annual cost to develop an erosion and sediment control plan would be \$2,537 and conclude that the benefits of the measure would outweigh the costs.

Mode of Operation

Currently, the Niagara Project operates in a run-of-river mode under all flow conditions, where outflow approximates inflow at any given point in time. The project is operated to maintain the impoundment at or near elevation 884.4 feet, which is 0.6 foot below the crest of the main spillway. During extreme flow conditions, such as rapidly changing inflows, Appalachian operates the project with a minimum impoundment elevation of 883.4 feet. Appalachian proposes to operate the project as it currently does, except that inflow would *equal*, rather than approximate, outflow. Run-of-river operation would be temporarily modified by operating emergencies beyond the control of Appalachian and for short periods upon mutual agreement among Appalachian, FWS, and Virginia DWR. Interior and Virginia DWR recommend, under section 10(j) of the FPA, that the project be operated in an instantaneous run-of-river mode, whereby inflow to the project equals outflow from the project at all times.

As discussed in section 3.3.2.2, *Environmental Effects, Mode of Operation*, operating the project such that the total outflow from the project approximates, rather than equals, inflow at any point in time would still be expected to result in relatively stable impoundment elevations, in addition to being more practical from a compliance standpoint. Operating the project in this manner (i.e., a non-instantaneous run-of-river mode) would also ensure that downstream flows are similar in magnitude and timing to natural river flows. Hence, operating the project in a non-

instantaneous run-of-river mode would provide similar benefits to aquatic resources upstream and downstream of the project as would the recommended instantaneous run-of-river mode of operation (if operating the project in this mode is feasible).

Therefore, we recommend that the Niagara Project be operated in a run-of-river mode where outflow approximates, rather than equals, inflow at any given point in time. There are no incremental costs associated with this measure because it reflects Appalachian's current mode of project operation.

Minimum Flows

Currently, Appalachian provides a continuous, year-round flow of 8 cfs to the bypassed reach. It proposes to release a continuous, year-round 30-cfs minimum flow, or project inflow, if less, into the bypassed reach for the protection of water quality and aquatic resources. Virginia DEQ's certification condition would require Appalachian to provide a continuous minimum flow to the bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less). Interior and Virginia DWR recommend, under section 10(j), that a continuous minimum flow of 10% of the inflow to the project, or 30 cfs (whichever is greater) be provided to the bypassed reach, to mimic the natural seasonal variation in flows.

The minimum flow would be provided through the existing Obermeyer gate at the project dam. As discussed in section 3.3.2.2, *Environmental Effects, Minimum Flows, Appalachian's Bypassed Reach Flow and Aquatic Habitat Study* indicates that the amount of available habitat for target species and guilds is higher at 30 cfs compared to the 8 cfs provided under the current operation, including for the federally listed Roanoke logperch. For some modelled fish guilds and species, the largest rate of habitat gains occurs from 8 to 30 cfs, with a lower rate of gain above 30 cfs, but for others, including the Roanoke logperch, predicted habitat suitability increases at a steady rate above 30 cfs to the highest modelled flow (91 cfs). Hence, Virginia DEQ's required seasonal 45-cfs flow would provide additional habitat for Roanoke logperch and other modelled fish guilds during the winter and spring months. Based on historical flows, the greatest gains in habitat under Interior and Virginia DWR's recommended flow regime would likely occur during the high-flow spring months from February through May, with lower flows and relative habitat gains during the remainder of the year. In addition to increases in available aquatic habitat, an increase to the minimum flow under the applicant's proposal and as recommended by the agencies should help prevent the occurrence of low DO conditions in the upper section of the bypassed reach during warm, low-flow summer months.

Interior and Virginia DWR do not specify the timestep which would be used to determine or to provide their recommended minimum flows (e.g., hourly, daily, or monthly average). For our analysis, we estimated annual opportunity costs in foregone generation from providing the recommended flows using 10% of the monthly mean flows (based on flow data from 1994 to 2022, as shown in table C-1). The Obermeyer gate is capable of providing flow releases of approximately 7 cfs to 287 cfs under the current and proposed impoundment operating range of 883.4 feet to 884.4 feet, respectively, hence it would be capable of providing the range of recommended flows without modification and shouldn't require additional capital costs beyond what Appalachian estimates for its proposed 30-cfs minimum flow. However, there may be

some additional unknown operational costs of providing recommended variable minimum flows, depending on the time step used to determine the flow requirement at any given moment (e.g., would the hourly/daily average flow from the previous day be used to set the flow requirement for the following hour/day). Virginia DEQ's certification condition, which would require Appalachian to provide a continuous minimum flow to the bypassed reach of 45 cfs from January 1 through June 30 and 30 cfs from July 1 through December 31 (or inflow, whichever is less), would provide similar benefits to aquatic resources as Interior and Virginia DWR's recommended variable flows, but at a lower cost. The required seasonal flow would strike the appropriate balance between developmental and non-developmental resources by continuing to provide a source of hydroelectric power while also protecting environmental resources. Therefore, we conclude that the benefits of providing 10% of the inflow (assumed to be based on mean monthly flows) to the bypassed reach, as recommended by Interior and Virginia DWR, are not worth the opportunity cost of \$56,545 and the estimated annual levelized cost of \$372. While the opportunity cost of providing the minimum flows as required by the certification condition (\$37,201) is slightly higher than a year-round 30-cfs minimum flow as proposed by Appalachian (\$29,761), we conclude that the benefits are worth the cost.

Operation Compliance Monitoring Plan

Although Appalachian proposes to operate the project in a run-of-river mode and provide a 30-cfs minimum flow to the bypassed reach, it does not specify how it would ensure compliance with these measures, other than that it would continue to provide funding for the USGS gage located approximately 200 feet downstream of the powerhouse. In addition, it does not provide the specific elevation range (band) over which the impoundment would be maintained during normal or "extreme flow" project operations. Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian develop an operations and compliance monitoring plan for maintaining and monitoring run-of-river operation and minimum flow releases at the project and provide the plan to FWS and Virginia DWR for review within 6 months of any license issuance. The plan would include: (1) a description of the mechanisms and structures that would be used in maintaining and monitoring minimum flow and run-of-river operation at the project; (2) a description of the project's operation (i.e., manual and automatic); (3) methods used for recording data on run-of-river operation and minimum flow releases to the bypassed reach; (4) an implementation schedule; and (5) a provision to maintain the operation data for inspection by FWS and Virginia DWR. The agencies further recommend that relevant operational data such as headpond elevation and station generation should be recorded at least hourly and records should be maintained digitally for the term of any new license issued for the project. Virginia DEQ's certification condition I.E.1 would require Appalachian to develop a project monitoring and operations plan that follows the monitoring, inflow estimation, and reporting procedures in certification conditions I.D.2, I.D.3, and I.E.2. The plan would be submitted to Virginia DEQ, for approval, within 120 days of the issuance of any new license issued for the project. Condition I.E.3 outlines procedures for implementing conservation measures as directed by the Commonwealth of Virginia or county government during declared drought emergencies.

