VERMONT AGENCY OF NATURAL RESOURCES

Draft Water Quality Certification
(33 U.S.C. §1341)

In the matter of: Wrightsville Hydroelectric Project
Washington Electric Cooperative, Inc.
PO Box 8
40 Church Street
East Montpelier, VT 05601

APPLICATION FOR WRIGHTSVILLE HYDROELECTRIC PROJECT

Section 401 of the federal Clean Water Act requires that any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates that any such discharge will comply with other substantive provisions of the Clean Water Act. 33 U.S.C. § 1341(a)(1). The certifying State may set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a federal license or permit will comply with the Clean Water Act and with any other appropriate requirement of State law. 33 U.S.C. § 1341(d). In Vermont, the Agency of Natural Resources is the certifying agency of the State for purposes of Section 401 of the Clean Water Act. 10 V.S.A. § 1004. The Secretary of Natural Resources has delegated the authority to make certification determinations to the Department of Environmental Conservation (Department).

The Department has reviewed a water quality certification application dated March 29, 2021, and filed by the Washington Electric Cooperative, Inc. (WEC or the Applicant) for the Wrightsville Hydroelectric Project (the Project). The supporting documentation for the certification application includes the Applicant's Federal Energy Regulatory Commission (FERC) license application (FERC No. 5124) dated October 30, 2020, and other supporting documents filed by the Applicant in support of the application. The record for this decision includes the January 8, 2021, FERC Additional Information Request (AIR) responses; response to Preliminary Terms and Conditions dated May 17, 2021; the FERC Draft Environmental Assessment (EA) dated October 2021; and many other documents related to the Project and its relicensing filed through September 15, 2021.

The current application is subject to review under the Vermont Water Quality Standards promulgated by the Agency of Natural Resources and effective beginning January 15, 2017 (Environmental Protection Rule, Chapter 29A) (Standards). (Standards, Section 29A-101 Applicability).

The Department, based on the application and record before it, makes the following findings and conclusions.

I. Applicable Statues and Regulations

A. Applicable Provisions of the Vermont Water Quality Standards

1. The applicable 2017 Vermont Water Quality Standards (Standards) were adopted by the

Secretary of the Agency of Natural Resources pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. Section 1252 of this chapter provides for the classification of designated uses as either Class A(1), A(2), B(1) or B(2) and authorizes the adoption of standards of water quality to achieve the purpose of classification.

2. All waters of the State shall be managed to support their designated and existing uses. (Standards, § 29A-104(b)).

3. The designated uses are: aquatic biota and wildlife that may utilize or are present in the waters; aquatic habitat to support aquatic biota, wildlife, or plant life; the use of waters for swimming and other primary contact recreation; the use of waters for boating and related recreational uses; the use of waters for fishing and related recreational uses; the use of waters for the enjoyment of aesthetic conditions; the use of the water for public water source; and the use of water for irrigation of crops and other agricultural uses. (Standards, § 29A-104(d)).

4. The affected reaches of the North Branch of the Winooski River have been classified as Class B(2) for all uses.

5. The Antidegradation Policy in the Standards requires that "[a]ll waters shall be managed in accordance with [Standards] to protect, maintain, and improve water quality." (Standards, Section 29A-105).

6. The North Branch of the Winooski River is designated as cold-water fish habitat. (Standards, Section 29A-308).

7. In waters designated as cold-water fish habitat, the dissolved oxygen (D.O.) standard is not less than 7 mg/L and 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in waters that the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. In all other waters designated as a cold-water fish habitat, the standard is not less than 6 mg/L and 70 percent saturation at all times. (Standards, Section 29A-302(5)(A)).

8. The general temperature standard for waters is "[c]hange or rate of change in temperature, either upward or downward, shall be controlled to ensure full support of aquatic biota, wildlife, and aquatic habitat uses." (Standards, Section 29A-302(1)(A)).

9. In waters designated as cold water fish habitat and classified as Class B(2) for the fishing use, the total increase from ambient temperature due to all discharges and activities shall not exceed 1.0° F. (Standards, Section 29A-302(1)(B)(iii)).

10. The turbidity standard as an annual average under dry weather base-flow conditions is 10 NTU for cold water fish habitat. (Standards, Section §29A-302(4)(A)).

11. The management objectives for waters classified as Class B(2) for aquatic biota and wildlife are "Waters shall be managed to achieve and maintain good biological integrity." (Standards, Section 29A-306(a)(3)(A)). The Class B(2) criteria for aquatic biota and wildlife use, require "Change from the natural condition for aquatic macroinvertebrate and

fish assemblages not exceeding moderate changes in the relative proportions of taxonomic, functional, tolerant, and intolerant aquatic organisms." (Standards, Section 29A-306(a)(3)(B)).

12. The management objectives for waters classified as Class B(2) for aquatic habitat are "Waters shall be managed to achieve and maintain high quality aquatic habitat. The physical habitat structure, stream processes, and flow characteristics of rivers and streams and physical character and water level of lakes and ponds necessary to fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements, are maintained and protected." (Standards, Section 29A-306(b)(3)(A)). The Class B(2) criteria for aquatic habitat use in rivers and streams are "Changes to flow characteristics, physical habitat structure, and stream processes limited to moderate differences from the natural condition and consistent with the full support of high quality aquatic habitat. (Standards, Section 29A-306(b)(3)(B)(i)). Additionally, "waters shall comply with the Hydrology Criteria in Section 29A-304" of the Standards. (Standards, Section 29A-306(b)(3)(B)(iii)).

13. The Hydrology Policy in the Standards requires that "[t]he proper management of water resources now and for the future requires careful consideration of the interruption of the natural flow regime and the fluctuation of water levels resulting from the construction of new, and the operation of existing, dams, diversions, and other control structures." (Standards, Section 29A-103(f)(1)).

14. To effectively implement the hydrology policy, hydrology criteria shall be achieved and maintained, where applicable (Standards, § 29A-304(a)). The hydrology criteria require for waters classified as Class B(2) for aquatic habitat that "[a]ny change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria." The preferred method for ensuring compliance with this subsection is a site-specific flow study. In the absence of a site-specific study, the use of general hydrologic standards is also accepted. (Standards, Section 29A-304(b)(3)).

15. The management objectives for waters classified as Class B(2) for aesthetics are "Waters shall be managed to achieve and maintain good aesthetic quality." (Standards, Section 29A-306(c)(3)(A)). The Class B(2) criteria for aesthetics use in rivers and streams are "Water character, flows, water level, bed and channel characteristics, and flowing and falling water of good aesthetic value." (Standards, Section 29A-306(c)(3)(B)(i)).

16. The management objectives for waters classified as Class B(2) for boating are "Waters shall be managed to achieve and maintain a level of water quality compatible with good quality boating (Standards, Section 29A-306(d)(3)(A)). The Class B(2) criteria for boating use is "waters shall comply with the Hydrology Criteria in Section 29A-304 of these rules." (Standards, Section 29A-306(d)(3)(B)).

17. The management objectives for waters classified as Class B(2) for swimming and other primary contact recreation are "Where sustained direct contact with the water occurs, waters shall be managed to achieve and maintain a level of water quality compatible with good quality swimming and other primary contact recreation with very little risk of illness or injury from conditions that are a result of human activities." (Standards, Section 29A-

306(f)(3)(A)).

18. The management objectives for waters classified as Class B(2) for fishing are "Waters shall be managed to achieve and maintain a level of water quality compatible with good quality fishing. (Standards, Section 29A-306(e)(3)(A)). The criteria for fishing are "measures of wild salmonid densities, biomass, and age composition indicative of good population levels" and compliance with the temperature criteria in Section 29A-302(B) of the Standards. ((Standards, Sections 29A-306(e)(3)(B)(i)) and 29A-306(e)(3)(B)(ii)).

II. Factual Findings

A. Background

19. The Wrightsville Hydroelectric Project (the Project) is an existing licensed project located on the North Branch of the Winooski River (North Branch) in the town of Montpelier, Vermont. The drainage area at the Project is 68.7 square miles which includes the towns of Middlesex, Montpelier, East Montpelier, Worcester, and Elmore, Vermont.

20. The Wrightsville Dam was constructed by the Civilian Conservation Corps under the supervision of the Army Corps of Engineers. The dam was completed in 1935. The dam was one of three built on the tributaries of the Winooski River to reduce flood flows in communities along the river and in the case of Wrightsville, to reduce flooding in downstream communities including Montpelier, Vermont. After the construction of the facility, ownership was transferred to the state of Vermont to operate and maintain the flood control facility.

