Attachment C

Amended Final Application for New License for Major Water Power Project—Existing Dam

Bellows Falls Project (FERC No. 1855)

EXHIBIT B: PROJECT OPERATIONS AND RESOURCE UTILIZATION

January 2024 Revision

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EXHIBIT B: PROJECT OPERATIONS AND RESOURCE UTILIZATION

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) refers to Section 4.51 (License for Major Project—Existing Dam) for a description of information that an applicant must include in Exhibit B of its license application. Exhibit B is a statement of Project operation and resource utilization.

B1 Existing and Proposed Project Operation

B1.1 Existing Project Operations

Project operations are automated and controlled from a consolidated hydro operations control center located in Wilder, Vermont. Great River Hydro, LLC (Great River Hydro), typically operates the Project in a coordinated manner with other Great River Hydro generating facilities on the Connecticut River, taking into consideration variations in electricity demand as well as natural flow to maximize the efficient use of available water.

When inflows are within the Project's generating capacity, Great River Hydro uses the limited impoundment storage at the Project to dispatch generation as required to meet the generation dispatch schedule managed by New England Independent System Operator (ISO-NE). During any day, generation can vary between the required minimum flow and full generating capacity, depending on inflow and impoundment storage. Over the day, the Project generally passes the average daily inflow.

Estimated and anticipated inflow forms the basis for bidding into the ISO-NE's day-ahead energy market. Day-ahead hourly bids reflect must-run generation periods associated with minimum flow periods, periods when sustained higher flows are anticipated, and opportunistic generation when inflow and available storage allows and electricity demand is anticipated to be high. Anticipated inflow calculations predict impoundment water surface elevations (WSEs) (all elevations are mean sea level (m.s.l.), NGVD 29) and determine whether spill gates must be operated to pass flow in excess of Project generating capacity. Estimated inflow is calculated using discharge from the Project plus/minus changes in impoundment elevation measured at the dam on an hourly basis, averaged over a rolling 6-hour period. Impoundment drawdown rates are typically less than 0.1 to 0.2 foot (ft) per hour and do not exceed 0.3 ft per hour and depend upon station turbine discharge capability and rate of inflow. Due to the length and [river] channel characteristics of the impoundment, changes in WSE and flow at the dam are not mirrored at upstream locations within the impoundment due to reduced influence and affect from operations at the dam and increased influence and contribution from inflow as distance from of the dam is increased. There is approximately 3,000 cubic feet per second (cfs) per hour per 0.1 ft of elevation, and 0.3 ft per hour represents a maximum station output with little to no inflow.

The maximum station discharge with all three units operating is approximately 11,400 cfs, although 98 percent of the time flows are less than 11,235 cfs. The Project itself has a maximum discharge (generation plus spill) capacity of 119,785 cfs, and the flood of record, occurred in March 1936, was 156,000 cfs. Since then, three upstream U.S. Army Corps of Engineers (USACE) flood control structures have been built (Union Village, Ompompanoosuc River; North Hartland, Ottauquechee River; and North Springfield, Black River) and Moore dam, which has some flood control capability, was constructed. These facilities have helped to decrease the peak flow during flood events. Since the Moore dam began operating in the late 1950s, the highest flow recorded at the Bellows Falls Project (as measured at the dam) was 103,397 cfs during Tropical Storm Irene on August 29, 2011.

The licensed minimum flow requirement at the Bellows Falls powerhouse is 1,083 cfs (or inflow if less) and is provided primarily through generation, typically at least 1,200 cfs. There is no minimum flow requirement through the dam into the bypassed reach, but leakage provides some flow in the bypassed reach (flows range between 125 to 300 cfs as calculated or estimated over the course of various studies. Additional non-generation flows are provided seasonally at the powerhouse on a schedule provided annually by the Connecticut River Atlantic Salmon Commission (CRASC) based on fish counts at downstream projects. If required, fish passage flows are provided in spring (May 15–July 15) and in fall (September 15–November 15) for upstream fish passage (25-cfs fishway flow and 55-cfs attraction flow) and for downstream fish passage (225 cfs). As of 2016, CRASC no longer requires downstream passage operations at Bellows Falls for Atlantic Salmon smolts in spring, and it only requires fall downstream passage operations if 50 or more adults are documented passing upstream (see Exhibit A1.6, *Fish Passage Facilities*). During the summer recreation season, beginning the Friday before Memorial Day and continuing through the last weekend in September, Great River Hydro maintains a self-imposed minimum impoundment WSE of elevation (El.) 289.6 as measured at the dam from Friday at 4:00 p.m. through Sunday at midnight and on holidays during this period, unless the Project is experiencing high flows above generating capacity.

B1.2 Operations during Adverse, Mean, and High Water Years and Emergency Conditions

High flows occur routinely throughout the year at the Project, most often during the spring freshet, the fall rainy season, and significant rainfall events affecting the Connecticut River watershed below the Moore dam. Annually, flows at the dam exceed station capacity approximately 28 percent of the time. During periods of sustained high flows, Great River Hydro dispatches Project generation in a must-run status to use available water for generation. Spring runoff on the Connecticut River typically occurs in phases based on latitude. The seasonal storage capability of the Fifteen Mile Falls Project (FMF), Moore dam primarily, is limited in comparison to the total amount of inflow it receives. However, the storage capacity at the FMF Project is used during spring runoff to "shave" the maximum anticipated peak flows downstream and refill the impoundments. This operation reduces downstream high

water conditions at the downstream dams including the Bellows Falls Project which is typically spilling at that time. During periods of ice movement, frequent upstream observations and river elevation checks are made within the impoundment. When an ice jam occurs immediately upstream of the dam, an increased or artificial inflow condition is created by a large swell of water in front of the jam as the water behind the jam pushes the ice and water in front of it. When this condition occurs, the station or roller gate discharge must be increased to pass water during this temporary situation and to keep the impoundment elevation within its operating limits because there is no impoundment storage capacity in this circumstance.

When anticipated inflows to the Project impoundment increase above Project generating capacity, Great River Hydro initiates "river profile" operations by lowering the impoundment elevation at the dam. When the calculated anticipated inflows exceed Project generating capacity, various combinations of spill gates (see Table A-1 in Exhibit A, *Project Description*) are operated and impoundment elevations are maintained at certain set-points until flows exceed the total spill capacity of the Project, when flows would surcharge WSE at the dam. Table B-1 lists maximum impoundment elevations that are maintained based on different anticipated inflow levels at the Project.

Table B-1. River profile and high flow operations, inflows, and impoundment elevations.

Anticipated Inflow (cfs)	Maximum WSE (ft) at the Dam (NGVD29)[a]
<11,000	291.6
11,000–20,000	291.1
20,000–50,000	290.1 (289.6 if ice is present)
50,000–90,000	289.6 and partial stanchion board removal @ 52,000 cfs
>90,000	All gates are opened, and all stanchion bays removed, impoundment elevation increases dependent upon inflow increases; impoundment WSE rises from 289.6 and is maintained at 290.6 as long as possible before WSE surcharges as inflow increases.

a. All vertical elevations in Exhibit B are stated in National Geodetic Vertical Datum of 1929 (NGVD29).