As discussed in 3.3.2.2, *Environmental Effects, Operation Compliance Monitoring*, the development of a plan describing the methodology, instrumentation, and reporting procedures of project inflows and outflows, impoundment elevations, downstream flows, and releases to the

bypassed reach would serve to ensure and document a record of compliance with run-of-river operation and flow requirements at the Niagara Project. There are additional provisions, not specified in Interior's and Virginia DWR's plan, that would be beneficial for compliance with any license issued for the project, including: (1) a definition of "extreme flow" conditions; (2) specifying the range of impoundment elevations (bands) over which the impoundment would be maintained under both normal run-of-river and "extreme flow" operating conditions; and (3) establishing a schedule for reporting any operational deviations, including any deviations required during drought emergencies, to the Commission. Therefore, developing an operation compliance monitoring plan that incorporates the monitoring and operations plan specified by the certification and includes Interior and Virginia DWR's recommended provisions, as well as the additional staff-recommended provisions above, would ensure the operation requirements in any license issued for the project, for the protection and enhancement of environmental resources, are being met. We estimate that the levelized annual cost to develop an operation compliance monitoring plan, which includes funding of the USGS gage, as estimated by Appalachian, would be \$20,068 and conclude that the benefits of the plan would outweigh the costs.

Impoundment Refill Procedure

Interior and Virginia DWR recommend that Appalachian implement an impoundment refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of inflow (not including flow allocated to the bypassed reach) is passed downstream and the headpond is refilled using the remaining 10% of inflow to the project. The minimum flow to the bypassed reach would be maintained during refilling.

As discussed in section 3.3.2.2 *Environmental Effects, Impoundment Refill Procedure*, Appalachian does not routinely draw down the Niagara Project impoundment, but drawdowns may be required over the duration of a new license for maintenance and emergencies. Releasing 90% of the inflow to the Roanoke River downstream of the project during refilling would minimize the length of time the impoundment is drawn down and flows are reduced downstream, which would help to maintain the existing aquatic habitat for fish and other aquatic species. Implementing this procedure would have minimal or no cost because the expected use of the refill procedure would be infrequent and only 10 percent of the inflow would be retained for refill. Therefore, we recommend that the refill procedure be included in any new license issued for the project.

Bald Eagle Protection

Interior recommends, under section 10(j), that in the event bald eagles are documented at or in the vicinity of the project at any time during the license term, Appalachian must coordinate with the FWS and Virginia DWR to avoid impacts to this species.

Bald eagles are present during the breeding season, are known to forage at the project, nest in the project area, and could establish nests or roosts at the project in the future. Interior's recommendation could help minimize project-related effects on bald eagles, such as disturbance from trimming or removing trees, or noise from maintenance or construction activities, through

consultation during the term of any new license issued for the Niagara Project. However, it is unclear what specific actions taken by the applicant during the license term would cause the need to consult with FWS and Virginia DWR or the timing of such consultation. Therefore, staff recommends developing a bald eagle protection plan, consistent with FWS's National Bald Eagle Management Guidelines, to avoid impacts to bald eagles. Such a plan should include, but not be limited to, the following measures to minimize the potential for project effects on bald eagles: (1) prior to tree clearing, observe the affected area for bald eagle nests, and notify FWS and Virginia DWR within 5 days of discovery if bald eagle nesting activity is discovered within or immediately adjacent to the project boundary; and (2) during the nesting season (December 1 through July 31), no tree clearing would occur within 330 feet, and no construction activities would occur within 660 feet, of any known bald eagle nests. We estimate that the levelized annual cost to develop a bald eagle protection plan would be \$372 and conclude that the benefits of the plan would outweigh the costs.

Migratory Bird Protection

Among the 13 migratory Birds of Conservation Concern identified as potentially occurring within the project's boundary, the Canada warbler, Kentucky warbler, and prothonotary warbler are most likely to be impacted by vegetation maintenance. These birds rely on wetland and riparian habitats during their breeding seasons. Alterations to these sensitive habitats due to maintenance activities could disrupt the availability of suitable breeding sites and food sources, potentially impacting their reproductive success and overall populations. However, because migratory birds rarely nest in regularly maintained areas with low vegetation and high ground disturbance, continuing vegetation maintenance in routinely maintained areas is unlikely to adversely affect migratory bird breeding. Avoiding vegetation maintenance outside of routinely maintained areas between March 15 and August 15 as recommended by Interior and Virginia DWR would minimize project effects on migratory birds. Implementing this measure would have minimal or no cost and we recommend that it be included in any new license issued for the project.

Indiana, Northern Long-eared, and Tricolored Bat Protection

Indiana, northern long-eared, or tricolored bat hibernacula, maternity colonies, and roosts are not known to be present in the vicinity of the Niagara Project. However, staff's review of the iNaturalist database identified records of tricolored bats in Roanoke County. Appalachian is not proposing any new construction at the Niagara Project other than enhancements to the existing canoe portage take-out and trail. Although tree removal associated with routine project maintenance would likely be limited to periodic removal of trees that are a threat to human life, property, or the safe operation of the project (hazard trees), these activities may still affect suitable habitats for bats.

Under section 10(j) of the FPA, Interior and Virginia DWR recommend a protocol to avoid adverse effects on the Indiana, northern long-eared, and tricolored bats by undertaking one of the following measures: avoid any tree removal activities associated with the operation or maintenance of the Niagara Project between April 1 and November 14, or conduct bat exit surveys to determine if bats are utilizing potential roost trees slated to be removed. Because the

staff alternative includes the seasonal restriction on tree removal as recommended by Interior and Virginia DWR, project effects on Indiana, northern long-eared, or tricolored bats would be minimized without the need for conducting bat exit surveys. Implementing seasonal tree removal restrictions would have minimal or no cost while providing a greater or similar benefit compared to bat exit surveys with an annual levelized cost of \$372. Therefore, we recommend that the seasonal tree removal restrictions be included in any new license issued for the project.

Monarch Butterfly Protection

Based on staff's review of the iNaturalist database, monarch butterfly caterpillars and common milkweed (*Asclepias syriaca*) are known to occur less than 1 mile from the project boundary on the Blue Ridge Parkway. If milkweed and other nectar-rich flowering plants are present within the Niagara Project boundary, the presence of such habitat could support monarch butterfly reproduction and foraging.

Current vegetation maintenance of project facilities (such as mowing) is conducted on a routine basis during the growing season. Therefore, it is unlikely that extensive stands of milkweed are present for monarch butterfly reproduction or foraging within routinely maintained areas of the project. Outside of routinely maintained areas, potential monarch butterfly habitat would not likely be disturbed during the growing season. Interior and Virginia DWR's recommendation to avoid vegetation maintenance during the breeding season (spring through early fall, estimated by staff as April 1 through September 30 based on the growing season of milkweed species in Virginia) would provide further assurance that any milkweed stands that grow within the project boundary are not disturbed. Thus, effects of continued operation and maintenance of the Niagara Project on monarch butterflies and its habitat, with the addition of a measure to avoid mowing during the monarch butterfly breeding season in areas not subject to routine maintenance, would be minimal. Implementing this measure would have minimal or no cost and we recommend that it be included in any new license issued for the project.

Recreation Management Plan

The Blueway Committee recommends that Appalachian include in its proposed Recreation Management Plan (RMP) documentation of existing recreation facilities, a description of planned improvements to recreation facilities, and an outline of consultation commitments (i.e., with whom and at what intervals). Additionally, Roanoke County and the Town of Vinton recommend that the RMP include a recreation monitoring plan to survey recreational use every 5 years to assess ongoing use and demand of recreational opportunities in the project area.