21. In 1965, the dam was raised 20 feet and lengthened by 275 feet in addition to widening the spillway discharge channel. The intake was also modified, and a 1,920-foot-long section of Horn of the Moon Road was relocated on top of the dam.

22. The hydroelectric facility components were completed in 1985 which included the addition of an above-ground penstock, a powerhouse, modification of the intake, and a substation. As a result, the impoundment size was increased from 90 acres to 190 acres. The state of Vermont conveyed an easement and certain water rights to the Applicant in 1984 which expires November 1, 2022.

23. This Project was originally licensed in 1982, and was issued a water quality certification March 30th, 1983, and issued an amendment October 25th, 1988.

B. Project and Civil Works

24. The Wrightsville Hydroelectric Project utilizes water from a flood control dam owned and operated by the state of Vermont.

25. The dam is 1,225 feet long, and 115 feet high. The dam is an earth-fill dam with rock toes and riprapped faces. At its widest point, the dam is 665 feet wide, with a cap approximately 30 feet wide. From base to crest the dam ranges in height from approximately 600 feet elevation to 715 feet elevation. The emergency spillway is located on the eastern side of the dam, at elevation 687 feet.

26. The powerhouse contains three fixed capacity units (Unit 1: 21 cubic feet per second (cfs), Unit 2: 55 cfs, Unit 3: 122 cfs) for a total hydraulic capacity of 198 cfs. The Project has an installed generating capacity of 933 Kilowatts (kW).

27. The Project works consists of: (1) a hydraulic house that controls the intake hydraulics, (2) a gate control structure with trashracks that controls flow to the hydro tunnel, (3) a minimum flow gate at the base of the wall of the intakes that provides flow to the bypass with a total capacity of 25 cfs, (4) a 445-foot-long 5-foot diameter steel penstock that runs above ground from the hydro tunnel that runs through the dam to the generating units, (5) a 400-foot long bypass reach, (6) a powerhouse containing three fixed capacity units (Unit 1: 21 cubic feet per second (cfs), Unit 2: 55 cfs, Unit 3 122 cfs), (7) a substation adjacent to the power house, (8) a 450-foot long 12.5 kV overhead transmission line which directly injects the power generated by the Project into the Applicants distribution grid.

28. The Wrightsville Dam is an uncontrolled structure which does not require any gate openings. The intake structure is roughly 40 feet long, 28 feet wide and 28 feet high. It consists of two intake bays.

29. Water from the reservoir flows into two bays. The hydropower bay at elevation 631 feet, and the overflow bay at elevation 635 feet. At the base of the wall separating the two bays is a minimum flow gate. When this gate is opened it moves water from the hydropower bay to the overflow bay, which leads to the spill tunnel and exits at the base of the dam into the bypassed reach.

30. The minimum flow gate is used to pass minimum flows into the bypassed reach. The bypassed reach is approximately 400 feet long and contains a series of pools and riffle/step-pool habitat.

31. When the reservoir level is below 635 feet, water is used for generation and minimum flows within the capacity of the Project. When the reservoir level is above elevation 635 feet, the excess volume is spilled into the overflow bay which leads to the spill tunnel. The spill tunnel has a hydraulic capacity of approximately 1,080 cfs.

32. As the reservoir rises between elevations 635 feet and 659 feet, flow to the turbines is reduced as head increases to optimize electrical output of the Project. When the Reservoir is approximately at elevation 660 feet, the turbines are turned off as the head becomes too high for operations and water is only discharged from the dam via the spill tunnel into the bypassed reach.

33. When the reservoir elevation exceeds 687 feet, water is passed via the 155-foot-long concrete ogee emergency spillway which has a maximum discharge of 61,500 cfs. The highest average daily reservoir elevation from 2008-2018 was elevation 678 feet.

34. When the reservoir rises above 660 feet, water will continue to be released at approximately 1,080 cfs until reservoir levels return to 660 feet when the facility can begin to generate under lower head levels.

35. Article 29 of the current license issued by FERC November 23, 1982, states that the

Applicant shall enter into an agreement with the U.S. Army Corps of Engineers, and the State of Vermont for operations of the Project.

36. The Wrightsville reservoir impoundment has a surface area of 190 acres at elevation 635 feet, which extends roughly 2 miles. There is approximately 180 acre-feet of net storage capacity between elevations 635 feet and 634 feet. The total gross storage is roughly 2,530 acre-feet.

37. The trashracks are located on the hydropower bay which have a clear bar spacing of one inch.

38. The only way to lower the reservoir below elevation 631 feet would be to use the pond drain which is owned and operated by the state of Vermont.

C. River Hydrology

39. The United States Geological Survey (USGS) maintains a gage (04285500) on the North Branch of the Winooski River located just downstream of the Project powerhouse. The watershed area at the gage is 69.2 mi^2 with the Project utilizing runoff from 68.7 mi^2. An additional USGS gage is located within the reservoir (04285000). Another USGS gage (04285800) closer to the confluence of the Winooski River measures stage height.

40. Article 6 of the current FERC license issued November 23, 1982, states that it is the Applicant's responsibility to maintain gages and stream gaging stations for the Project.

41. The North Branch is a sub basin of the Winooski River watershed and its mainstem is approximately 18 miles long.

42. Hydrologic statistics were estimated using a nearby gage and prorating that data to the drainage area of the Wrightsville Hydroelectric Project. Due to Project infrastructure, a maximum of 1,080 cfs can only be released downstream regardless of inflow. Meaning under a variety of high flow conditions, water is stored in the reservoir with a maximum outflow of 1,080 cfs being passed downstream until the elevation drops and flows are back within the operating range of the hydroelectric Project. The result of constraining the flows is the data downstream of the Project is skewed, making the data unreliable for estimating higher flows at the site.

43. A dataset from a nearby gage on the Dog River (USGS 04287000) was used to estimate hydrologic statistics (Table 1) for Wrightsville Reservoir adjusting the drainage area to 66.5 square miles per the drainage area of the reservoir.

44. The estimated 7Q10 was derived from the USGS gage located just downstream of the reservoir (USGS 04285500) because the facility does not regulate the lower flows with inflow equal to outflow below 25 cfs.

Table 1. Estimated hydrologic statistics at the Wrightsville Reservoir on the North Branch of the Winooski River from years 1955-2020 using either the nearby Dog River gage (UGS 04287000) or the USGS gage located downstream of the facility (USGS 04285500).

North Branch Winooski River at Wrightsville Reservoir: Hydrologic statistic	Discharge Cubic feet per second (cfs)	Discharge cubic feet per second per square mile (csm)
10 % Exceedance Flow	253	3.80
50 % Exceedance Flow	62.9	0.95
90 % Exceedance Flow	16.6	0.25
7Q10	6.37	0.09

D. Current License Conditions and Operations

45. The Wrightsville Hydroelectric Project is currently licensed as a store-and-release facility. The Project is licensed to fluctuate the impoundment between 633.0 feet and 635.0 feet with a minimum flow below the powerhouse of 25 cfs or inflow if less and a minimum bypass flow of 3.4 cfs or inflow if less.

46. The Project currently operates in a modified run-of-river mode utilizing a programable logic control (PLC) system with a pond level control sensor at the intake. The PLC is programed to determine what turbines to operate based on the elevation of the reservoir and the time of year.

47. Generally, the volume of water discharged through the Project is equal to inflow to the reservoir over the course of a day. The exception is during times when inflow exceeds Project capacity and the capacity of the flood control facility (both the hydropower and spill bay).

48. The Applicant currently operates the reservoir level between elevation 633 and 635 feet from September 1 – May 31. Due to an agreement with the Montpelier Recreation Committee, the reservoir remains between elevations 634 and 635 feet from June 1 to August 31. However, elevations may exceed these values due to flood control operations. Once over elevation 635 feet, reservoir levels are beyond the Applicant's control.

E. Applicants Proposal

49. The Applicant's current proposal is to operate the Wrightsville Hydroelectric Project in a modified run-of-river mode. Modified run-of-river mode for this Project is one in which outflow approximates inflow to the extent possible due to the limitations of the infrastructure including capacity of the fixed units and the minimum and maximum hydraulic capacity of the Project.