Typically, routine and periodic maintenance does not require impoundment drawdown outside the license-specified full operating impoundment range. Gate inspections and minor repairs are often performed during spill conditions when gates are out of water. Otherwise coffer dams are installed or other methods are employed to avoid deviating from normal operation or potentially restricting the ability to pass flows in emergencies. If the need arises for unanticipated reasons or emergencies, Great River Hydro would consult with state and federal regulatory agencies, seek authorization from the Federal Energy Regulatory Commission (FERC) if needed, and secure any necessary permits to conduct such work.

Requirements such as minimum flow are ensured through the use of alternative conveyance structures (other units or gates). Extreme high water emergencies requiring impoundment drawdowns beyond normal operating levels, as specified in Project operating procedures, are necessary for public safety, flood management, and dam safety purposes.

B1.3 Proposed Project Operations

Great River Hydro, with support from relevant state and federal resource agencies, and regional and national non-governmental organizations that have actively participated in scoping and study phases of relicensing, proposes a modified project operation that significantly reduces both the frequency, amplitude and rate of change in Project-related discharge and impoundment water surface fluctuation in comparison to existing project operation. See Attachment A, *Great River Hydro's Proposed Alternative Operation for the Projects*, and Attachment B, *Evidence of Support for Proposed Alternative Operation*, for further information.

The proposed operation focuses on creating more stable reservoir WSEs, reducing the magnitude of changes and the frequency of sub-daily changes in discharge from the project, increasing the amount of time that the project is operated as inflow equals outflow and at full reservoir. At the same time, the proposed operation maintains Great River Hydro's capability to be flexible and responsive to current wholesale energy, forward capacity, reserve and other ancillary services markets managed by the New England Independent System Operator (ISO-NE). The proposed operation will also remain responsive to ISO-NE system emergencies when ISO-NE requires operation for reserves, security, system stability (e.g., voltage-ampere-reactive [VAR] support), system over-supply conditions (ISO-NE minimum generation emergency or negative prices), and critical events or emergencies involving dam and public safety. The proposed operation ensures the Project's ability to address future regional energy demands and system needs as those evolve over time.

With the proposed Project operation, Great River Hydro will predominantly maintain a specified WSE (Target WSE) at the dam and as a result, maintain flow below the Project equal to the approximate inflow as measured or calculated at the dam (inflow equals outflow or IEO). Specifically, a Target WSE of 291.1ft m.s.l. (NVGD 29) will be maintained at the Bellows Falls dam by passing inflow within a Target WSE Bandwidth between 291.6 ft and 290.6 ft to account for potential differences between anticipated inflow and actual instantaneous inflow. A minimum of 300 cfs of the total flow below the Project will be continuously provided below the Bellows Falls dam in the bypassed reach associated with the Project. In addition to IEO Operation, the Project will have restricted discretionary Flexible Operation capability to respond to elevated energy prices as well as unrestricted capability to respond to emergencies and ISO-NE transmission and power system requirements. The proposed Project operation is described in detail in Attachment A, and evidence of stakeholder support is provided in Attachment B. Elements associated with the proposed Project operations, including modes of operation, capabilities, restrictions, requirements and allowances, are defined and described in the following section.

Great River Hydro proposes to construct and operate a new 681 kW turbine generator at the Dam for the purpose of providing a continuous 300 cfs minimum flow through generation. During maintenance or emergencies, when the unit is out of service, spilling over the dam crest or through gates will provide the required minimum flow into the bypassed reach. (See Exhibit A, Section A3 Proposed Modifications and Enhancements)

B1.3.1 Definitions and Terms used in Proposed Project Operations

The terms defined in this section are specific to the proposed Project operation. Terms are capitalized so that terms used before they are defined and after may be easily referenced.

Dwarf Wedgemussel Winter Habitat Protection Operation

Dwarf wedgemussel (DWM) winter habitat protection operation is intended to create overwintering habitat that is protected from potential water drawdown that could expose mussel beds to freezing air temperatures. Mussels reduce their mobility and settle into the substrate for the winter as water temperatures drop below 15°Celsius (°C). By lowering the WSE, the habitat they occupy will remain submerged over the winter, protecting largely immobile mussels from exposure and freezing air temperatures. To accomplish this, Great River Hydro will lower the WSE at the Bellows Falls dam to an elevation at or above the low limit of the Flexible Operating Impoundment Range and maintain that WSE for the limited period of time during which water temperatures consistently drop from 15°C to 10°C. This period is typically 10-21 days in length, occurring from late-October to early-November. Once water temperatures are consistently below 10°C within identified DWM habitats within the Bellows Falls Project impoundment, the WSE can be adjusted upward to the Target WSE to use the elevation range above the low limit for Flexible Operations. The WSE at the Bellows Falls dam will remain at or above this DWM habitat winter protection WSE throughout the subsequent period when water temperature is at or below 10°C and no earlier than March 1 unless inflow exceeds station capacity and inflow levels require flood profile operation WSE at the dam (see Section B1.2).

Emergency and System Operation Requirements

- Emergencies outside the control of Great River Hydro when dam safety, public safety or flood control require action or response.

- Emergency system operations, conditions, and emergencies when the ISO-NE requires Great River Hydro to be fully available and if necessary responsive. Examples include ISO-NE reserve deficiencies (a.k.a. reserve constraint penalty factors) when reserves are depleted on the power grid, for fuel security emergencies or scarcity events, for ISO-NE system (or system) stability (e.g., VAR support), and system over supply (negative prices).

- ISO-NE required audits, demonstrations, and tests necessary for participation in and to qualify resources for systems support and markets. Present audits

include claimed capacity audits (CCA) and reactive power demonstrations. A CCA demonstrates maximum capacity for the Project through a two-hour generation run and is used by the ISO-NE for calculating capacity related market participation. Reactive capacity demonstrations are ISO-NE audits currently required under both minimum and maximum generation conditions every five years, to verify capability of providing voltage reactive power or VAR to the regional power grid. Other future requisites are requirements specified by the ISO-NE, which are unknown and unanticipated at this time, to demonstrate and meet performance capability requirements, in accordance with ISO-NE market rules that may be changed from time to time.

Flexible Operation

When the Project is operated at the discretion of Great River Hydro and deviates from IEO Operation.

Flexible Operation Hours

The hours of Flexible Operation that will count towards the maximum number of hours of Flexible Operation allowed each month. Determination of the number of Flexible Operation Hours that have been used each month for comparison to the maximum number of Flexible Operation Hours allowed, will be as follows:

The minimum duration of a Flexible Operation event is one hour. Should an event be less than an hour for any reason, the event will be counted as one hour. ISO-NE is responsible for the dispatch of a unit or station and as such Great River Hydro is not able to precisely determine or dictate when a unit starts or stops. ISO-NE typically dispatches units at or near the top of the hour (e.g., 1:00, 2:00, etc.) under non-emergency situations. Should an event last more than 15 minutes past the top of the hour that event will be considered to have lasted and counted as if it were for that entire hour (e.g., if an event ends and Down-ramping Transition Operation is initiated within 15 minutes past the top of the hour, it will not be considered an additional hour; if after 15 minutes past the top of the hour, it will count as an additional Flexible Operation Hour. Examples are:

Approximate Time Flexible Operation Event Begins*	Time Flexible Operation Event Ends and Down-ramping Begins	Number of Flexible Operation Hours
2:00 pm	2:57 pm	1
2:00 pm	3:15pm	1
2:00 pm	3:16 pm	2

*ISO dispatches units near the top of the hour.