The recommended additions to the RMP would provide comprehensive documentation of Appalachian's responsibilities and commitments related to recreation and would aid in future decision-making related to recreation facilities at the project. The anticipated population increase within the Roanoke Region along with the continued expansion of local recreational access would likely result in an increase in demand and use for recreational amenities within the Roanoke Valley-Alleghany Region. Conducting periodic recreational surveys would help determine whether an increase in recreational demand and use is occurring and if so, whether additional recreational amenities are warranted. Therefore, as discussed in section 3.3.5.2,

Recreation Resources, Environmental Effects, we recommend that the above-described additions be included in the RMP. We estimate the levelized annual cost to develop the RMP to be \$1,455. Due to the level of anticipated benefits to recreation resources within the region we conclude that the benefits of developing and executing the RMP would outweigh the costs.

Portage Facility Improvements

The boat take-out facility is difficult for boaters to locate due to lack of signage and is unsafe for boaters to use because of the dilapidated state of the stairs and instability of the embankment. The proposed improvements to the boat take-out facility would improve access and safety for boaters. Signage along the portage trail is worn and limited; therefore, updating the signage, and installing additional signage would improve navigability of the portage trail for users. Clearing and grading the gravel portage trail would improve traction and reduce some slopping creating a safer experience for boaters.

The current boat put-in facility is located within Blue Ridge Parkway which is owned and operated by the Park Service. The boat put-in location is not formally defined (e.g., no physical structure or obvious location such as a beach to launch boats) resulting in recreationists determining the best location to place boats in the river. The shoreline in this area consists of large flat rocks that become slippery when wet and are often covered in debris left from upstream high flows creating a public safety hazard. The Park Service, Roanoke County, the Town of Vinton, the Roanoke Outside Foundation, the Blueway Committee, Interior, and Virginia DWR recommend that Appalachian construct a boat put-in facility within the project boundary.

As discussed in section 3.3.5.2, *Recreation Resources, Environmental Effects*, implementing the proposed improvements to the boat take-out facility and the portage trail would improve navigability and safety for recreationists. Additionally, constructing a boat put-in facility within the project boundary would eliminate the need for a boat put-in facility on Park Service land, would improve Appalachian's ability to implement facility improvements, and would clarify responsibility for operation and maintenance of the facility. Implementing these changes would improve the experience of boaters using the portage facilities by providing a well-defined and safe boating access point to the Roanoke River below the dam. We estimate the levelized annual cost to construct a boat put-in facility within the project boundary to be \$2,944 and conclude that the benefits of the measure would outweigh the costs.

Cultural Resources Protection

Archaeological or historic sites could be discovered during ground-disturbing activities associated with project operation and maintenance over the term of a license. In addition, constructing a formal boat put-in facility within the project boundary would involve some ground disturbance to install a boat ramp or other launching structure.

Therefore, as discussed in section 3.3.7.2, *Cultural Resources, Environmental Effects*, we recommend that Appalachian notify the Commission, the Virginia State Historic Preservation Office (Virginia SHPO), the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe (collectively, Tribes) if previously unidentified archaeological or historic resources are discovered during the term of any new license issued for

the project. In the event of any such discovery, Appalachian should discontinue any ground-disturbing activities until the need for treatment of the archaeological or historic resource is established. Further, if any project modifications are proposed during the term of any license issued for the project, we recommend that the licensee consult with the Commission, the Virginia SHPO, and Tribes to determine the effects of the activities and the need for any cultural resource studies.

Measures Not Recommended by Staff

Roanoke Logperch Enhancement Plan

Roanoke logperch is a federally listed endangered species that is present in the project area, including in the Roanoke River and Tinker Creek upstream of the impoundment and in the bypassed reach. Interior and Virginia DWR recommend, under section 10(j) of the FPA, that Appalachian develop a Roanoke logperch enhancement plan to outline how Appalachian would work with FWS and Virginia DWR to enhance Roanoke logperch habitat. The plan would be developed in consultation with FWS and Virginia DWR with the goal to provide funds annually to be used to fund restoration projects to benefit Roanoke logperch. The agencies further recommend that the plan be provided to FWS and Virginia DWR for review within 6 months of license issuance.

As discussed in section 3.3.4.2 *Environmental Effects, Roanoke logperch*, Roanoke logperch was found in greater numbers and more widely distributed in the project area than in previous studies. Because Appalachian proposes to continue its current mode of operation and increase the minimum flow in the bypassed reach from 8 cfs to 30 cfs, which will enhance habitat for the species, continued operation and maintenance of the project would not be likely to adversely affect Roanoke logperch. Interior and Virginia DWR do not provide specific measures that would be included in their recommended plan, other than that the intent would be for Appalachian to provide an unspecified amount of funds annually to develop restoration projects in cooperation with FWS and Virginia DWR. Therefore, we are unable to analyze the benefits of this recommended enhancement plan to Roanoke logperch, specifically how such effects would relate to the Niagara Project. While we estimate that the levelized annual cost to develop a plan would be \$2,537, the total cost for implementing this plan cannot be estimated by staff due to a lack of details. For these reasons, staff does not recommend this plan.

Terrestrial Resources Protection Plan

Appalachian proposes to develop a terrestrial resources protection plan in consultation with FWS and Virginia DWR. Staff does not recommend developing such a plan because staff's recommendations, as described above, to avoid vegetation maintenance outside of routinely maintained areas between March 15 and August 15 to protect migratory birds, avoid tree removal activities associated with project operation or maintenance between April 1 and November 14 to protect listed bat species, and limit vegetation maintenance activities during the monarch butterfly breeding season (spring to early fall) would provide the necessary protection for terrestrial resources at the project. The estimated annual levelized cost of Appalachian's proposed terrestrial resources protection plan would be \$6,528, while the protection measures

recommended by staff would have no or limited cost. Therefore, staff's plan provides the most appropriate balance between resource protection and generation cost.

Notification of Future Project Effects and Amendments

Interior and Virginia DWR recommend that Appalachian be required to notify the agencies and the Commission of any activity that may affect a federally listed species in a manner not considered in a new license. If issues related to federally listed species were to arise during the term of a new license, either based on new listings or availability of new information, post-licensing procedures developed by the Commission and resource agencies (FERC et al., 2000) provide a framework for identifying issues, information gaps, and the need for protection measures. The Commission typically includes in its licenses a standard article providing such protection. The standard fish and wildlife reopener provision could be used to require changes to project facilities or maintenance plans upon Commission motion, or as recommended by the appropriate state and federal fish and wildlife agencies, after notice and opportunity for hearing. This standard reopener retains authority for the Commission to implement any measures that may be needed to protect threatened or endangered species or other fish and wildlife resources over the term of the license issued for the project. Therefore, there is no need for and we do not recommend that Interior's measure be included in any license for the project.

Recreation Flow Releases

Roanoke County, Roanoke River Blueway Committee, and Roanoke Outside Foundation recommend that Appalachian update the field and mapping surveys used to calculate the project's water volume and use the updated data to continue evaluating the possibility of providing controlled recreational flow releases.

Additionally, the Town of Vinton recommends that Appalachian continue evaluating the possibility of controlled recreational flow releases downstream of the Niagara Project dam to Explore Park's Rutrough Point.