50. The Applicant proposes to operate the facility in an automatic modified run-of-river mode using the three fixed capacity units with the bypass flow gate to limit the flow

fluctuations between units. Operations are intended to reduce flow fluctuations downstream of the powerhouse.

51. The Applicant proposes to maintain a minimum flow of 25 cfs, or inflow if less, downstream of the powerhouse.

52. In the Final License Application, the Applicant also proposed to maintain a year-round flow in the bypass between 3.4 and 25 cfs, or inflow if less. This is the range in capacity of the bypass flow gate which would be used to limit the flow fluctuations between the fixed turbine units. This method would create a more continuous flow downstream of the Project.

53. In a response[1] from the Applicant to the Agency's preliminary terms and conditions[2] the Applicant agreed to a minimum bypass flow of 7 cfs year-round. The Applicant now proposes to maintain a year-round bypass flow between 7 cfs and 25 cfs.

54. Table 2 provides the flow fluctuations that remain with the current 3 fixed capacity units with a flow of 7 cfs in the bypassed reach year-round.

Table 2. Wrightsville turbine and bypass flow gate capacity between unit transitions and resulting flow fluctuations in the Projects hydraulic capacity while passing a minimum of 7 cfs into the bypassed reach. "Step 1" are the units operating under lower flow, as flows increase additional units are tuned on "Step 2". The fixed capacity of the units results in a flow fluctuation downstream indicated in "proposed flow fluctuations through use of bypass flow gate (25 cfs)".

Step 1		Step 2		Proposed Downstream Flow Fluctuation Through Use of Bypass Flow Gate (25 cfs)
Unit(s) Operating	Discharge (cfs)	Unit(s) Operating	Discharge (cfs)	
None	0	Unit 1	21	0
Unit 1	21	Unit 2	55	16
Unit 2	55	Units 1, 2	76	0
Units 1, 2	76	Unit 3	122	28
Unit 3	122	Units 1, 3	143	0
Units 1, 3	143	Units 2, 3	177	16
Units 2, 3	177	Units 1, 2, 3	198	0

55. Additionally, the Applicant proposes to maintain the reservoir between elevation 634-feet and 635- feet year-round. When the reservoir is above elevation 635 feet the hydraulic capacity of the facility is reached, and water begins to flow into the overflow

[1] Response to Preliminary Terms and Conditions Project No. 5124. Electronic filling May 17, 2021. Washington Electric cooperative, Inc.
[2] Comments Recommendations terms and conditions, North Branch No. 3 Hydroelectric Project No. 5124. Electronic filing March 29, 2021. Vermont Agency of Natural Resources.

bay leading to the spill tunnel. When the reservoir drops below elevation 634 feet, the Applicant will cease generation and maintain the proposed minimum flows.

56. To avoid possible roost disruption of the Northern long-eared bat (state listed as endangered), the Applicant proposes to avoid tree trimming within the Project boundary between April 1 and October 31. This restriction would not apply under public safety or other emergency measures.

F. Current Status

57. In September 2020, the U.S. Environmental Protection Agency approved a list of waters considered to be impaired based on water quality monitoring efforts and in need of total maximum daily load (TMDL) development to address pollution. The Department submitted the list under section 303(d) of the Federal Clean Water Act according to the State of Vermont's 2018 303(d) list of impaired surface waters in need of a TMDL.

58. The lower section of the North Branch of the Winooski River from the Montpelier Recreation Field to the mouth is listed as impaired for contact recreation due to *E. coli*. There are no additional listed waters within or near the Project area[3].

59. The Department concurrently issued a four-part list, List of Priority Surface Waters Outside the Scope of the Clean Water Act Section 303(d) in 2018. This list does not contain any waters near the Project.

60. There is one known water withdrawal located on the North Branch of the Winooski River upstream of the Project for VT Natural CBD farm.

G. Water Chemistry

61. There are two minor NPDES permits issued on the North Branch of the Winooski River. A minor permit is defined as one that discharges less than 1 million gallons per day. The two facilities are the Worcester Fire Department and the Montpelier Recreation Field.

62. Previously collected water quality data within the Wrightsville Reservoir have occurred sporadically. Information collected includes chemical data (total alkalinity, phosphorus, calcium, ext.), and vertical profiles (depth, temperature, and dissolved oxygen). Data collection has occurred occasionally from 1989 to 2014. A summary of available data collected in the Wrightsville Reservoir by the Vermont Department of Environmental Conservation Monitoring and Assessment Program are provided in Table 3 and Table 4.

[3] State of Vermont 2020 303(d) List of Waters, Part A-Impaired Surface Waters in Need of TMDP, September 2020.

Table 3. Monitoring site Summary of Wrightsville Reservoir located in Center of Reservoir collected by the Vermont Department of Environmental Conservation.

Characteristic	Description	Number of samples	Max	Mean	Min
Nitrogen (mg/L)	Nutrient that may fuel algae blooms	1	0.5	0.5	0.5
Phosphorus (ug/L)	Nutrient that may fuel algae blooms	6	14.5	10.0	4.0
Secchi Transparency (m)	Measurement of water transparency in lakes	7	2.2	1.6	1.2

Table 4. Monitoring site Summary of Wrightsville Reservoir located in the southern section of the Reservoir collected by the Vermont Department of Environmental Conservation.

Characteristic	Description	Number of Samples	Max	Mean	Min
Chloride (mg/L)	At elevated values mostly from deicing	2	4.3	3.9	3.2
Conductivity (umho/cm)		4	85.7	44.8	33.0
Nitrogen (mg/L)	Nutrient that may fuel algae blooms	3	0.6	0.4	0.2
pH	Acidity	4	7.7	6.4	5.2
Phosphorus (ug/L)	Nutrient that may fuel algae blooms	8	19.1	12.5	9.0
Secchi Transparency (m)	Measurement of water transparency in lakes	7	2.8	1.5	1.1
Turbidity (NTU)	Measure of suspended sediment	2	84.0	20.3	3.7

63. Vermont Fish and Wildlife Department (VTFWD) deployed three temperature loggers, one upstream of the facility at Putnamville Rd., one immediately below Wrightsville Reservoir, and the last 2.9 miles downstream of the reservoir from June 20 to September 30, 2012.

64. VTFWD calculated the number of days where maximum temperatures exceeded 65ºF, 72 ºF, 75 ºF, and 80 ºF between June 20 to September 30, 2012. These are the thresholds used for trout management in the state of Vermont. The results are presented in Table 5. For reference, the acute thermal threshold for brown trout occurs at 75 ºF, and the chronic thermal threshold occurs at 68 ºF.

Table 5. The number of days between June 20 and September 30, 2012-when maximum temperatures exceeded 65ºF, 72ºF, 75ºF, and 80ºF above, directly below and 2.9 miles downstream of the Wrightsville Reservoir.

Maximum Temperatures	Putnamville Rd. (Above)	Below Wrightsville Reservoir	Montpelier Recreation Field (Below)
Days >65 ºF	87	91	93
Days >72 ºF	68	70	79
Days >75 ºF	45	35	67
Days >80 ºF	7	2	33

65. Downstream of the Project at the Montpelier Recreation Field, the number of days water temperatures exceeded all temperature thresholds increased.

66. Given the results of the 2012 data collection, VTFWD consulted with the Applicant on the feasibility of the facility to release water from the hypolimnion to establish a cold water fishery below the Project. Currently the only way to pull hypolimnetic water would be to manually operate the pond drain gate.

67. Before the Applicant investigated the potential for Project modification, VTFWD conducted a water quality study[4] whose objectives were (1) determine the temperature of the water in the hypolimnion, (2) investigate if there was sufficient volume of cool water within the reservoir to sustain a cold water fishery below the facility, and (3) determine if there would be a meaningful benefit to cold water fisheries in the lower reaches of the North Branch of the Winooski River during the hottest portions of the summer.

68. In 2018, VTFWD collected water temperature and dissolved oxygen data in the reservoir at two stations. Reservoir profiles at 1-foot intervals were collected on July 15, August 13, and September 13, 2018. The reservoir stratified during the study period with a broad thermocline and a narrow hypolimnion. By September, the epilimnion showed cooling.

69. To estimate the volume of cool water available, VTFWD used the bathymetric map[5] created by Vermont Department of Environmental Conservation to estimate the volume of water occupying various depths that could theoretically be accessed for downstream cooling.