When up-ramping is implemented in accordance with Transition Operation, hours for Flexible Operation begin the hour immediately following the up-ramp hour. If up-ramping is not implemented in accordance with Transition Operation, due to

Real-Time pricing, hours for Flexible Operation begin as soon as Flexible Operation begins as described above. In all cases, the time that Flexible Operation ends for the purpose of determining the number of allowed hours that have been used each month is when down-ramping begins in accordance with Transition Operation.

If Great River Hydro needs to conduct more than two CCA tests per year at the Project (due to problems, changing conditions, or failure to reach expected levels), Great River Hydro will alert the relevant resource agencies that: 1) it must conduct additional tests, 2) each additional test will require maximum impoundment elevation of 291.63 ft (see Full Operating Impoundment Range) and no ramping, and 3) the number of Flexible Operation Hours for each additional test will be determined as described above and counted either in the current or in the next month's allocation if none were available in the current month (see Section B1.3.2).

Flexible Operation Maximum Discharge

The maximum discharge from the Project powerhouse during Flexible Operation, it is a function of Inflow and Maximum Station Generating Capacity.

Flexible Operating Impoundment Range

The WSE bounded limits, except during the DWM Winter Habitat Protection Operation, are as follows:

WSE Range (m.s.l. NGVD29)	Maximum Fluctuation During Any Flexible Operation Event (ft)
Oct 1 – May 31: 289.6 and 291.1 June 1-Sept 30: 290.1 and 291.1	Oct 1 – May 31: 1.5 June 1-Sept 30: 1.0

The Flexible Operating Impoundment Range is narrowed between June 1 and September 30 to reduce the potential for dewatering at-risk DWM habitat and individuals within portions of the Bellows Falls Project.

It is anticipated that the typical impoundment operating range as a function of Flexible Operation will be on average less than the Flexible Operating Impoundment Range measured at the dam and as specified in the table above. Great River Hydro may, at some future date and at its discretion, after gaining more operating experience with the Proposed Project Operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth and/or modifying the Flexible Operating Impoundment Range, by raising both the upper and lower limits of the range, but not increasing the difference between the upper and lower limits (i.e., the maximum fluctuation shown in the table above).

Full Operating Impoundment Range

The historic full operating range for the Bellows Falls Project that generally corresponds with the maximum height (top) of the flashboards or gates down to the low limit. This range is used for managing high flows and not for power generation. Water surface elevations must be lower if extreme high water or dam safety emergencies require stanchion flashboards and beams to be removed from the concrete dam crest. In order to rebuild the stanchion flashboards, the impoundment WSE must be lowered to the crest before rebuilding the structures can be accomplished. The Full Operating Impoundment Range for the Bellows Falls Project is top of boards - 291.63 ft; low limit to manage flood flows - 288.63 ft; and concrete stanchion flashboard crest - 278.63.0 ft (m.s.l. NGVD29).

High Water Operation

When anticipated Inflow at the dam exceeds Maximum Station Generating Capacity. In most cases this requires implementing high water procedures including management of the impoundment flood profile operating procedures, which require specific elevations be maintained at the dam for specific ranges of flow. These elevations fall within the Full Operating Impoundment Range of the Project.

Inflow

Flow to the Project estimated based on anticipated inflow arriving at the dam from upstream. In real-time it is calculated and monitored through actual change in WSE measured at the dam on an hourly basis and adjusted through actual discharge from the Project.

Inflow Equals Outflow (IEO) Operation

When the Project maintains discharge through the powerhouse equal to Inflow at the dam by maintaining a stable target WSE together with any required non-generation flow in the bypass reach flow, fish passage related flow or, when inflow exceeds Maximum Station Generating Capacity and all Inflow is passed via a combination of spillage and discharge through the powerhouse or, if the station were out of service, via spillage alone.

Maintenance Requirements

Either scheduled periodic maintenance or unscheduled maintenance due to an unanticipated situation or condition. Maintenance Requirements can, in some cases, be pre-planned and executed accordingly or unplanned and require various elements such as investigation and problem identification, engineering, planning, and execution.

Maximum Station Generating Capacity

The maximum flow that can be passed through the powerhouse as shown in the last column of the table below:

Number and Type of Turbines	Maximum Flow/ Turbine (cfs)	Minimum Flow/ Turbine (cfs)	Maximum Nameplate Rated Capacity* (cfs)	Maximum Station Generating Capacity** (cfs)
3- Vertical Francis	3670	700	11,010	11,400

* The maximum nameplate hydraulic capacity is based on design specifications of the turbine (or nameplate rating) and is the sum of the hydraulic capacities of all units in the powerhouse. It is not a realistic representation of what the Station can actually pass through the turbines at the same time, which is largely determined by net head.

** The maximum station generating capacity represents the maximum Station discharge based on operating data and represents the maximum discharge that can actually be passed through the turbines.

Minimum Base Flow

The minimum flow required to be maintained below the Project at all times. Flows are expected to be equal to Inflow and significantly higher than these base flows the vast majority of the time. The Minimum Base Flow includes a seasonal component. During the following periods, the requirement will be to provide, at a minimum, the approximate Inflow as measured at the dam.

- While operating in IEO Operation – discharging Inflow will require maintaining Target WSE within the Target WSE Bandwidth and hourly adjustments as necessary to maintain proximity to Target WSE.
- While operating in Flexible Operation and Transition Operation modes of Up-ramping and Down-ramping, flows will be maintained above or equal to Inflow.
- The economic minimum dispatch flow (Eco-Min) specified to the ISO-NE will be the estimated hourly inflow. When prices go negative, station discharge will be set to the specified Eco-Min (i.e., the estimated inflow). When a system minimum generation emergency is declared by the ISO-NE, a combined spill plus station discharge will equal the Eco-Min. Both of these situations will resemble IEO Operation and any discrepancy between estimated Eco-Min and real-time inflow would be captured within the Target WSE Bandwidth and adjusted once either the negative pricing situation or the system minimum generation emergency has ended.

While operating in the refill mode of Transition Operation, discharge will be approximately 70 percent of estimated inflow and adjusted as necessary through hourly real-time monitoring and calculation of Inflow. Discharge during refill will not fall below the seasonal Minimum Base Flow thresholds shown below.

- For the purpose of establishing a base flow below the dams for IEO/Flexible Operational planning purposes and deciding whether or not

to implement Flexible Operation by utilizing Flexible Operation Hour sin the Day-Ahead (DA) market or in responding to Real-Time (RT) price signals in the RT market, all flows associated with Transition Operation up-ramping, Flexible Operation, Transition Operation down-ramping, and Transition Operation refill will be maintained above the following Project and seasonal Minimum Base Flow thresholds. The only time Project flows prior to or following these periods may be less than these thresholds is when the calculated Inflow is less. It is anticipated that flows will be higher than the base flows the vast majority of the time.

Bellows Falls*
Oct 1 - March 31: 1,600 cfs
April1 - May 31: 3,000 cfs
June 1 - Sept 30: 1,400 cfs
Bypass Reach below dam: 300 cfs year round

* Minimum Base Flow is the combined flow below dam and station.

- Emergencies, facility outages, station trips that result in unanticipated reductions in station discharge will be considered unavoidable flow reductions, and Great River Hydro will restore flows below the Project to at least the estimated inflow as quickly as possible either through spill or station discharge or both.