As discussed in section 3.3.5.2, *Recreation Resources, Environmental Effects*, based on a 1990 field survey, Appalachian concluded that the impoundment storage volume had decreased less than 4% since 1972 and that sediment accumulation through the upcoming license term at the time (1994 – 2024) would proceed at a further reduced rate. Therefore, sediment build-up in the impoundment alone would not appear to measurably impact any ability of the project to provide controlled recreational flow releases. Although the project operates run-of-river under its current license, Appalachian determined that it could provide short-term recreational flow releases as a flow pulse for somewhere between 1 hour and 3.5 hours depending on the number of units generating and the available impoundment storage volume. However, optimal flows for beginner and intermediate boaters are available for about 5 months of the year during typical boating seasons (July through November). Therefore, we conclude that the benefits of providing controlled recreational flow releases are not worth the estimated annual levelized cost of \$18,268.

APPENDIX H: LITERATURE CITED

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APPENDIX I: LIST OF PREPARERS

Laurie Bauer – Project Coordinator, Geology and Soils, Aquatic Resources, and Threatened and Endangered Species (Fish Biologist, M.S., Marine, Estuarine, and Environmental Sciences; B.A., Biology).

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Samantha Pollak – Recreation Resources, Aesthetic Resources, and Environmental Justice (Outdoor Recreation Planner, M.S., Recreation, Parks, and Tourism; B.S., Environmental Studies; B.A., Geography).

Claire Rozdilski – Cultural Resources (Outdoor Recreation Planner, J.D.; B.A., History).

APPENDIX J: DRAFT LICENSE ARTICLES

Draft Article 2XX. Administrative Annual Charges. The licensee must pay the United States annual charges, effective the first day of the month in which the license is issued, and as determined in accordance with provisions of the Commission’s regulations in effect from time to time, for the purposes of reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 2.4 megawatts.

Draft Article 2XX. Exhibit G Drawings. The following Exhibit G drawings filed on February 28, 2022, are approved.

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Drawing Title
G-1	P-2466-1003	Niagara Hydroelectric Project – Project Boundary Map (sheet 1 of 2)	Project Boundary Vinton
G-2	P-2466-1004	Niagara Hydroelectric Project – Project Boundary Map (sheet 2 of 2)	Project Boundary Roanoke

Draft Article 2XX. Exhibit F Drawings. The following Exhibit F drawings filed on February 28, 2022, are approved.

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Drawing Title ⁹⁸
F-1	P-2466-1001	Niagara Hydroelectric Project – Plan, Elevation and Sections	General Plan and Elevation
F-2	P-2466-1002	Niagara Hydroelectric Project – Sections	Sections

Draft Article 2XX. Exhibit Drawings. Within 45 days of the date of issuance of this license, as directed below, the licensee must file the approved exhibit drawings, Form FERC-587, and geographic information system (GIS) data in electronic file format.

(a) The licensee must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensee must add the FERC Project-Drawing Number (*i.e.*, P-2466-1001 through P-2466-1004) in the margin below the title block of the corresponding approved drawing. The licensee must separate the Exhibit F drawings from the other project exhibits, and label and file them as **Critical Energy**

⁹⁸ These exact drawing titles must be used in the filename when filing the electronic file format drawings required in license Article 2XX. Commission staff shortened the drawing titles due to filename character limits. There is no need to modify the titles as they appear on the drawings.

Infrastructure Information (CEII) material under 18 CFR § 388.113 (the submission should consist of: 1) a public portion consisting of a cover letter, the Exhibit G drawings, and GIS data; and 2) a CEII portion containing only the Exhibit F drawings). Each drawing must be a separate electronic file, and the file name must include: FERC Project-Drawing Number, FERC Exhibit Number, Filename Title, date of this license, and file extension in the following format [P-2466-1001, F-1, General Plan and Elevation, MM-DD-YYYY.TIFF].

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (*i.e.*, latitude and longitude coordinates or state plane coordinates), arranged in a triangular format for GIS georeferencing the project boundary drawing to the polygon data. The licensee must identify the spatial reference for the drawing (*i.e.*, map projection, map datum, and units of measurement) on the drawing and label each reference point. In addition, a registered land surveyor must stamp each project boundary drawing. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY:	black & white raster file
FILE TYPE:	Tagged Image File Format, (TIFF) CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION:	300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE:	22" x 34" (minimum), 24" x 36" (maximum)
FILE SIZE:	less than 1 megabyte desired

The licensee must file a third set of the digital images (Exhibit G only) and a copy of Form FERC-587 with the Bureau of Land Management office at the following address:

State Director
Bureau of Land Management
5275 Leesburg Pike
Falls Church, VA 22041
ATTN: FERC Withdrawal Recordation

Form FERC-587 is available through the Commission's website at the following URL: <https://cms.ferc.gov/media/ferc-587>. A hard copy of Form-587 is available by mailing a request to the Secretary of the Commission.

(b) Project boundary GIS data must be in a georeferenced electronic file format (such as ArcGIS shapefiles, GeoMedia files, MapInfo files, or a similar GIS format). The filing must include both polygon data and all reference points shown on the individual project boundary drawings. Each project development must have an electronic boundary polygon data file(s). Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ± 40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) must include: FERC Project Number, data description, date of

this license, and file extension in the following format [P-2466, boundary polygon or point data, MM-DD-YYYY.SHP]. The filing must include a separate text file describing the spatial reference for the georeferenced data: map projection used (*i.e.*, UTM, State Plane, Decimal Degrees, *etc.*), the map datum (*i.e.*, North American 27, North American 83, *etc.*), and the units of measurement (*i.e.*, feet, meters, miles, *etc.*). The text file name must include: FERC Project Number, data description, date of this license, and file extension in the following format [P-2466, project boundary metadata, MM-DD-YYYY.TXT].

In addition, for those projects that occupy federal lands, the filing must include a separate georeferenced polygon file(s) that identifies transmission line acreage and non-transmission line acreage affecting federal lands. The file(s) must also identify each federal owner (*e.g.*, Bureau of Land Management, Forest Service, U.S. Army Corps of Engineers, *etc.*), land identification (*e.g.*, forest name, Section 24 lands, national park name, *etc.*), and federal acreage affected by the project boundary. Depending on the georeferenced electronic file format, a single file with multiple layers may include the polygon, point, and federal lands data.

Draft Article 2XX. Amortization Reserve. Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project must be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee must set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee must deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee must set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee must maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves must be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios must be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity must be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Draft Article 2XX. Reservation of Authority to Require Financial Assurance Measures. The Commission reserves the right to require future measures to ensure that the licensee maintains sufficient financial reserves to carry out the terms of the license and Commission orders pertaining thereto.

Draft Article 2XX. Headwater Benefits. If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously

assessed and reimbursed to the owner of the headwater improvement, the licensee must reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations.

Draft Article 2XX. *As-built Exhibits.* Within 90 days of completion of construction of the facilities authorized by this license, the licensee must file for Commission approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built. If the licensee determines the previously approved exhibits reflect the as-built facilities and no revisions are necessary, the licensee must file a letter stating the approved exhibits reflect the as-built project facilities.