70. Within the North Branch, VTFWD placed three temperature loggers in similar locations as described in Table 5. The Putnamville location was used as the upstream reference, and the Montpelier Recreation Field location was used as the downstream reference. The collected data was used to develop a regression model to predict water temperatures in the North Branch at the Montpelier Recreation Field, under different scenarios to evaluate if there would be a meaningful benefit.

[4] Assessing the thermal benefits of hypolimnetic release at Wrightsville Dam. Vermont Fish and Wildlife Department Annual Report. Period covered June 30, 2018, to July 1, 2019.
[5] https://dec.vermont.gov/watershed/lakes-ponds/data-maps/charts

71. Four scenarios were evaluated: status quo (as currently operated), cold water release to the bypass at 3.4 cfs, cold water release to the bypass of 12 cfs, and all downstream flows sourced from available cold water. The Project infrastructure would not allow for all downstream flows to be released from the hypolimnion. The scenario where all flows are released from the hypolimnion allows for a best-case scenario to be modeled.

72. The regression models are a function of (1) average water temperature at the tailrace (2) stream flow (USGS 04285500) (3) daily maximum air-tailrace water temperature differential (i.e., some rate of water warming is to be expected) (4) categorical effect (breaking the summer period to before or after July 31).

73. A number of assumptions were included in the modeling including; (1) The stratification within the impoundment would be unaffected by hypolimnetic withdrawal, however some mixing would occur so water within the hypolimnion may be warmer and (2) the conditions in 2018 (i.e., rate of water warming, and atmospheric/hydrologic conditions) are static and representative of future conditions.

74. The analysis concluded that the downstream reference site would have temperature reductions ranging from 1 ºF to 12 ºF depending on the scenario. However, although there were improvements the minimum and maximum daily temperatures still exceeded the management thresholds in July, and no thermal benefits were provided in August, which limits meaningful benefit to the cold water fishery.

H. Aquatic Biota

75. The North Branch of the Winooski River is classified as Class B(2) for the aquatic biota designated uses and is designated as a cold water fish habitat. “Aquatic Biota” means all organisms that, as part of their natural life cycles, live in or on waters. (Standards, Section 29A-102(5)). Aquatic biota include fish, aquatic insects, amphibians, and some reptiles such as turtles.

76. Fish communities in the vicinity of the Project and within Wrightsville Reservoir have been periodically sampled. Fish observed in the North Branch downstream of Wrightsville Reservoir and within the reservoir are presented below (Table 6).

Table 6. Fish species found downstream in the North Branch of the Winooski River in the vicinity of the Project and regularly observed within the Wrightsville Reservoir.

Common Name	Scientific Name	Present Downstream	Present in Reservoir
Largemouth bass	*Micropterus salmoides*	No	Yes
Smallmouth bass	*Micropterus dolomieu*	Yes	Yes
White sucker	*Catostomus commersonii*	Yes	Yes
Yellow perch	*Perca flavenscens*	Yes	Yes
Brown bullhead	*Ameiurus nebulosus*	No	Yes
Chain pickerel	*Essox niger*	No	Yes
Pumpkin seed	*Lepomis gibbosus*	Yes	Yes
Golden shiner	*Notemigonus crysoleucas*	No	Yes
Brown trout	*Salmo turtta*	Yes	No
Longnose dace	*Rhinichthys cataractae*	Yes	No
Blacknose dace	*Rhinichthys atratulus*	Yes	No
Common shiner	*Luxilus cornutus*	Yes	No
Fallfish	*Semotilus corporalis*	Yes	No

77. There are no known migratory fish species in the North Branch of the Winooski River. There is no current or historical evidence to suggest the presence of American eel in the Project vicinity.

78. VTFWD stocks brook trout in the upper reaches of the North Branch of the Winooski River.

I. Aquatic Habitat

79. The North Branch of the Winooski River is classified as Class B(2) for the aquatic habitat designated use.

80. Waters designated as Class B(2) for aquatic habitat use shall be managed to achieve and maintain high quality aquatic habitat, characterized by the physical habitat structure, stream processes, and flow characteristics of rivers and streams and the physical character and water level of lakes and ponds necessary to protect and support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements. (Standards, Section 29A-306(b)(3)(A)).

81. There are three distinct areas where the Project affects aquatic habitat: the Wrightsville Reservoir, the bypassed reach of the North Branch of the Winooski River, and the North Branch of the Winooski River downstream of the powerhouse.

Wrightsville Reservoir

82. The Applicant is proposing to operate the Project in a modified run-of-river mode, using the bypass flow gate to fill in any flow fluctuations occurring between the fixed-capacity

turbine units. Additionally, the Applicant is proposing to maintain the reservoir between elevation 634 and 635 feet. The previous range of reservoir elevation was between 633 and 635 feet. The Applicant has proposed to cease all generation should the impoundment fall below 634 feet. All flows are passed through the flow gate at the base of the wall of the intakes.

Bypassed Reach

83. The Applicant is proposing to provide 7 cfs year-round into the bypass reach in addition to using the minimum flow gate to limit flow fluctuations (Table 2) created by the fixed turbine units to operate in a modified run-of-river. Because of the proposed operations, flow will vary between 7 cfs and 25 cfs within the bypassed reach.

84. The bypassed reach of the North Branch is roughly 400 feet long and consists of bedrock, large boulder and cobble dominated substrates. Mesohabitat types were mapped during low flow conditions. Pool habitat made up 29.5% of the bypass area, riffle/step pool accounted for 52.2%, and the remaining 18% of the bypass habitat was cascade.

85. The Applicant conducted an instream flow study to evaluate the effects of flow on available habitat. Within the bypass, two transects were selected based on the mesohabitat mapping. One transect was located in pool habitat and the other was located in riffle/step-pool habitat. No transects were placed in cascade habitat because cascades provide little suitable habitat for the target species and life stages.

86. The study evaluated five flows 3.7, 5.4, 11.6, 17.8, and 23 cfs. At transect 1 (pool habitat), the wetted width increased by 19.2% from 13 feet to approximately 15.5 feet across the range of flows measured. At transect 2 (riffle/step-pool), the wetted width increased 68.2 % from 11 feet to 18.5 feet across the range of flows measured.

87. Eight target species were used to calculate area weighted suitability. They were longnose dace adults, fallfish juveniles and adults, brown trout juveniles and adults, white sucker juveniles and adults, and benthic macroinvertebrates. The results of the study indicated that the highest measured flow (23 cfs) provided the maximum available habitat at steady state (Figure 1).

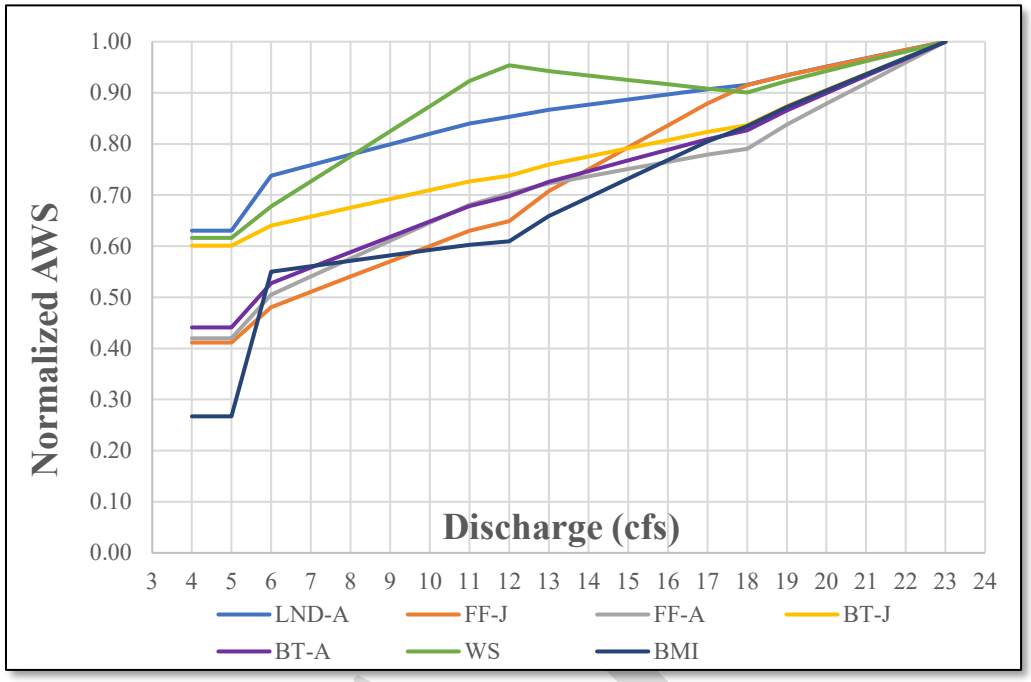

Figure 1. Relationship between flow and habitat (area weighted suitability, AWS) for select species and life stages in a 400-foot-long bypass reach of the North Branch Winooski River below Wrightsville Dam. Longnose dace adults (LND-A), fallfish juveniles (FF-J) and adults (FF-A), brown trout juveniles (BT-J) and adults (BT-A), white sucker juveniles and adults (WS), and benthic macroinvertebrates (BMI).