Target Water Surface Elevation

A specified elevation at Bellows Falls dam to be maintained under IEO Operation by adjusting station discharge. The Target WSE would be monitored no less frequently than hourly, and station discharge would be adjusted as frequently as reasonably possible to ensure accurate WSE. Bellows Falls station discharge is calculated and adjusted based on unit discharge curves and formulas within the accuracy of the unit's control systems.

Target WSE Bandwidth

A range, 0.5 ft above and 0.5 ft below the Target WSE, available for use during IEO Operation, to absorb unanticipated changes in Inflow at the dam or slight deviations or imbalances between hourly Inflow and hourly discharge due to miscalculation of inflow or unit discharge. See Section B.1.3.2. for elevations associated with the bandwidth. Great River Hydro may, at some future date and at its discretion, after gaining more operating experience with the proposed operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth.

Transition Operation

Actions required to precede Flexible Operation in some cases and follow Flexible Operation in all cases. There are three modes associated with Transition Operation:

- Up-ramping: A flow increase for the hourly period that would precede most (exceptions specified below) initial Flexible Operation Hours at a specified flow so that the overall flow difference between the IEO Operation and the scheduled Flexible Operation flow is gradual and not instantaneous. Up-ramping rates only apply when Flexible Operation is scheduled in advance (i.e., in the Day-Ahead market) and not when Flexible Operation is initiated in Real-Time or for CCA and reactive capacity demonstrations audits. The up-ramp rate specific to Bellows Falls Project is the lesser of 5,414 cfs (representing 1 cfs/square mile of drainage area or cfsm) or the flow half-way between current IEO Operation flow and the Flexible Operation flow.

- Down-ramping: A flow decrease at a specified rate for the period following Flexible Operation until the flow is equal to Inflow at the dam. Decreases will occur on an hourly basis, as a percentage of the previous hourly flow. The first hour after the Flexible Operation Hour will be no greater than approximately 70 percent of the Flexible Operation flow and each successive hour will be approximately 70 percent of the previous hour.

- Refill: A maximum 48-hour period subsequent to post-Flexible Operation down-ramping when the impoundment WSE is restored to the Target WSE by passing a fraction of the Inflow at the dam and retaining the remaining fraction as impounded water above the dam. The hourly flow rate below the dam during refill will be the greater of approximately 70 percent of inflow or the Minimum Base Flow.

- The 48-hour maximum refill period begins immediately following down-ramping after a Flexible Operation event and ends no more than 48 hours later unless the reservoir is within 0.1 ft of the Target WSE. The 48-hour period includes any temporary interruptions during refill (e.g., purposely pausing refill and passing all inflow, or decisions to implement another Flexible Operation event prior to the impoundment reaching a WSE equal to the Target WSE minus 0.1 ft). Great River Hydro expects to only pause refill for extended periods as needed when participating in the Real-Time Market (see Transition Operation – up-ramping). Based on analysis of Flexible Operation simulations provided by Great River Hydro, it is expected that the number and duration of pauses will be minimal especially during the critical spawning months spanning from April through July 15.

B1.3.2 Description of Proposed Project Operation

The Project will comply with IEO Operation, applying Target WSE and associated Target WSE Bandwidths as described below, unless:

- Flexible Operation along with Transition Operation are applied as specified herein and implemented;
- IEO Operation is suspended due to either High Water Operation or Emergency and System Operation Requirements; or
- IEO Operation is suspended due to non-emergency Maintenance Requirements that mandate deviating from IEO Operation, but only after consultation with relevant state and federal resource agencies prior to initiating a necessary deviation and developing a suitable refill plan and schedule.

Target WSE for the Bellows Falls Project is 291.1 ft except during the DWM Winter Habitat Protection Operation. The corresponding Target WSE Bandwidth at the Bellows Falls Project is between 291.6 and 290.6 ft, representing 0.5 ft above and below the Target WSE.

Rates of change in station discharge to maintain a Target WSE (matching inflow with outflow) will be limited to reasonable changes necessary to continue or adjust the actual WSE to the Target WSE within the Target WSE Bandwidth, largely dependent upon rate of change in inflow, the degree of flow control using megawatt setpoints on the generator and the monitoring accuracy of WSE at the dam. Changes in station discharge necessary to match inflow should not occur more than once per hour (unless rate of change in inflow is rapidly accelerating or declining) and would not be greater than reasonably necessary to restore a balanced IEO Operation condition at the Target WSE. Specifics regarding how to distinguish between flow adjustments for IEO Operation and Flexible Operation for compliance purposes will be addressed in the operation compliance and monitoring plans (OCMPs) anticipated to be filed with the Commission.

Flexible Operations are limited, in part, by maximum allowable hours specified below, which are allocated on a monthly basis in order to reflect the seasonal criticality of instream aquatic resources as well as the criticality and fuel security concerns associated with winter peaking loads in New England:

- December, January, February, March: no more than 65 hours in each month
- April, May, June: no more than 10 hours in each month
- July: A total of 20 hours with no more than 10 hours from July 1 through July 15. Although a maximum of 10 hours is allowed from July 1 through July 15, in order to further enhance the potential for successful Sea Lamprey spawning, Great River Hydro will strive to minimize the hours of Flexible Operation during this period when conditions allow.
- August, September, October: a total of no more than 20 hours in each month.

- November: a total of 42 hours with no more than 10 hours from November 1 through 15.

Flexible Operations will comply with the Flexible Operating Impoundment Range. The duration (in hours) of each Flexible Operation event will be determined in accordance with Flexible Operation Hours. The minimum duration of a Flexible Operation event will be one hour in most cases.

Flexible Operation Maximum Discharge will be based upon the calculated inflow at the hour in which the Flexible Operation will occur as follows:

- When calculated inflow is approximately 1,800 cfs or less, Flexible Operation Maximum Discharge is 4,500 cfs.
- When calculated inflow is greater than approximately 1,800 cfs, the Flexible Operation Maximum Discharge is limited to 2.5 times the calculated inflow and will not exceed the maximum Bellows Falls station generating capacity of 11,400 cfs.

For the purpose of protecting DWM from freezing in the winter, the Bellows Falls Project impoundment will be temporarily lowered in the fall of each year as described for Dwarf Wedgemussel Winter Habitat Protection Operation. To reduce the potential for dewatering at-risk DWM habitat and individuals within portions of the Bellows Falls Project, the Flexible Operating Impoundment Range will be reduced by 0.5 ft and maintained between 291.1 and 290.6 between June 1 and September 30.

There are no limitations on the number of Flexible Operation events per day or the duration of Flexible Operation events other than those indirect limitations due to Inflow and Transition Operation requirements as specified herein.

Scheduled Flexible Operation will require one hour of Transition Operation up-ramping. Unscheduled (in response to Real-Time price signals) Flexible Operation and Emergency and System Operation Requirements will not require up-ramping.