Draft Article 3XX. *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensee must consult with the Division of Dam Safety and Inspections – Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

Draft Article 3XX. *Final Design Documents.* At least 60 days prior to the start of any construction, the licensee must file final design documents with the Commission by eFiling to the appropriate Regional Office. The design documents must include: final plans and specifications, supporting design report, Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the Division of Dam Safety and Inspections - Regional Engineer has reviewed and commented on the documents, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

Draft Article 3XX. *Public Safety Plan.* Within 60 days prior to opening new recreation features authorized in Article 4XX, the licensee must file a Public Safety Plan with the Commission by eFiling to the appropriate Regional Office. The plan must include a description of all safety devices and signage needed to warn the public of fluctuations in flow from the project or otherwise protect the public in the use of project lands and waters. The plan must also include a map showing the location of all public safety measures. For guidance on preparing public safety plans the licensee can review the *Guidelines for Public Safety at Hydropower Projects* on the FERC website.

Draft Article 4XX. *Project Operation.* The licensee must:

- (a) operate the project in a run-of-river mode such that, at any point in time, the sum of all outflows from the project approximates the sum of all inflows to the project;
- (b) provide continuous minimum flows to the bypassed reach, as required by condition I.D.1 of Virginia Department of Environmental Quality's water quality certification (certification), as a release from the sluice gate at the project dam, over the project spillway, or a combination thereof; and

(c) following a drawdown of the impoundment for maintenance or emergency purposes, pass at least 90 percent of inflow downstream of the powerhouse and use the remaining 10 percent of inflow to refill the impoundment to protect aquatic habitat.

Planned Deviations

Run-of-river operation, continuous minimum flow releases (certification condition I.D.1), and refill procedures required by this article may be temporarily modified for short periods, of up to 3 weeks, after mutual agreement among the licensee and the U.S. Fish and Wildlife Service and Virginia Department of Wildlife Resources (collectively, resource agencies). After concurrence from the resource agencies, the licensee must notify the Commission within 14 days and file a report with the Secretary of the Commission as soon as possible, but no later than 30 days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and how project operations were modified, (2) the duration and magnitude of the deviation, (3) any observed or reported environmental effects, and (4) documentation of consultation with the resource agencies. For planned deviations exceeding 3 weeks, the licensee must file an application for a temporary amendment of the operational requirements of this license and receive Commission approval prior to implementation.

Unplanned Deviations

Run-of-river operation and the continuous minimum flows required by this article may be temporarily modified if required by operating emergencies beyond the control of the licensee (*i.e.*, unplanned deviations). For any unplanned deviation that lasts longer than 3 hours *or* results in visible environmental effects such as a fish kill, a turbidity plume, bank erosion, or downstream flooding, the licensee must notify the resource agencies within 24 hours, and the Commission within 14 days, and file a report as soon as possible, but no later than 30 days after each such incident. The report must include: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies; (6) documentation of any observed or reported environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

For unplanned deviations from the operational requirements of this license lasting 3 hours or less that do not result in visible environmental effects, the licensee must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period. The report must include for each 3 hours or less deviation: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response to each deviation; (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies; and (6) a description of measures implemented to prevent similar deviations in the future.

Draft Article 4XX. Operation Compliance Monitoring. The monitoring and operations plan required by condition I.E.1 of the Virginia Department of Environmental Quality's water

quality certification, which is made a condition of this license by Ordering Paragraph X, must include the following additional provisions:

- (a) a detailed description of how the licensee will document compliance with the run-of-river, minimum flow, and refill procedure requirements of Article 4XX;
- (b) a definition of “extreme flow” conditions and specification of the elevation range(s) over which the impoundment will be maintained when operating in a run-of-river mode under (1) normal operating conditions, and (2) extreme flow conditions;
- (c) a description of all gages or measuring devices that will be used to monitor compliance, including the method of calibration, location, and monitoring and recording frequency of each such gage or device;
- (d) standard operating procedures to be implemented outside of normal operating conditions, including during: (1) scheduled facility shutdowns and maintenance; and (2) emergency conditions such as unscheduled facility shutdowns and maintenance;
- (e) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of this license;
- (f) a provision to maintain a log of project operation;
- (g) a provision to allow the U.S. Fish and Wildlife Service and Virginia Department of Wildlife Resources (collectively, agencies) to, in the performance of their official duties, review the project’s operational data after a minimum of 24 hours advanced noticed; and
- (h) procedures for reporting monitoring data to the Commission on an annual basis.

The licensee must prepare the plan after consultation with the agencies. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies’ comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee’s reasons based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the plan is approved by the Commission. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 4XX. *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior pursuant to section 18 of the Federal Power Act.

Draft Article 4XX. Bald Eagle Protection. Within six months of license issuance, the licensee must develop a bald eagle protection plan, in consultation with the U.S. Fish and Wildlife Service (FWS) and the Virginia Department of Wildlife Resources (Virginia DWR), to ensure the protection of eagles that roost or nest at the project. The plan must be consistent with FWS's National Bald Eagle Management Guidelines, and must include, but not necessarily be limited to, the following: (1) a provision for observing the affected area for bald eagle nests prior to tree clearing, and notifying FWS and Virginia DWR within 5 days of discovery if bald eagle nesting activity is discovered within or immediately adjacent to the project boundary; and (2) a provision for avoiding tree clearing within 330 feet, and construction activities within 660 feet, of any known bald eagle nests during the nesting season (December 1 through July 31).

The licensee must prepare the plan in consultation with FWS and Virginia DWR (resource agencies, collectively). The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the plan is approved by the Commission. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 4XX. Migratory Bird Protection. To protect migratory birds, the licensee must avoid vegetation maintenance or ground disturbance, outside of routinely maintained areas between March 15 and August 15. This restriction does not apply to routinely maintained areas within the project boundary where maintenance activities, such as mowing, are necessary to manage project facility grounds and facilitate safe employee access to project facilities.

Draft Article 4XX. Bat Protection. To protect the Indiana, northern long-eared, and tricolored bats during their active seasons (April 1 to November 14), the licensee must limit non-hazardous tree removal to the period of November 15 through March 31. Tree removal is defined herein as cutting down, harvesting, destroying, trimming, or manipulating in any other way the non-hazardous trees, saplings, snags, or any other form of woody vegetation likely to be used by Indiana, northern long-eared, or tricolored bats (i.e., woody vegetation greater than or equal to 3 inches diameter at breast height).

Draft Article 4XX. Monarch Butterfly Protection. To protect the monarch butterfly and its host plant (milkweed), the licensee must avoid vegetation maintenance during the monarch butterfly breeding season (April 1 through September 30) outside of routinely maintained areas within the project boundary. This restriction does not apply to routinely maintained areas within the project boundary where maintenance activities, such as mowing, are necessary to manage project facility grounds and facilitate safe employee access to project facilities.

Draft Article 4XX. Recreation Management Plan. Within 1 year of license issuance, the licensee must file with the Commission, for approval, a recreation management plan that includes:

(a) a description of project recreation facilities (i.e., boat take-out, portage trail, and boat put-in) including type and location, ownership, operation, and maintenance responsibilities;

(b) a map depicting the type and location of all project recreation facilities in relation to the project boundary;

(c) a detailed description of and implementation schedule for the planned improvements of project recreation facilities (i.e., improvements to the boat take-out facility, improvements to the portage route, replacement of existing project information and directional signage associated with the recreational facilities, installing additional emergency contact information signage, and site clean-up and landscaping);

(d) a provision to conduct recreation use monitoring, including, at minimum, recreation survey and recreation spot counts at project recreation facilities 5 years from license issuance and then every 10 years thereafter through the license term and a description of how the collected recreation monitoring data will be evaluated;

(e) a provision for filing a report with the Commission of the recreation use monitoring results within 90 days of the conclusion of each monitoring period; the report must include, at minimum, all monitoring data and analysis, stakeholder comments on the monitoring results, a summary of stakeholder consultation efforts, and a description of any proposed improvements or changes to project recreation facilities;

(f) a provision and implementation schedule for a public website that includes real-time river flow downstream of the project and information about recreational opportunities in the project area; and

(g) a provision for the licensee to participate in any river cleanup events led by other organizations at the project or in areas affected by the project.