88. As flows increased in the bypass reach, suitable habitat increased for most target species and life stages. The exception was white suckers. However, white suckers retained at least 80% of maximum available habitat at flows greater than 9 cfs.

89. As noted, the proposed operations would fluctuate flows in the bypassed reach between 7 cfs and 25 cfs. Therefore, a two-flow analysis was conducted to determine the minimum habitat available at a base and peak flow for the target species and life stages. A two-flow analysis looks at how much available habitat there is at both the base and peak flow. The least amount of habitat at either flow is what is considered available.

90. Two-flow analyses indicated that as base flows increase, available habitat increases for all species and life stages evaluated. This followed a similar trend as the steady state analysis. The two-flow analysis concluded that base flows of 4 cfs reduces suitable habitat to less than 50% of the maximum available habitat for juvenile and adult fallfish and juvenile brown trout. Increasing base flows provided more habitat for all target life stages with a base flow of 7 cfs providing at least 50% of the maximum available habitat for all target species and life stages.

Downstream of Powerhouse

91. The Applicants proposal to operate in a modified run-of-river mode will create flow fluctuations downstream of the Project. The magnitude of these fluctuations is described in Table 2. A continuous bypass flow of 7 cfs will result in flow fluctuations downstream of 16 and 28 cfs.

92. The greater the minimum flow in the bypassed reach, the greater the potential flow fluctuations downstream of the Project, as there would be less incremental steps that could be used with the minimum flow gate. The Agency analyzed the frequency of flow fluctuations that may be observed downstream under different minimum bypass scenarios.

93. A model was developed using USGS data from September 1, 2019, through September 26, 2020, during the time the Applicant demonstrated the proposed operations. The data was prorated from the USGS gage to the Project. Prorated inflows that were greater than 200 cfs were not included in the analysis because those flows are out of the hydraulic capacity of the Project. When the USGS gage reported icing, those data points were also excluded from the analysis because flows could not be estimated. A total of 5,114 data points, or approximately 14%, were excluded from the analysis of 37,629 data points.

94. Using Table 2 the Department simulated different minimum bypass flows and using estimated inflow simulated how the Project would operate (i.e., which turbines would be 'on' and the flow through the bypass). This was done on a 15-minute time step.

95. From this simulation, the frequency of flow fluctuations between 25 and 50 cfs was estimated. This range was used because flow fluctuations over 50 cfs appeared to be an anomaly or outside of Project operations, whereas flow fluctuations greater than 25 cfs were thought to represent flow fluctuations associated with project operations that may impact aquatic habitat.

96. Generally, the greater and faster a flow fluctuation is, the greater the potential effect on suitable habitat. Flow fluctuations that are more gradual allow mobile aquatic organisms time to find more suitable habitat under changing flows.

97. Model results indicate the frequency of 15-minute flow fluctuations of 25 to 50 cfs in the Wrightsville tailrace tended to increase with increasing minimum bypass flows (Figure 2).

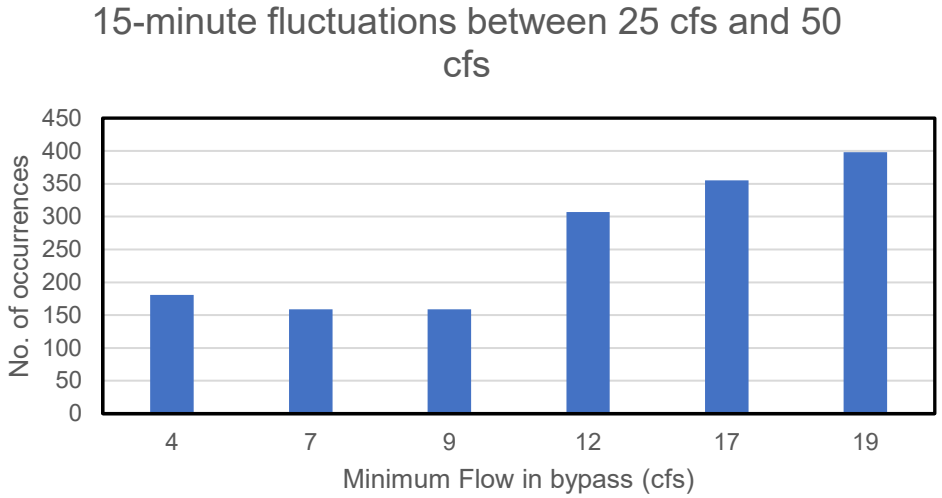

Figure 2. A simulation of the frequency of 15-minute flow fluctuations between 20 and 50 cfs in the North Branch of the Winooski River given various minimum bypass flows from September 1, 2019, through September 26, 2020, excluding times when flows were outside of the Project hydraulic capacity and when there were icing conditions.

98. The Applicant reprogramed the automated pond level sensor (PLC) to demonstrate the proposed operations starting in September 2019, as described in finding 95, with 3.4 cfs year-round in the bypassed reached. This allows the Agency to review downstream flow fluctuations compared to previous operations.

99. The Agency referenced the USGS gage (USGS 04285500) to understand flow fluctuations downstream of the Project. Figure 3 below depicts two time periods where the Applicant was operating under the current licensed operations (left) and the proposed operations (right). The Applicant's proposal to use the minimum flow gate to limit flow fluctuations due to the capacity of the turbines results in limited downstream fluctuations compared to previous operations. Previous operations (left) show clear steps due to fixed units, which were not as evident under proposed operations (right).

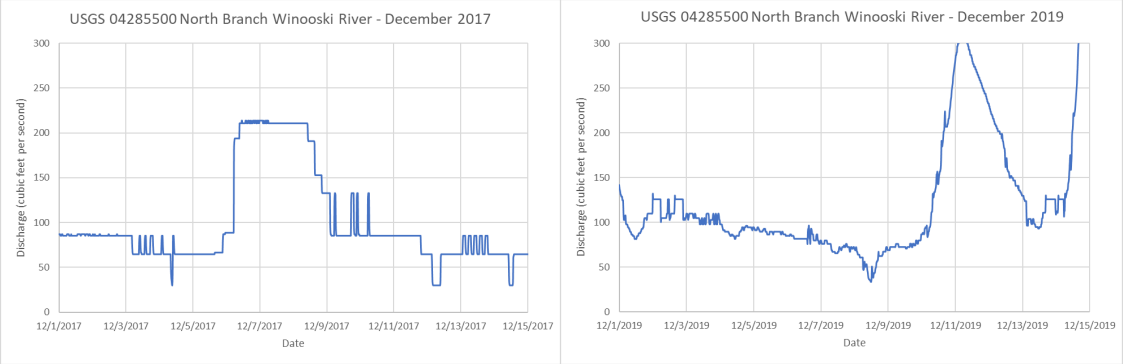

Figure 3. Comparison of hydrographs from December 1 – 15, 2017 and December 1 – 15., 2019 of the previous (Left) and proposed (Right) Project operations from the USGS streamflow gauge (USGS No. 0428550) data collected below the Project on the North Branch.

100. Additionally, the Agency deployed a trail camera to visualize habitat changes under the proposed operations. The camera was placed roughly 125 meters downstream of the tailrace. The camera was deployed closer to the facility because it is anticipated that any flow fluctuations would be greatest closer to the Project as there would be limited attenuation. Data were collected from October 2021 through December 2021.

101. The Agency reviewed footage to identify occasions where flow fluctuations occurred that would be similar to those anticipated in the next licensing term, specifically in the range of 16 cfs and 28 cfs. Three time periods were identified using the USGS gage located downstream of the powerhouse.