All Flexible Operation events will require Transition Operation down-ramping and refill as defined. The Transition Operation modes will be applied as follows:

	Up-Ramping	**Down-Ramping**	**Refill**
IEO Operations	Not Applied	Not Applied	Not Applied
Flexible Operations, Scheduled	Applied during the hour prior	Applied as Defined	Applied as Defined
Flexible Operations, Un-Scheduled	Not Applied	Applied as Defined	Applied as Defined
High Water Operations	Not Applied	Not Applied	Not Applied
CCA and RPD Audits	Not Applied	Applied as Defined	Applied as Defined

	Up-Ramping	Down-Ramping	Refill
Emergencies and System Emergencies	Not Applied	Not Applied	Not Applied

B1.3.3 Compliance

Great River Hydro will determine specifics for compliance with the proposed Project operation in OCMPs developed in consultation with relevant resource agencies and filed with FERC. If review of information submitted to relevant resource agencies pursuant to the OCMPs indicates that operation of the Project is not complying with the proposed Project operation, Great River Hydro will consult with the state and federal resource agencies to discuss their concerns and, if necessary, will identify and implement appropriate corrective actions.

B1.3.4 Consultation

If after evaluating operation data pursuant to OCMPs, resource agencies observe instances where operations do not appear to adequately represent the proposed Project operation as described in Attachment A, specifically, a) the simulations discussed in the last paragraph of the Introduction, b) attain the five bulleted focus areas listed in the Introduction, or c) attain DWM management goals at levels suggested by Great River Hydro simulations, Great River Hydro will, if requested, meet with the agencies to discuss their concerns and possible corrective actions.

B2 Dependable Capacity and Annual Generation

B2.1 Estimate of Dependable Capacity and Average Annual Generation

At full load, with inflow equaling a maximum station discharge of approximately 11,400 cfs, the Project has the capability of producing 49.0 megawatts (MW). Current ten-year average annual generation is approximately 239,070 megawatt-hours (MWh). Generation is expected to remain close to this average under the proposed operations. The difference between generating continuously under inflow equals outflow and current operations would be negligible because the electricity would be produced continuously as opposed to in peaks.

B2.2 Annual Plant Factor

The average annual plant factor is calculated as the average annual generation / nameplate capacity x 8,760 hours per year. Nameplate capacity of the Project is 40.8 MW. Based on the 10-year average annual generation, the average annual plant factor = 239,070 MWh/(40.8 MW x 8,760 hours) = 66.8 percent.

B2.3 Project Flows and Flow Exceedance Curves

The Bellows Falls Project has a total drainage area (DA) of 5,414 square miles (sq. mi.). Inflow is from discharge from the Wilder Project and natural inflow from the 2,039 sq. mi. of intermediate DA downstream of the Wilder Project. More than 42 percent of the total enters as unmanaged flow downstream of the Wilder Project, except under flood flow conditions when the USACE dams on the Ottauquechee and Black rivers store water temporarily (see Exhibit E, Section 3.1.1, *Overview of the Basin*). Under normal generation conditions, it takes about 8 hours for flow from the Wilder Project to reach Bellows Falls dam.

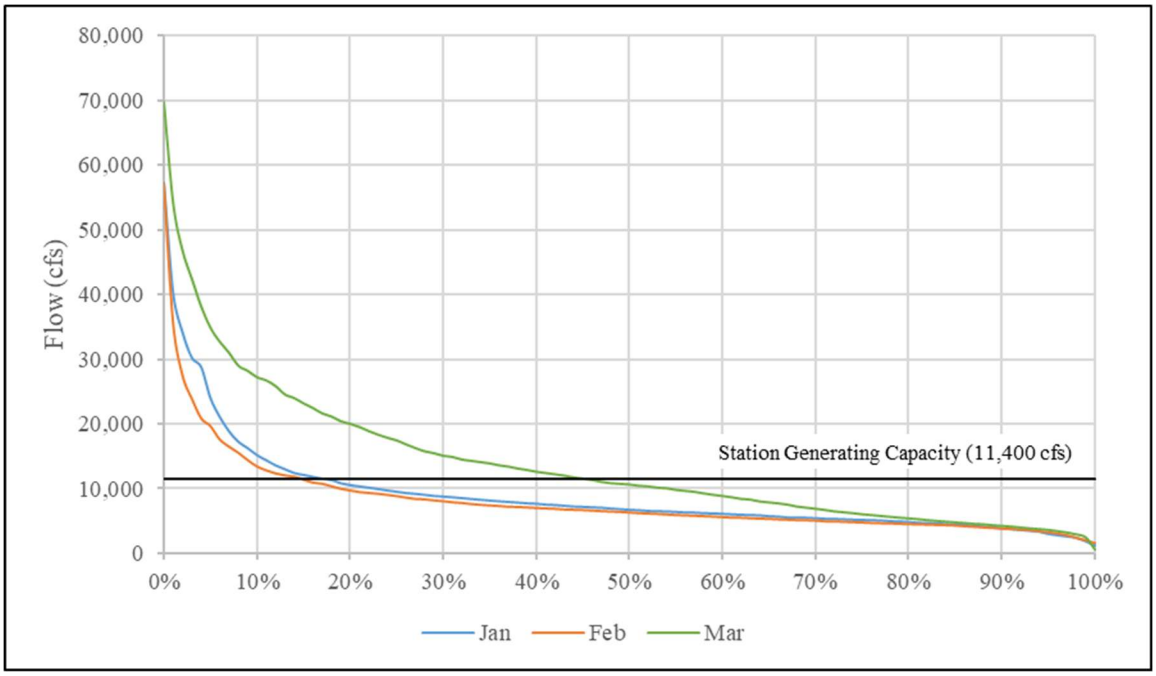
The impoundment is approximately 26 miles long and extends upstream to Chase Island at Windsor, Vermont, about 1 mile downstream of the Windsor Bridge. The impoundment is riverine in character and ranges in depths of several feet to about 30 ft near the dam. Bathymetry in the impoundment changes rapidly as a result of underlying bedrock, channel constriction, deposition, and scour primarily associated with high flows, such as those that occurred with Tropical Storm Irene in late August 2011. Because of the relatively flat terrain from the upper extent of the impoundment to the dam, the Project has limited storage capacity, which is primarily a function of impoundment length and operating range. Under normal generation conditions, regulated flow from the FMF Project reaches Wilder dam in about 8 hours on average and flows released at the Wilder Project generally reach the Bellows Falls dam in another 8 hours on average. Table B-2 summarizes the minimum, mean, and maximum values of average monthly flows from 1979 through 2019.

Table B-2. Bellows Falls estimated minimum, mean, and maximum average monthly flow values (cfs), January 1979—December 2019.

Month	Minimum	Year	Mean	Maximum	Year
January	2,589	1981	8,866	20,581	2006
February	2,698	1980	8,012	21,507	1981
March	4,407	2015	13,667	33,673	1979
April	7,693	1995	25,938	40,692	2008
May	7,139	1995	15,178	29,416	1996
June	3,039	1999	8,987	20,980	2006
July	1,897	1991	5,962	16,886	2013
August	1,632	2001	4,935	17,810	2008
September	1,534	1995	4,109	13,963	2011
October	1,811	2001	7,929	25,560	2005
November	2,772	2001	10,038	22,803	2005
December	3,559	2001	10,420	22,449	2003