The plan must be developed in consultation with the National Park Service, Roanoke County, the Town of Vinton, Roanoke Outside Foundation, Roanoke River Blueway Committee of the Roanoke Valley–Alleghany Regional Commission, U.S. Fish and Wildlife Service, Department of the Interior, and Virginia Division of Wildlife Resources, and Virginia Department of Conservation and Recreation (consulted entities). The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated into the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons based on project-specific information.

The Commission reserves the right to require changes to the recreation management plan. The plan must not be implemented until the licensee is notified by the Commission that the plan

is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 4XX. Boat Put-in Facility. Within 1 year of license issuance, the licensee must file with the Commission, for approval, a plan to provide a boat put-in facility below the powerhouse within the project boundary. The plan must include, at a minimum:

- (a) a written description and conceptual drawings for the boat put-in facility;
- (b) a construction and implementation schedule for completing the boat put-in facility within two years of license issuance that includes best management practices to avoid or minimize soil and vegetation disturbance, to the extent possible, during construction and maintenance of the new boat put-in facility; and
- (c) informational signage directing boaters to the facility.

The plan must be developed in consultation with the National Park Service, Roanoke County, the Town of Vinton, Roanoke Outside Foundation, Roanoke River Blueway Committee of the Roanoke Valley–Alleghany Regional Commission, U.S. Fish and Wildlife Service, Virginia Division of Wildlife Resources, and Virginia Department of Conservation and Recreation (consulted entities). The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the consulted entities above, and specific descriptions of how the consulted entities comments are accommodated into the plan. The licensee must allow a minimum of 30 days for the consulted entities to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee’s reasons based on project-specific information.

The Commission reserves the right to require changes to the boat put-in facility plan. The plan must not be implemented until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission. The licensee is responsible for the operation and maintenance of these facilities for the term of the license.

Draft Article 4XX. Protection of Cultural Resources. Prior to implementing any project modifications not specifically authorized by this license, including but not limited to maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities, the licensee must consult with the Virginia State Historic Preservation Office (Virginia SHPO) and interested federally recognized Tribes, to determine the effects of the activities and the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the Virginia SHPO and interested federally recognized Tribes.

If a project modification is determined to affect a historic property, the licensee must file, for Commission approval, a historic properties management plan (HPMP) prepared by a qualified cultural resource specialist after consultation with the Virginia SHPO. In developing the HPMP, the licensee must use the Advisory Council on Historic Preservation and the

Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP must include the following items: (1) a description of each historic property; (2) a description of the potential effect on each historic property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for implementing mitigation and conducting additional studies.

The Commission reserves the right to require changes to the HPMP. The licensee must not implement any project modifications, other than those specifically authorized in the license, until informed by the Commission that the requirements of this article have been fulfilled.

Draft Article 4XX. Protection of Previously Undiscovered Cultural Resources. If the licensee discovers any unidentified cultural resources during construction, operation, or maintenance of project works or other facilities at the project, the licensee must stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Virginia State Historic Preservation Office (Virginia SHPO), the Catawba Indian Nation, the Delaware Nation, the Monacan Indian Nation, and the Pamunkey Indian Tribe, and other interested federally recognized Tribes (collectively, Tribes) to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the Virginia SHPO and Tribes immediately.

If a discovered cultural resource is determined to be eligible for the National Register of Historic Places (National Register), the licensee must file, for Commission approval, a historic properties management plan (HPMP) prepared by a qualified cultural resource specialist after consultation with the Virginia SHPO and Tribes. In developing the HPMP, the licensee must use the Advisory Council on Historic Preservation and the Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP must include the following items: (1) a description of each discovered property that is eligible to be listed in the National Register; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The licensee must not resume land-clearing or land-disturbing activities in the vicinity of a cultural resource discovered during construction until informed by the Commission that the requirements of this article have been fulfilled.

Draft Article 4XX. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure

compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file with the Commission a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. No report filing is required if no conveyances were made under paragraph (c) during the previous calendar year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project lands or waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX K: WATER QUALITY CERTIFICATION

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
VIRGINIA WATER PROTECTION PERMIT FOR THE
NIAGARA HYDROELECTRIC PROJECT
VWP INDIVIDUAL PERMIT NUMBER 23-0182
EFFECTIVE DATE: JANUARY 17, 2024
EXPIRATION DATE: JANUARY 16, 2039
FILED ON MARCH 12, 2024

Part I – Special Conditions

A. Authorized Activities

1. This permit authorizes the operation of a surface water diversion to support the operation of an existing electric power generation station and impoundment (the Project) on the Roanoke River in Roanoke County as described in Part I D.
2. The permittee shall conduct authorized activities as described in the Joint Permit Application and supplemental materials, revisions and clarifications. Any changes to the authorized activities or impacts map that affect permitted areas shall be submitted to the Department immediately upon determination that changes are necessary, and Department approval shall be required prior to implementing the changes.
3. The permittee shall notify the Department of any changes in authorized impacts to surface waters, of any modifications of the intake structure, or any changes to the design or type of construction activities in surface waters authorized by this permit. Department approval shall be required prior to implementing the changes. Any additional impacts, modifications, or changes shall be subject to individual permit review or modification of this permit.

B. Permit Term

1. This permit is valid for fifteen (15) years from the date of issuance. A new permit may be necessary for the continuance of the authorized activities, including water withdrawals, or any permit requirement that has not been completed, including compensation provisions.
2. The permittee shall submit a new permit application at least 270 calendar days prior to the expiration of this permit if reissuance will be requested. A complete permit application is due by April 21, 2038, in accordance with 9VAC25-210-65.
3. This permit may be modified, or alternatively revoked and reissued, if the Federal Energy Regulatory Commission (FERC) issues, reissues, or modifies its license granted to Appalachian Power Company for the Niagara Hydroelectric Project, and where such issuance, reissuance, or modification results in a change to surface water release operations.

C. Standard Project Conditions

1. The activities authorized by this permit shall be executed in such a manner that any impacts to beneficial uses are minimized. As defined in § 62.1-44.3 of the Code of Virginia, "beneficial use" means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. The preservation of instream flows for purposes of the protection of navigation, maintenance of waste assimilation capacity, the protection of fish and wildlife resources and habitat, recreation, cultural and aesthetic values is an instream beneficial use of Virginia's waters. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural uses, electric power generation, commercial, and industrial uses.
2. No activity shall substantially disrupt the movement of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the primary purpose of the activity is to impound water.
3. Flows downstream of the project area shall be maintained to protect all uses.
4. No activity shall cause more than minimal adverse effect on navigation, and no activity shall block more than half of the width of the stream at any given time.
5. The activity shall not impede the passage of normal or expected high flows, and any associated structure shall withstand expected high flows.
6. All required notifications and submittals shall include project name and permit number and be submitted electronically to Withdrawal.permitting@deq.virginia.gov or mailed to the office stated below, unless otherwise directed in writing by the Department subsequent to the issuance of this permit: Department of Environmental Quality, Attn: Water Withdrawal Permitting Program Manager, Office of Water Withdrawal Permitting, P.O. Box 1105, Richmond VA 23218.
7. All reports required by this permit and other information requested by the Department shall be signed by the permittee or a person acting in the permittee's behalf, with the authority to bind the permittee. A person is a duly authorized representative only if both criteria below are met. If a representative authorization is no longer valid because of a change in responsibility for the overall operation of the facility, a new authorization shall be immediately submitted to the Department.
 - a. The authorization is made in writing by the permittee.
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. A duly

authorized representative may thus be either a named individual or any individual occupying a named position.