102. October 23, 2020, from 15:45 to 17:15 flows changed from 88.5 cfs to 72.3 cfs, for a flow fluctuation of 16.2 cfs. October 26, 2021, from 13:00 to 13:15 flow changed from 192 cfs to 162 cfs for a flow fluctuation of 30 cfs. On December 1, 2021, from 15:00 to 15:30 flows changed from 87.1 cfs to 74 cfs for a flow fluctuation of 13.1 cfs.

103. At the location of camera deployment, the wetted width changed minimally as discharge was increased or decreased. The changes in velocity did not appear dramatic, although it is anticipated the depth varied between flows, it was estimated to be a few inches. Flow patterns (i.e., eddy, connectedness, main channel) remained relatively unchanged. There were occasions when a connected side channel received less water but did not become stagnant.

J. Wildlife and Wetlands

104. The shoreline area of the impoundment, in general, is important overwintering habitat for reptiles and amphibians.

105. The National Wetlands Inventory created by the United States Fish and Wildlife Service (USWS) has identified several wetland types within the Project area. These include lacustrine limnetic (81.5 acres), palustrine emergent (2.4 acres), palustrine forested (8.7 acres), palustrine shrub-scrub/emergent (82.6 acres), palustrine shrub-scrub (1.3 acres), palustrine unconsolidated shore (0.6 acres).

106. Vermont wetlands identified significant wetlands as class II in the Project area. These wetlands overlap those mapped by the National Wetlands Inventory.

K. Rare, Threatened, and Endangered Species

107. The Project is in the range of the Northern long-eared bat (*Myotis septenrionalis*) which is state listed as endangered and federally listed as threatened.

108. The Applicant has proposed avoiding tree trimming and removal in its Project Boundary between April 1 and October 31 to avoid any roost disruption of the Northern long-eared bat.

109. Based on consultation with the Vermont Fish and Wildlife Natural Heritage Program, there were no other species of concern that would be affected by the Project. Several species were identified in the Project area however, all records were outside of any effects from Project operations.

L. Shoreline Erosion

110. Most of the shoreline of the impoundment is vegetated with little development. The North Branch in the bypassed reach is armored with bedrock and is boulder dominated in a confined channel.

111. The Applicant is proposing to reduce fluctuations in the impoundment from 633 to 635 feet to between 634 and 635 feet. When the reservoir rises above 635 feet, it is no longer under control of the Applicant.

112. The Project proposal includes releasing flows between 7 cfs and 25 cfs into the bypassed reach. With a bedrock dominated bypass, it is not anticipated that flows of this magnitude will cause erosion. Flows released above 25 cfs are a result of flood operations and are not under control of the Applicant.

113. There will likely be limited erosion from proposed Project operations and reduced impoundment fluctuations. Any impoundment fluctuations between 634 and 635 feet are expected to be gradual.

M. Recreation Use

114. Much of the land, 650 acres, surrounding Wrightsville Reservoir is owned by the Department. There are three major recreational opportunities surrounding the Project.

115. Shady Rill Recreation area runs along Martins Brook which flows into the reservoir. This park offers a number of picnic tables, parking, fireplaces, and an open field area. This area is operated and maintained by the Department who contracts seasonal management duties to the Wrightsville Beach Recreation Association.

116. The Wrightsville Reservoir Boat Launch is located on Route 12 and offers a boat ramp and parking. The boat launch is owned by the Department and maintained by contracted entities of the Department and VTFWD.

117. The Applicant originally constructed the third location, Wrightsville Beach, but has since turned it over to the Wrightsville Beach Recreation District Board, which is made up of the surrounding municipalities of Middlesex, Montpelier, East Montpelier, and Worcester. The beach offers several parking spaces, picnic tables, fireplace grills, playground area, a pavilion, hiking trails, sanitary facilities, shelter, disc golf, and an office for rentals.

118. The Applicant no longer maintains or owns any recreation sites or facilities including informal access to the river. The Applicant instead has agreements with various stakeholders, including the State of Vermont, which outlines the Applicant's financial, among others, contributions. The current lease agreement with the State expires November 1, 2022.

N. Debris

119. The Applicant notes that the Project has full time fully trained personnel who monitor day to day operations at the Project. This includes cleaning the trashracks. The Applicant does not indicate how trash is handled once removed from the racks.

O. Aesthetics

120. The Applicant is proposing to operate the Project in a modified run-of-river mode with outflows approximate to inflows as described in finding 49. It is anticipated that because the Project is operating modified run-of-river, this will provide good aesthetic values downstream of the Project and within the impoundment.

III. Analysis

121. A state's 401 certification shall assure "that a discharge from a Federally licensed or permitted activity will comply with water quality requirements." (40 C.F.R §121.3). Accordingly, the Department may set forth limitations and other requirements necessary for it to find that there is reasonable assurance that the Project will be operated in a manner which will not violate Vermont Water Quality Standards. A goal of the Standards and the Clean Water Act is to restore the biological integrity of waters such that aquatic biota and wildlife are sustained by high quality habitat.

122. Continued operation of the Project may lead to violations of Standards. The particular aspects of operation that have the potential to cause violations of Standards are analyzed below to determine the limitations and requirements necessary to find that there is reasonable assurance that the discharge will not violate the Vermont Water Quality Standards.

123. In addition to the specific items pertaining to the Application on review, if an activity was not presented in the Application and not consistent with the findings of this Certification, the Department reserves the right to review said activity to assure it will not cause a violation of Vermont Water Quality Standards (e.g., change in operation, maintenance drawdown, construction activity, etc.). In addition to specific operational conditions, other provisions like reporting, inspections, and flow monitoring will also be necessary to assure the discharge does not violate Vermont Water Quality Standards.

A. Water Chemistry

124. A portion of the North Branch of the Winooski River is impaired due to *E. Coli.* It is not anticipated that *E. Coli* will not be increased due to Project operations (finding 57 and 58), as this is due to the city of Montpelier having a combined sewer system causing combined sewer overflows.

125. VTFWD investigated the potential to use bottom water releases from the Wrightsville Reservoir to reduce summer water temperatures downstream for a cold water fishery (finding 63- 74). Under ideal modeled circumstances (all flows released from the hypolimnion, little to no thermal mixing in the reservoir, large volume of cold water) benefits could be realized. This is unrealistic given the current Project infrastructure, and limited information on how reservoir stratification would respond with a low-level withdrawal.

126. Within the reservoir, low dissolved oxygen concentrations were observed in the hypolimnion. Releases of water from the hypolimnion would have to consider impacts and require mitigation measures for low oxygen downstream of the Project.

127. A decrease in the rate of warming flows either entering the reservoir creating a larger volume of cool water, or downstream of the facility (through riparian plantings for example) could then benefit from additional cool water being released through the facility.

128. This certification is being conditioned (Condition E) to have the opportunity to revisit the conversation around withdrawing water from the hypolimnion should VTFWD determine that there would be a meaningful difference in cold water refuge further downstream on the North Branch of the Winooski River.

129. It is not anticipated that continued operations of the Project will have any changes on additional water chemistry measures over the next license term.

B. Flow and Water Level Management

130. The Wrightsville Hydroelectric Project is unique in that the Applicant proposes to use the minimum flow gate to limit flow fluctuations between the three fixed capacity turbines to operate in a run-of-river mode to the extent that Project infrastructure allows. Because of this, the bypassed reach will experience flow fluctuations while flows downstream of the Project will experience closer to run-of-river hydrology (finding 50-55).

131. The Project has made changes to the PLC system and have been operating in a modified run-of-river since September 2019. The bypass flow is lower (3.4 cfs) than what is being proposed for the next licensing term. The current flow regime can be used as a

demonstration of future operations, but the Department recognizes that some adjustments to the PLC system remain, and the settings required for future operations have yet to be fully implemented.

132. To ensure project operations comply with Standards this certification is being conditioned (condition C) to develop flow management and monitoring plan. Additionally, this certification is being conditioned to continue to maintain USGS stream gaging at the Project as listed in Article 6 of the 1982 license (finding 40). This will demonstrate how the Applicant will operate the Project according to this certification.

C. Aquatic Biota

133. The Wrightsville Reservoir and the North Branch of the Winooski River are classified as Class B(2) for all designated uses and is a cold water fishery. The Agency's goal is to minimize potential negative effects on fish and other aquatic life.

134. The Applicant is proposing to reduce impoundment fluctuations by 1 foot and operate in a modified run-of-river mode. The more stable impoundment and modified run-of-river operations will improve habitat conditions. This certification is being conditioned (condition B) as the Applicant proposed while providing a minimum bypass flow of 7 cfs or inflow, if less.