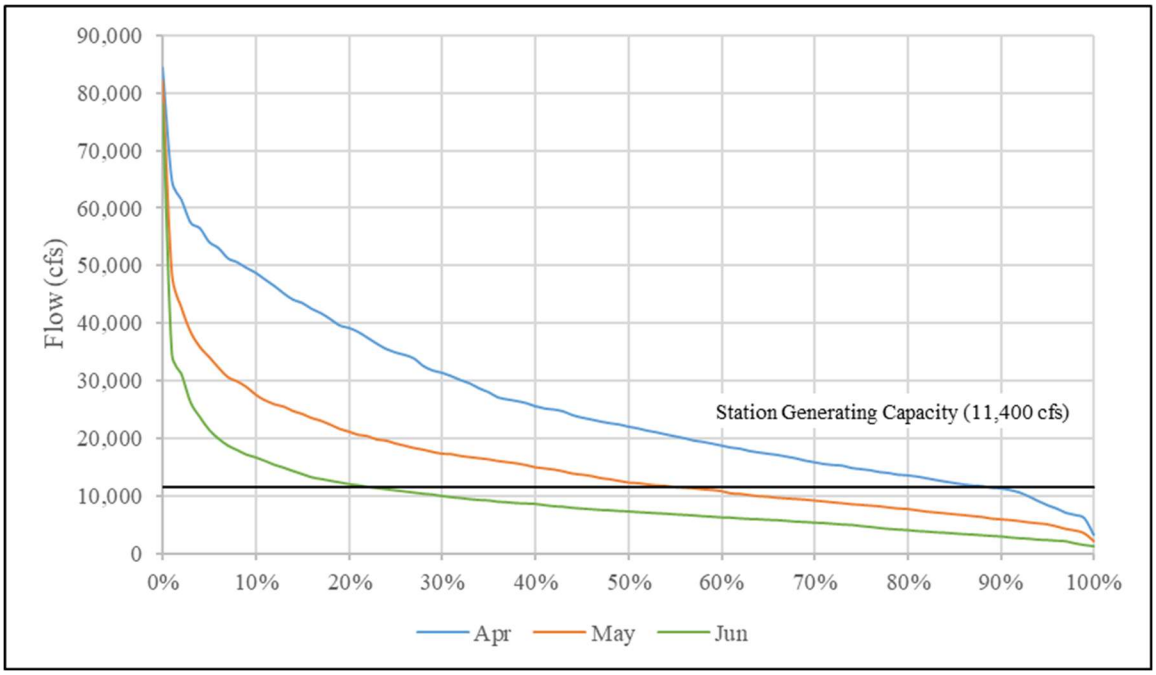
Source: USGS (2020, as modified by Great River Hydro)

Figures B-1 through B-4 provide monthly flow exceedance curves for the Bellows Falls Project from January 1, 1979, to December 31, 2019. Data are based on U.S. Geological Survey (USGS) gage no. 01154500, Connecticut River at North Walpole, New Hampshire (subsequently referred to as the North Walpole gage), located downstream of the confluence with Saxtons River (about 2 miles downstream from Bellows Falls dam). To estimate flow at only the Bellows Falls Project, the daily flow data from the North Walpole gage were prorated by 0.986 based on gaged DA to remove the small effect of inflow from the Saxtons River under most circumstances.



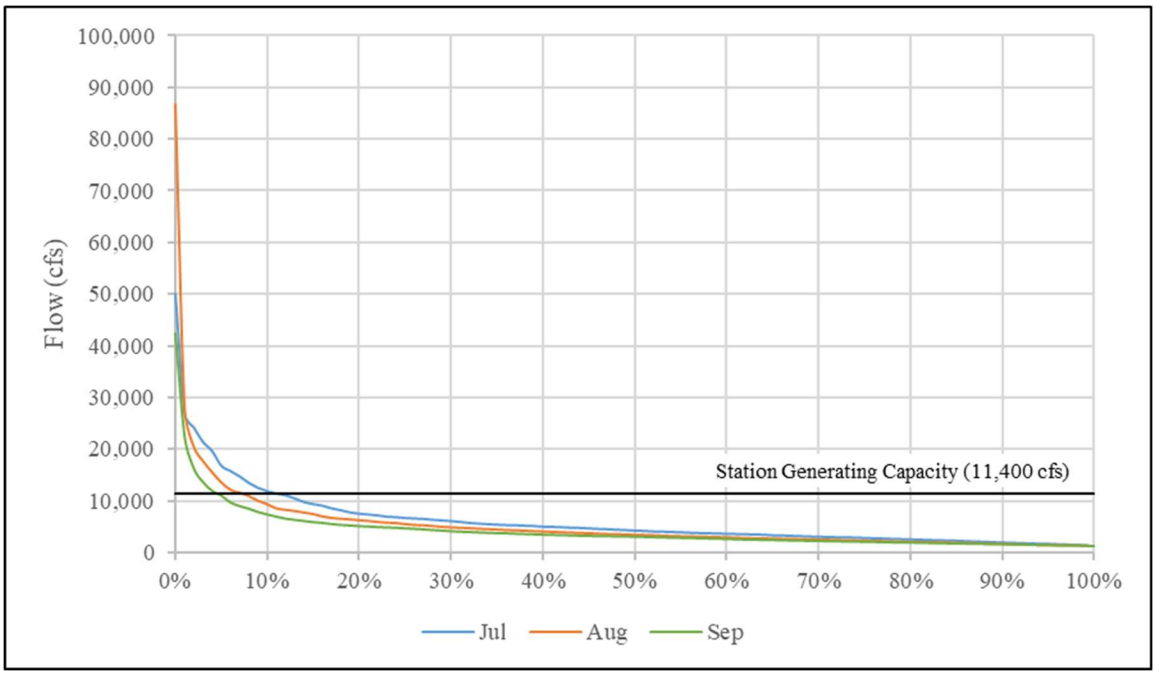
Source: USGS (2020, as modified by Great River Hydro)

Figure B-1. Flow exceedance curves, January–March (based on flow data from January 1, 1979 to December 31, 2019).



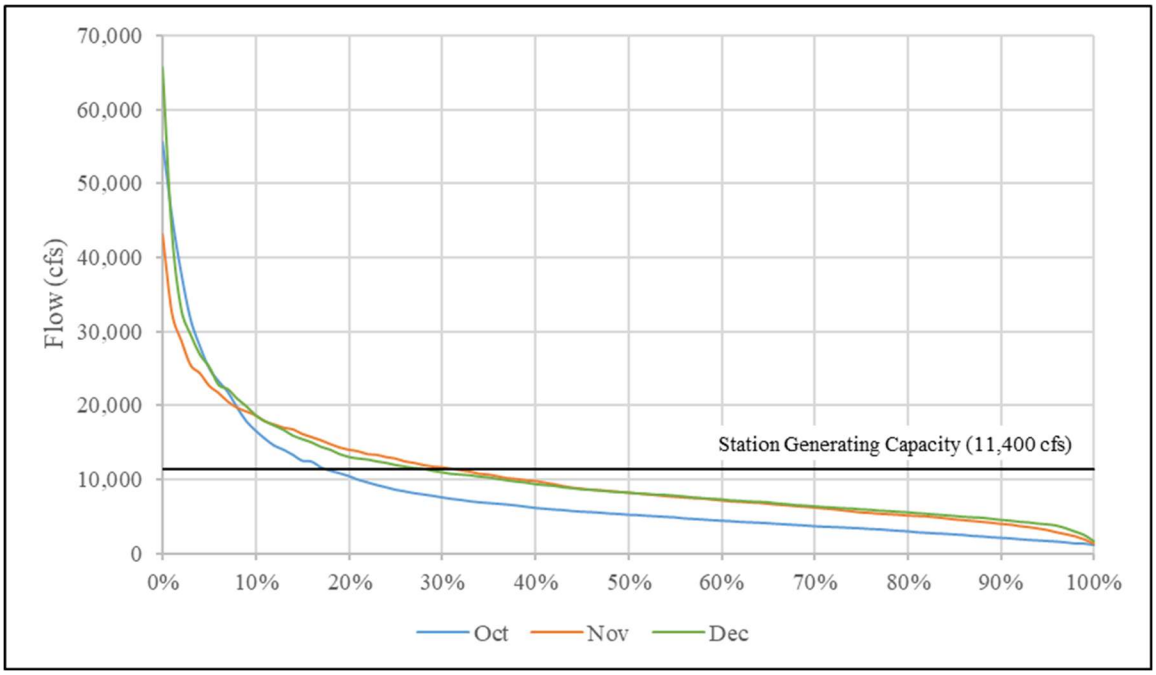
Source: USGS (2020, as modified by Great River Hydro)

Figure B-2. Flow exceedance curves, April–June (based on flow data from January 1, 1979 to December 31, 2019).