8. All submittals shall contain the following signed certification statement: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."
9. Any fish kills or spills of fuels or oils shall be reported to the Department immediately upon discovery at If the Department cannot be reached, the spill or fish kill shall be reported to the Virginia Department of Emergency Management (VDEM) at 1-800-468-8892 or the National Response Center (NRC) at 1-800-424-8802. Any spill of oil as defined in § 62.1-44.34:14 of the Code of Virginia that is less than 25 gallons and that reaches, or that is expected to reach, land only is not reportable, if recorded per § 62.1-44.34:19.2 of the Code of Virginia and if properly cleaned up.
10. The Department shall be notified in writing within 24 hours or as soon as possible on the next business day when potential environmentally threatening conditions are encountered which require debris removal or involve potentially toxic substances. Measures to remove the obstruction, material, or toxic substance or to change the location of any structure are prohibited until approved by the Department.
11. Virginia Water Quality Standards shall not be violated in any surface waters as a result of the project activities.

D. Instream Flow Conditions

1. The permittee shall maintain minimum instream flow releases, or inflow (whichever is less), to the bypass reach in accordance with the table below:

Month(s)	Minimum Release into Bypass Reach (cfs)
January – June	45
July – December	30

2. Elevations and outflows in the tailrace (below the dam) shall be monitored at Stream Gage No. 0205600 (Roanoke River at Niagara, VA) on a daily basis.
3. The permittee shall estimate inflow to the Project on a daily basis using the following equation:
 - a. $Q_{intake} = Q_{(Roanoke\ River\ at\ Niagara,\ VA)} \times 1.0$, where:
 - a. Q_{intake} = estimated streamflow at the intake;

- b. $Q_{\text{Roanoke River at Niagara, VA}}$ = the previous day's provisional mean daily flow at the Stream Gaging Station No. 0205600 (Roanoke River at Niagara, VA); and
- c. 1.0 = is the adjustment factor for drainage area.

E. Monitoring, Recordation and Reporting Conditions

1. Within 120 days of Federal Energy Regulatory Commission (FERC) license issuance, the permittee shall submit a Monitoring and Operations Plan for Department approval. The Plan should specifically address the following:
 - a. Procedures for operating the intake to ensure compliance with all water withdrawal conditions of this permit;
 - b. Procedures for estimating streamflow in accordance with Part I D 3 including the time of day that the estimate will be made;
 - c. A procedure for estimating the previous day's inflow at the intake location in the event that Gage No. 0205600 (Roanoke River at Niagara, VA) is damaged, disabled, or discontinued; and,
 - d. Procedures for recording diversions as well as all other monitoring and reporting requirements, including a sample of the reporting form or table that will be used.
2. The permittee shall report any diversion not in compliance with Part I D by the fifth (5th) day of the month following the month in which the diversion or release occurred. Failure to report may result in compliance or enforcement activities.
3. When a drought emergency is declared by the Commonwealth of Virginia or by Roanoke County in accordance with the County's (or Locality's) Drought Management Ordinance, the permittee shall implement either the provisions directed by the Commonwealth, the Drought Management Ordinance or the mandatory conservation measures as detailed in Attachment A of this permit, whichever is the most restrictive. The permittee shall be responsible for determining when drought emergencies are declared. The permittee shall retain records documenting that mandatory conservation measures were implemented during declared drought emergencies.
4. Water withdrawal monitoring and reporting activities shall comply with this section, Part I C, and Part II. All records and information that result from the monitoring and reporting activities required by this permit, including any records of maintenance activities to the withdrawal system, shall be retained for the life of the permit. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or as requested by the Department.

Part II – General Conditions

A. Duty to Comply

The permittee shall comply with all conditions and limitations of the VWP permit. Nothing in this chapter shall be construed to relieve the permittee of the duty to comply with all applicable federal and state statutes, regulations, toxic standards, and prohibitions. Any VWP permit violation or noncompliance is a violation of the Clean Water Act and State Water Control Law and is grounds for enforcement action, VWP permit termination, VWP permit revocation, VWP permit modification, or denial of an application for a VWP permit extension or reissuance. Nothing in this VWP permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

B. Duty to Cease or Confine Activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a VWP permit has been granted in order to maintain compliance with the conditions of the VWP permit.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any impacts in violation of the VWP permit that may have a reasonable likelihood of adversely affecting human health or the environment.

D. VWP Permit Actions

A VWP permit may be modified in whole or in part, revoked and reissued, extended, transferred, or terminated in accordance with 9VAC25-210-180 of the Virginia Administrative Code.

1. During the drafting and authorization of a permit modification, only those conditions to be modified shall be addressed with preparing a draft modified permit. VWP permit terms and conditions of the existing permit shall remain in full force and effect during the modification of the permit.
2. This VWP permit may be modified upon the request of the permittee or upon department initiative when any of the following developments occur:
 - a. When new information becomes available about the project or activity covered by the VWP permit, including project additions or alterations, that was not available at VWP permit issuance and would have justified the application of different VWP permit conditions at the time of VWP permit issuance;
 - b. When a change is made in the promulgated standards or regulations on which the VWP permit was based;

- c. c. When changes occur that are subject to "reopener clauses" in the VWP permit;
or
 - d. When developments applicable to surface water withdrawals occur as specified in 9VAC25-210-380 of the Virginia Administrative Code.
- 3. When this VWP permit authorizes surface water withdrawals, it may be modified when any of the following developments occur:
 - a. When the department determines that minimum instream flow levels resulting directly from the permittee's withdrawal of surface water are detrimental to the instream beneficial use, existing at the time of permit issuance, and the withdrawal of surface water should be subject to further net limitations or when an area is declared a surface water management area pursuant to §§ 62.1-242 through 62.1-253 of the Code of Virginia, during the term of the VWP permit.
 - b. Significant changes to the location of the surface water withdrawal system are proposed such that the Department of Environmental Quality determines a new review is warranted due to the potential effect of the surface water withdrawal to existing beneficial uses of the new location.
 - c. Changes to the permitted project or the surface water withdrawal, including increasing the storage capacity for the surface water withdrawal, that propose an increase in the maximum permitted withdrawal volumes or rate of withdrawal or that cause more than a minimal change to the instream flow requirements with potential to result in a detrimental effect to existing beneficial uses.
 - d. A revision to the purpose of the surface water withdrawal that proposes to include a new use or uses that were not identified in the permit application or a modification of the existing authorized use or uses such that the use description in the permit application and permit is no longer applicable. Examples of uses include, but are not limited to agricultural irrigation, golf course irrigation, public water supply, manufacturing, and electricity generation.
- 4. When the permittee has submitted a timely and complete application for reissuance of an existing VWP individual permit, but through no fault of the permittee, the department does not reissue or reissue with conditions a VWP individual permit or the department does not provide notice of its tentative decision to deny the application before an existing VWP individual permit expires, the conditions of the expiring VWP individual permit shall be administratively continued in full force and effect until the effective date of a reissued permit or the date on which the department denies the application. Timely application shall be a minimum of 180 days for an individual permit or a minimum of 270 days for an individual permit for a surface water withdrawal, unless otherwise specified in the existing permit.
- 5. Any permittee desiring to continue a previously permitted activity after the expiration date of this VWP permit shall apply for and obtain a new permit or, if applicable, shall request an extension in accordance with 9VAC25-210-180 of the Virginia Administrative Code. Any permittee with an effective VWP permit for an activity that is expected to continue after the expiration date of the VWP permit, without any change in the activity authorized by the VWP permit other than as may be allowed under 9VAC25-210-180,