D. Aquatic Habitat

135. The Applicant proposes to operate Wrightsville Hydroelectric Project in a modified run-of-river mode (finding 49-55).

136. The modified run-of-river operations will limit any water level fluctuations in the impoundment and those fluctuations are anticipated to be gradual, when not in flood operations (finding 82 and 82). Additionally, the reduction in reservoir elevation changes will provide stability needed for plant growth which provides habitat for spawning, rearing, and foraging fish.

137. The bypassed reach of the North Branch of the Winooski was evaluated using both steady state (Figure 1) and two-flow analyses. The steady state analysis demonstrated that at a flow 7 cfs, longnose dace, white suckers, and juvenile brown trout retained 60-65% of the habitat available at 23 cfs. The remaining species and life stages retained less than 50% of the maximum available habitat at 3.7 cfs, with benthic macroinvertebrates habitat being particularly limited. At flows of 7 cfs or greater, all species retained greater than 50% of the maximum available habitat.

138. The two-flow analysis concluded that base flows of 4 cfs reduces suitable habitat to less than 50% of the maximum available habitat for juvenile and adult fallfish and juvenile brown trout. Increasing base flows provided more habitat for all target life stages with a bypass flow of 7 cfs providing at least 50% of the maximum available habitat for all target species and life stages.

139. Downstream of the powerhouse, the Agency reviewed the anticipated frequency of flow fluctuations under proposed operations (Figure 2). The frequency of these flow fluctuations ranged from 159 at bypass flows of 7 or 9 cfs to 398 when the minimum

bypass flow was 19 cfs from September 1, 2019, to September 26, 2020. The greatest increase in the frequency of flow fluctuations in the downstream reach occurred at bypass flows between 9 and 12 cfs. This indicated that to limit the number of fluctuations downstream of the powerhouse, a minimum bypass flows of either 7 cfs or 9 cfs would be optimal.

140. The Applicant implemented the proposed operations in the year 2019. This allowed the Agency to compare before and after operations using the USGS gage downstream (Figure 3). The proposed operations greatly reduced the magnitude of the fluctuations and smoothed out the hydrograph of the clear steps of the fixed unit turbines relative to previous operations.

141. Additionally, the downstream flow fluctuations were observed using a remote camera that was set downstream of the powerhouse. It is anticipated that any flow fluctuations, would be most noticeable a short distance downstream, as flows have not yet had a chance to attenuate.

142. In reviewing the photos (findings 101-103) it was determined that the anticipated flow fluctuations as proposed (condition B) will have limited impacts on available habitat downstream of the Project.

E. Wildlife and Wetlands

143. It is not anticipated that there will be any Project effects on wildlife or wetlands in the vicinity of the Project. The Applicant is proposing to operate in a modified run-of-river mode. These operations will reduce impoundment fluctuations while inflows and impoundment levels are within control of the Applicant.

144. The Applicant is proposing to reduce the impoundment fluctuations from 2 feet to 1 foot from September 1 – May 31. This will reduce any impacts on wildlife that use the shore for overwintering activity such as turtles and muskrats.

F. Rare, Threatened, and Endangered Species

145. The Northern long-eared bat is listed at both the federal and state level (finding 107). As such, condition D adopts the Applicant's proposal to avoid tree trimming and removal in the project boundary between April 1 and October 31 to avoid any roost disruption.

G. Shoreline Erosion

146. The Applicant is proposing to reduce the impoundment fluctuations from 2 feet from September 1 – May 31 to 1 foot year-round, while flows are within the capacity of the Project. It is anticipated that this will limit shoreline erosion in the reservoir. Additionally, because the Applicant is proposing to operate in a modified run-of-river mode, any fluctuations that do occur will be gradual, both within the impoundment and downstream of the Project in the North Branch of the Winooski.

147. WEC reprogramed the automated pond level sensor (PLC) to demonstrate the proposed operations starting in September 2019. This allowed the Agency to review flow fluctuations compared to previous operations. Under the proposed flow regime, the Agency did not observe dramatic increase or decreases in elevation within the

impoundment or downstream of the Project, while flows were within the capacity of the facility.

H. Recreation Use

148. The Applicant has proposed, and this certification is being conditioned (condition B) to maintain the reservoir between elevation 334 feet and 335 feet year-round. This will reduce fluctuations on the Wrightsville Beach and other nearshore areas while the reservoir is within the capacity of the Project.

149. Additionally, because the Applicant does not own or maintain any of the recreational facilities at the Project it is anticipated that maintaining the current agreements (finding 118) will continue to support recreational needs.

I. Debris

150. The Applicant did not include information on how debris is handled for the Project. This certification is being conditioned (condition F) that debris is disposed of properly according to state law.

J. Antidegradation

151. Pursuant to the Anti-Degradation Policy set forth in the Standards (§ 29A-105) and the Agency's 2010 Interim Anti-Degradation Implementation Procedure (Procedure), the Secretary must determine whether a proposed discharge or activities are consistent with the Policy by applying the Procedure during the review of applications for any permit for a new discharge if during the application review process compliance with the Standards is evaluated pursuant to applicable state or federal law. (Procedure, Section III(A)). This includes water quality certifications required by Section 401 of the federal Clean Water Act for a federal license or permit for flow modifying activities. (Procedure, Section III(B)(3)).

152. In making a determination that proposed activities are consistent with the Anti-Degradation Policy and Implementation Procedure, the Secretary is required to use all credible and relevant information and the best professional judgement of Agency staff. (Procedure, Section III(D)). Section VIII of the Procedure governs the Agency's review of Section 401 applications for flow modifying activities. (Procedure, Section VIII(A)(1)). The Secretary may have to review a single waterbody under multiple tiers of review depending on whether a waterbody is impaired or high quality for certain parameters.

153. Tier 3 review is required if the project will discharge to an Outstanding Resource Water. (Procedure, Section VIII(D)). This Project does not affect any Outstanding Resource Waters and therefore does not trigger a Tier 3 review under Section VIII of the Procedure.

154. This Project affects waters classified as B(2) waters for designated uses and criteria, which are high quality waters for certain parameters that trigger a Tier 2 review under Section VIII of the Procedure. (Procedure, Section VIII(E)(1)(c)). Under Tier 2, the Secretary must determine whether the proposed discharge will result in a limited reduction in water quality of a high quality water by utilizing all credible and relevant information and the best professional judgment of Agency staff. (Procedure, Section VIII(E)(2)(b)).

155. When conducting a Tier 2 review, the Secretary may consider, when appropriate, one or more of the following factors when determining if a proposed new discharge will result in a reduction in water quality: (i) the predicted change, if any, in ambient water quality criteria at the appropriate critical conditions; (ii) whether there is a change in total pollutant loadings; (iii) whether there is a reduction in available assimilative capacity; (iv) the nature, persistence and potential effects of the pollutant; (v) the ratio of stream flow to discharge flow (dilution ratio); (vi) the duration of discharge; (vii) whether there are impacts to aquatic biota or habitat that are capable of being detected in the applicable receiving water; (viii) the existing physical, chemical and biological data for the receiving water; (ix) degree of hydrologic or sediment regime modifications; and (x) any other flow modifications. (Procedure, Section VIII(E)(2)(d)).

156. The Secretary considered the foregoing factors during the review of pertinent to a Tier 2 review of the project to determine if the project will result in a reduction of water quality at each of the waters affected by the project. The principal impacts of the Project are at the Wrightsville Reservoir and the North Branch of the Winooski River and is the flow and water level management associated with Project operations and their resulting effects on aquatic habitat and water chemistry. The changes in operation of the Wrightsville Hydroelectric Project will not result in a discharge of additional pollutants or reduce other ambient water quality criteria. As a result, factors (i), (ii), (iii), (iv), (v), and (vi) are not at issue. Conditions B and C prescribe flow and water level management regimes and monitoring that will support aquatic habitat while reducing the degree of hydrologic alteration downstream of the facility.

157. This certification does not authorize any activities that would result in a lowering of water quality for those parameters that are exceeding Standards.

158. For those parameters for which project waters do not exceed Standards, the Secretary must conduct a Tier 1 review. (Procedure, Section VIII(F)).