Source: USGS (2020, as modified by Great River Hydro)

Figure B-3. Flow exceedance curves, July–September (based on flow data from January 1, 1979 to December 31, 2019).



Source: USGS (2020, as modified by Great River Hydro)

Figure B-4. Flow exceedance curves, October–December (based on flow data from January 1, 1979 to December 31, 2019).

B2.4 Area-Capacity Curve

The impoundment has a surface area of 2,804 acres and a total maximum total volume of 26,900 acre-feet (acre-ft) at El. 291.63 ft (National Geodetic Vertical Datum of 1929 [NGVD29]) at the top of the stanchion boards. The overall operating range of the Project, accounting for both low inflow and most high inflow conditions, is typically between El. 288.63 ft and 291.63 ft, providing about 7,476 acre-ft of storage in the 3-ft range. The stage versus storage values are shown in Table B-3 and plotted in Figure B-5.

Table B-3. Stage versus storage curve.

Elevation (ft NGVD29)	Approximate Storage (acre-ft)
284	11,194
285	12,696
286	14,353
287	16,166
288	18,151
289	20,317
290	22,684
291	25,259
291.6	26,900

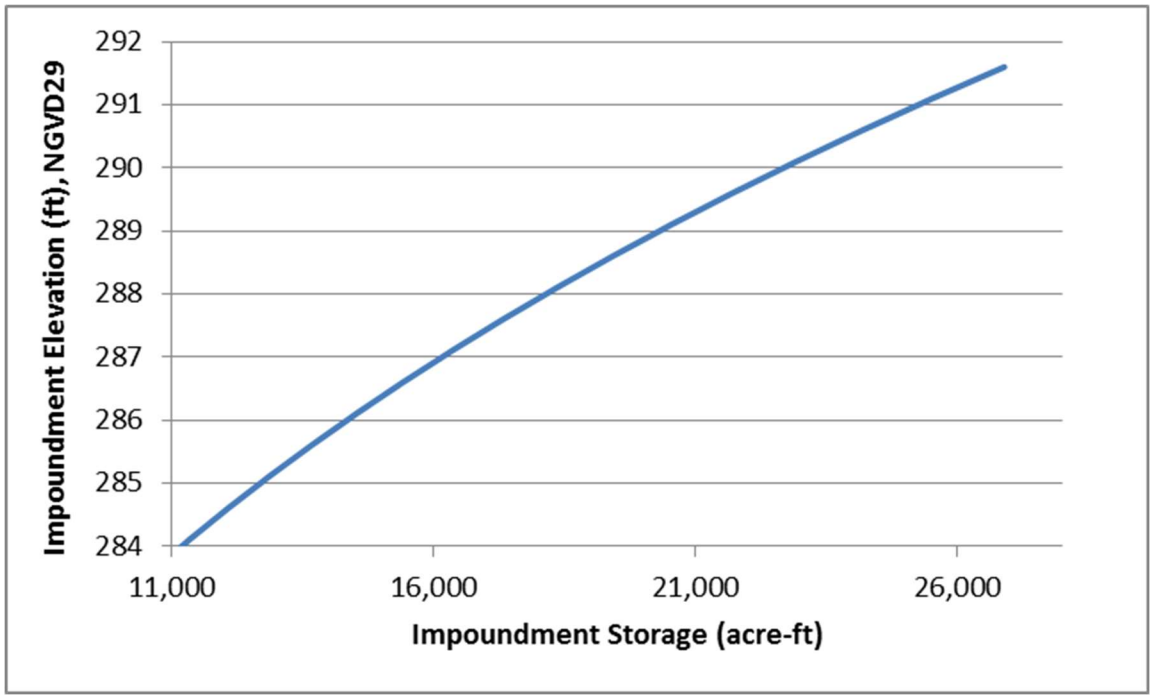


Figure B-5. Area-capacity curve.

B2.5 Hydraulic Capacity

The estimated maximum hydraulic capacity of Unit Nos. 1, 2, and 3 is 3,670 cfs each at 57 ft of head. The Project maximum hydraulic capacity (calculated as the sum of each individual unit's maximum discharge capacity) is therefore 11,010 cfs at 57 ft of head.

The estimated minimum hydraulic capacity of Unit Nos. 1, 2, and 3 is 700 cfs each for a total Project minimum hydraulic capacity of 2,100 cfs.

B2.6 Tailwater Rating Curve

The Project discharges directly into the Connecticut River. The normal tailwater elevation is El. 229.0 ft. The tailwater curve data represent the stage discharge relationship for discharge from the dam, spillway, and powerhouse at a location just downstream of the confluence of the bypassed reach with the powerhouse canal. The tailwater rating values are shown in Table B-4 and plotted in Figure B-6.

Table B-4. Tailwater rating curve.

Tailwater Elevation (ft NGVD29)	Flow (cfs)
211.4	0
229.3	10,000
232.9	20,000
235.9	30,000
238.6	40,000
240.9	50,000
243.1	60,000
245.0	70,000
246.9	80,000
248.7	90,000
250.4	100,000
263.6	200,000
274.2	300,000
283.9	400,000