shall submit written notification requesting an extension. The permittee must file the request 90 days prior to the expiration date of the VWP permit. VWP permit modifications shall not be used to extend the term of a VWP permit beyond 15 years from the date of original issuance. When a permit term, other than that of an Emergency Virginia Water Protection Permit, is less than 15 years, an extension of the permit terms and conditions may be granted in accordance with 9VAC25-210-180. Emergency Virginia Water Protection Permits shall not exceed a duration of one year or shall expire upon the issuance of a regular Virginia Water Protection Permit, whichever comes first.

6. This VWP permit may be transferred to a new permittee only by modification to reflect the transfer, by revoking and reissuing the permit, or by automatic transfer. Automatic transfer to a new permittee shall occur if the current permittee: a) Notifies the department of the proposed transfer of the permit and provides a written agreement between the current and proposed permittees containing the date of transfer of VWP permit responsibility, authorization, and liability to the new permittee; and b) the department does not within 15 days notify the existing permittee of its intent to modify the VWP permit.
7. After notice and opportunity for a formal hearing pursuant to § 62.1-44.15:02 of the Code of Virginia, a VWP permit can be terminated for cause. Reasons for termination for cause are as follows:
 - a. Noncompliance by the permittee with any condition of the VWP permit;
 - b. The permittee's failure in the application or during the VWP permit process to disclose fully all relevant facts or the permittee's misrepresentation of any relevant facts at any time;
 - c. The permittee's violation of a special or judicial order;
 - d. A determination by the department that the permitted activity endangers human health or the environment and can be regulated to acceptable levels by VWP permit modification or termination;
 - e. A change in any condition that requires either a temporary or permanent reduction or elimination of any activity controlled by the VWP permit; and
 - f. A determination that the permitted activity has ceased and that the compensation for unavoidable adverse impacts has been successfully completed.
8. The department may terminate this permit without cause when the permittee is no longer a legal entity due to death, dissolution, or when a company is no longer authorized to conduct business in the Commonwealth. The termination shall be effective 30 days after notice of the proposed termination is sent to the last known address of the permittee or registered agent, unless the permittee objects within that time. If the permittee does object during that period, the department shall follow the applicable procedures for termination under § 62.1-44.15:25 of the Code of Virginia and 9VAC25-230 of the Virginia Administrative Code.
9. This VWP permit may be terminated by consent, as initiated by the permittee. The permittee shall submit a request for termination by consent within 30 days of completing

or canceling all permitted activities and all required compensatory mitigation requirements. When submitted for project completion, the request for termination by consent shall constitute a notice of project completion. The director may accept this termination on behalf of the department. The permittee shall submit the following information:

- a. Name, mailing address, and telephone number;
- b. Name and location of the activity;
- c. The VWP permit number; and
- d. One of the following certifications:
 - i. For project completion: "I certify under penalty of law that all activities and any required compensatory mitigation authorized by a VWP permit have been completed. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit."
 - ii. For project cancellation: "I certify under penalty of law that the activities and any required compensatory mitigation authorized by this VWP permit will not occur. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit."
 - iii. For events beyond permittee control, the permittee shall provide a detailed explanation of the events, to be approved by DEQ, and the following certification statement: "I certify under penalty of law that the activities or the required compensatory mitigation authorized by this VWP permit have changed as the result of events beyond my control (see attached). I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit."

E. Inspection and Entry

Upon presentation of credentials, the permittee shall allow the department or any duly authorized agent of the department, at reasonable times and under reasonable circumstances, to conduct the actions listed in this section. For the purpose of this section, the time for inspection shall be deemed reasonable during regular business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency.

1. Enter upon any permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the VWP permit conditions;
2. Inspect any facilities, operations or practices (including monitoring and control equipment) regulated or required under the VWP permit; and
3. Sample or monitor any substance, parameter, or activity for the purpose of ensuring compliance with the conditions of the VWP permit or as otherwise authorized by law.

F. Duty to Provide Information

The department may request (i) such plans, specifications, and other pertinent information as may be necessary to determine the effect of an applicant's discharge on the quality of state waters or (ii) such other information as may be necessary to accomplish the purposes of this chapter. Any owner, permittee, or person applying for a VWP permit or general permit coverage shall provide the information requested by the department.

G. Monitoring and Records Requirements

1. Monitoring of parameters, other than pollutants, shall be conducted according to approved analytical methods as specified in the VWP permit. Analysis of pollutants will be conducted according to 40 CFR Part 136 (2017), Guidelines Establishing Test Procedures for the Analysis of Pollutants.
2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
3. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the VWP permit, and records of all data used to complete the application for the VWP permit, for a period of at least three years from the date of permit expiration. This period may be extended by request of the department at any time.
4. Records of monitoring information shall include:
 - a. The date, exact place and time of sampling or measurements;
 - b. The name of the individuals who performed the sampling or measurements;
 - c. The date and time the analyses were performed;

- d. The name of the individuals who performed the analyses;
- e. The analytical techniques or methods supporting the information such as observations, readings, calculations and bench data used;
- f. The results of such analyses; and
- g. Chain of custody documentation.

H. Property rights

The issuance of a VWP permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize injury to private property or any invasion of personal rights or any infringement of federal, state or local laws or regulations.

I. Reopener

This VWP permit may be reopened for the purpose of modifying the conditions of the VWP permit to meet new regulatory standards duly adopted by the board. Cause for reopening VWP permits includes, but is not limited to when the circumstances on which the previous VWP permit was based have materially and substantially changed, or special studies conducted by the board or the permittee show material and substantial change, since the time the VWP permit was issued and thereby constitute cause for VWP permit modification or revocation and reissuance.

J. Compliance with State and Federal Law

As to the permitted activity(ies), compliance with a VWP permit constitutes compliance with the VWP permit requirements of the Law and regulations.

K. Severability

The provisions of this VWP permit are severable.

L. Oil and Hazardous Substance Liability

Nothing in this VWP permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Clean Water Act or §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

M. Unauthorized Discharge of Pollutants

Except in compliance with a VWP permit, unless the activity is otherwise exempted or excluded, no person shall dredge, fill, or discharge any pollutant into, or adjacent to surface waters; withdraw surface water; otherwise alter the physical, chemical, or biological properties of state waters regulated under this chapter and make them detrimental to the public health, to animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses; excavate in wetlands; or on or after October 1, 2001, conduct the following activities in a wetland:

1. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
2. Filling or dumping;
3. Permanent flooding or impounding; or
4. New activities that cause significant alteration or degradation of existing wetland acreage or functions.