159. Under Tier 1 review, the Secretary may identify existing uses and determine the maintenance necessary to protect these uses. (Procedure, Section VIII(F)). In determining the existing uses to be protected and maintained, the Secretary must consider the following factors: (a) aquatic biota and wildlife that utilize or are present in the waters; (b) habitat that supports existing aquatic biota, wildlife, or plant life; (c) the use of the waters for recreation and fishing; (d) the use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and (e) evidence of the uses' ecological significance in the functioning of the ecosystem or evidence of the uses' rarity. (Procedure, Section VIII(F)(2)).

160. The Secretary considered the foregoing factors pertinent to a Tier 1 review of the Project and, based on information supplied by the Applicant and Agency staff field investigations, identified the following existing uses at the North Branch of the Winooski River: aquatic biota and wildlife; aquatic habitat; aesthetics; and recreation.

161. The Applicant is moving from a daily peaking operation to a modified run-of-river operation, operating the Project as close to run-of-river mode as possible given the Project infrastructure. This certification will result in improvements to water quality and will protect and maintain conditions that support existing uses.

162. The Secretary considered the factors under fining 159 pertinent to a Tier 1 review of the Project and, based on information supplied by the Applicant and Agency staff investigations, identified the following existing uses at the Wrightsville Reservoir; aquatic biota and wildlife; aquatic habitat; recreation; and aesthetics.

163. The Applicant is proposing to limit the impoundment fluctuations from 2 feet from September 1 through May 31 to 1 foot year-round. Additionally, as the Applicant proposes to operate the Project in a modified run-of-river mode, this will also result in a more gradual increase and decrease of any impoundment fluctuation while flows are within Project capacity. The certification will result in improvements to water quality and will protect and maintain conditions that support existing uses.

164. The Secretary finds that development and operation of the Project as conditioned by this certification will comply with the Vermont Water Quality Standards and other applicable rules. Accordingly, the Secretary finds that the Project, as conditioned, meets the requirements of the Policy and Procedure relating to the protection, maintenance, and improvement of water quality.

IV. Decision and Certification

The Department has examined the Project application and other pertinent information deemed relevant by the Department to issue a decision on this certification application pursuant to the Department's responsibilities under Section 401 of the federal Clean Water Act. After examination of these materials, the Department certifies that there is reasonable assurance that operation of the Project, when done in accordance with the following conditions will not violate Standards; will not have a significant impact on use of the affected waters by aquatic biota, fish or wildlife, including their growth, reproduction, and habitat; will not impair the viability of the existing populations; will not result in a significant degradation of any use of the waters for recreation, fishing, water supply or commercial enterprises that depend directly on the existing level of water quality; and will be in compliance with sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, 33 U.S.C. section 1341, and other appropriate requirements of state law:

A. Compliance with Conditions. The Applicant shall operate and maintain this Project consistent with the findings and conditions of this certification. The Applicant shall not make any changes to the Project or its operations that would have a significant or material effect on the findings, conclusions, or conditions of this Certification without approval of the Department.

See finding 123 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-101.

B. Flow and Water Level Management. The Project shall operate in a modified run-of-river mode. Modified run-of-river mode for this Project is one of which outflow approximates inflow to the extent possible due to the limitations of the infrastructure, including the minimum and maximum hydraulic capacity and capacity of the fixed units. This operation mode will be used to limit the flow fluctuations between the three units to provide a hydrograph resembling run-of-river downstream of the powerhouse. When generating, the Project shall pass a bypass flow between 7 cfs and 25 cfs continuously year-round. When inflows are less than the generating capacity of the smallest unit, 25 cfs or inflow, whichever is less, shall be passed through the minimum flow gate of spilled at the intake. When generating, the reservoir shall be no lower than 634 feet.

See finding 82-103, 113, 135-142, and 146 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306(b)

C. Flow Management and Monitoring Plan. The licensee shall develop, within 180 days of the effective date of the FERC license, a plan detailing how the Project will operate in modified run-of-river mode and comply with the operations and bypass flow described above and continuous monitoring and reporting of flow releases at the Project (bypass flow, spillage, and turbine discharge), impoundment levels, and inflows. The plan shall include provisions for the inclusion of contemporaneous records from the U.S. Geological Survey (USGS) gage (North Branch of Winooski River at Wrightsville, Vermont, Gage No. 04285500) associated with operations of the Project and for funding the State portion for operation of the gage under the Joint Funding Agreement with the USGS. The licensee shall include in the monitoring plan copies of turbine generation which depicts the flow/production relationship for each turbine. The plan shall include procedures for reporting deviations from prescribed operating conditions to the Department. Reports shall be made within 15 days

after a deviation explaining to the extent possible, the cause, severity, and duration of the deviation, observed or reported adverse environmental impacts from the incident, pertinent data, and measures to be taken to avoid recurrences. The Applicant shall maintain records and provide such records upon request by the Department. The plan shall be subject to approval by the Agency prior to implementation.

See finding 2, 40, 121, and 132 for a statement of necessity. 10 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-304 & § 29A-306(b).

D. Threatened and Endangered Species. The Applicant shall avoid tree trimming and removal, unless there is an emergency, in its Project Boundary between April 1 and October 31 to avoid any roost disruption of the Northern long-eared bat.

See finding 107, 108, and 145 for a statement of necessity. 10 V.S.A. § 5403.

E. Temperature. Vermont Fish and Wildlife Department may determine that there would be a significant benefit for a lower water release to the trout fishery downstream of the Project on the North Branch of the Winooski River. The Applicant shall engage in conversations with Vermont Fish and Wildlife Department should they request discussions upon showing a potential significant benefit.

See finding 62-74 and 125-128 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 302(1)(B) & § 29A-306(b).

F. Debris Disposal. Debris associated with Project operations shall be disposed of in accordance with state laws and regulations.

See finding 2, 119, 150, and 121 for a statement of necessity. 0 V.S.A. § 1258 & Vt. Code R. 12 030 026 § 29A-303(1).

G. Maintenance and Repair Work. Any proposals for Project maintenance or repair work, including drawdowns below the normal operating range to facilitate repair/maintenance work, shall be filed with the Department for prior review and approval, if said work may have a material adverse effect on water quality or cause less-than-full support of an existing use or a beneficial value or use of State waters.

See finding 2 and 121 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-103(a), § 29A-306(b) and § 29A-304(b).

H. Compliance Inspection by Department. The Applicant shall allow the Department to inspect the Project area at any time to monitor compliance with certification conditions.

See finding 2 and 121 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § § 29A-104(a).

I. Posting of Certification. A copy of the certification shall be prominently posed within the Project powerhouse.

See finding 2 and 121 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

J. Modification of Certification. The conditions of this certification may be altered or amended by the Department to assure compliance with the Vermont Water Quality Standards and to respond to any changes in classification of management objectives for the waters affected by the Project, when authorized by law, and, if necessary, after notice and opportunity for hearing.

See finding 2 and 121 for a statement of necessity. 10 V.S.A § 1258 & Vt. Code R. 12 0330 026 § 29A-104(a).

Effective Date and Expiration of Certification

This certification shall become effective on the date of issuance, and the condition of any certification shall become conditions of the federal permit (33 U.S.C. § 1341(d)). If the federal authority denies a permit, the certification becomes null and void. Otherwise, the certification runs for the terms of the federal license or permit.

Enforcement

Upon receipt of information that water quality standards are being violated as a consequence of the Project's construction or operation or that one or more certification conditions has not been complied with, the Secretary, after consultation with the Applicant and notification of the appropriate federal permitting agency, may, after notice and opportunity for a public hearing, modify the Certification and provide a copy of such modification to the Applicant and the federal permitting agency.

Certification conditions are subject to enforcement mechanisms available to the federal agency issuing the license and to the state of Vermont. Other mechanisms under Vermont state law may also be used to correct or prevent adverse water quality impacts from construction or operation of activities for which certification has been issued.

Appeals

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. Pursuant to 10 V.S.A. Chapter 220, an aggrieved person shall not appeal this decision unless the person submitted to the Secretary a written comment during the applicable public comment period or an oral comment at the public meeting conducted by the Secretary. Absent a determination of the Environmental judge to the contrary, an aggrieved person may only appeal issues related to the person's comments to the Secretary as prescribed by 10 V.S.A. § 8504(d)(2). The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the Applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Division is 32 Cherry Street, 2nd Floor, Suite 303; Burlington, VT 05401 (Tel. 802.951.1740).

Dated this ____day of _____, 2022

Peter Walke, Commissioner
Vermont Department of Environmental Conservation

By _____
Peter LaFlamme, Director
Watershed Management Division