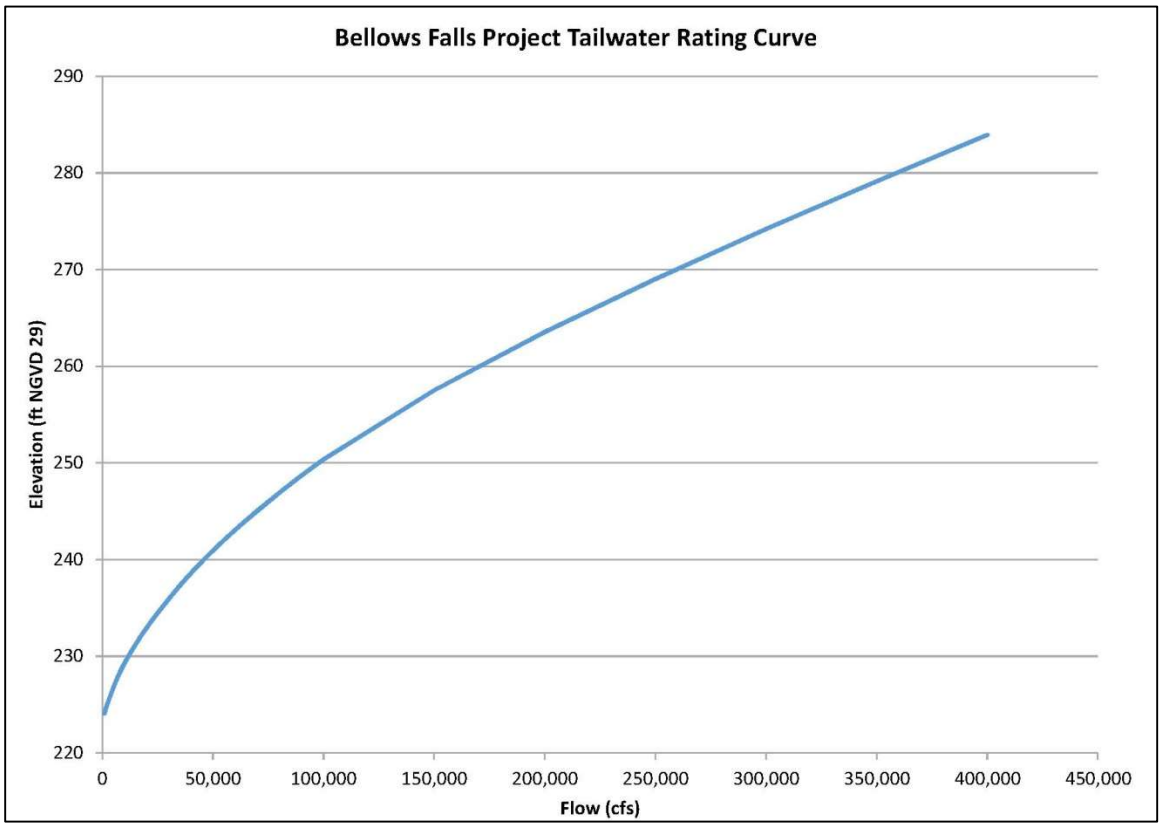


Figure B-6. Tailwater rating curve.

B2.7 Powerplant Capability

Powerplant capability is the Project's output in MW over a range of gross heads, depicted in Figure B-7.

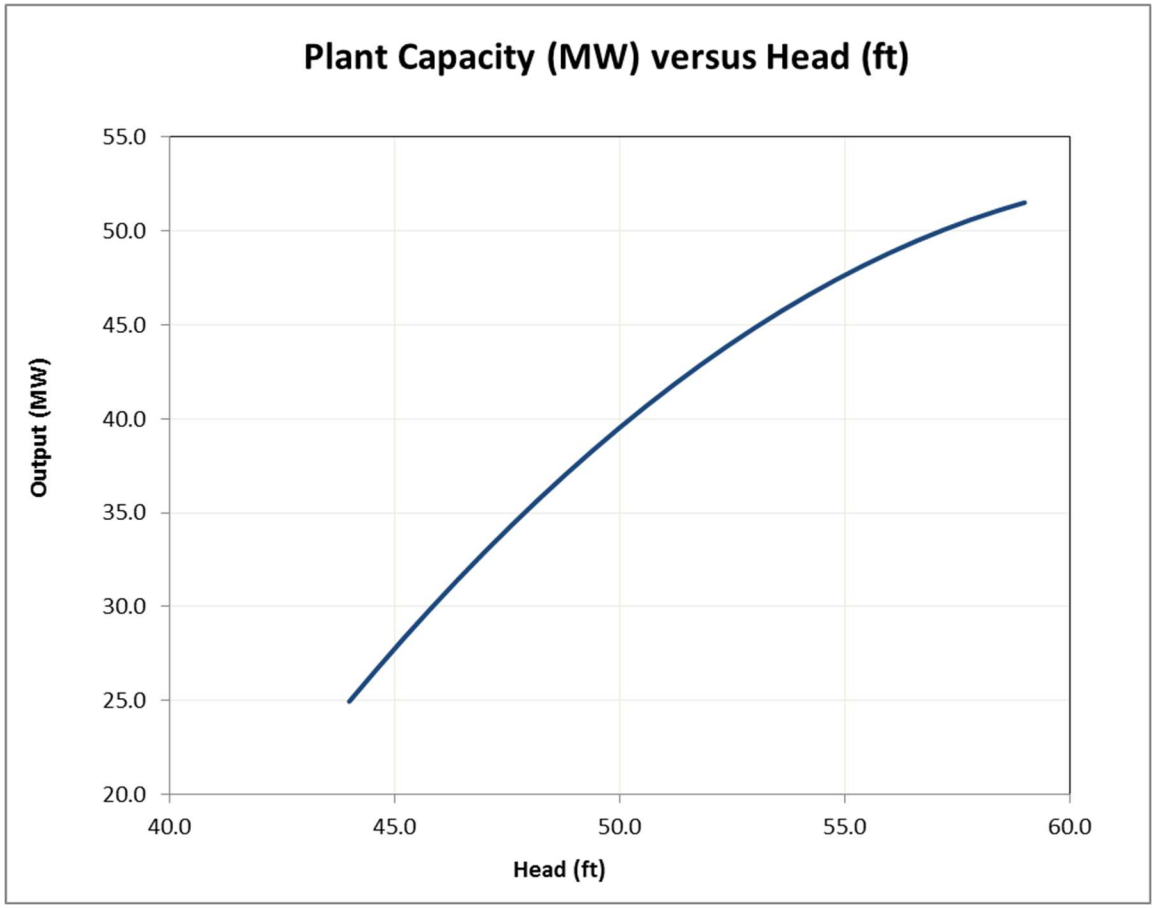


Figure B-7. Powerplant capability.

B3 Utilization of Project Power

The Project is located in the regional electric system that is operated by ISO-NE, which supplies electric power to the New England states. ISO-NE is responsible for regional grid operation, dispatch of generation, wholesale market administration, and power system analysis and planning to ensure that system reliability and adequate generation and transmission resources are available to meet regional needs. ISO-NE prepares both short- and long-term projections of electricity supply and demand. The 2020–2029 Forecast Report of Capacity, Energy, Loads, and Transmission projects the summer peak demand under typical summer peak weather conditions to rise annually at a rate of 0.9 percent and the winter peak demand under typical winter weather conditions to rise by an average of 1.1

percent, and 0.4 percent in annual overall electricity use from 2020 to 2029 (ISO-NE, April 30, 2020 reports).

As stated in Section B2.1, the Project has the capability of producing 49.0 MW and 239,070MWh annually, on average, to the regional power grid. The Project uses approximately 0.681 MWh annually for station service. In addition, the Island Corporation holds the rights to 300 kW of power from the Bellows Falls Project dating back to a 1914 lease indenture between the predecessor companies of Great River Hydro and Island Corporation.[1]

Over the term of the new license, the Project will continue to directly provide renewable power and can support and facilitate the further penetration of additional variable energy (wind and solar) resources into the region through reserve capacity and grid stability functionality. Project generation displaces fossil-fired generation, reduces power plant emissions, and provides substantial environmental benefit. The Project also provides forward capacity, real-time reserves, and VAR[2] support within the ISO-NE power pool.

B4 Plans for Future Development

Proposed new facilities include a new 681 kW minimum flow turbine generator, an affiliated control house at the dam and electrical interconnect equipment to local distribution utility in Vermont. The minimum flow unit will recover approximately 55% of the lost energy, resulting from the 300 cfs provided below the dam into the bypassed reach under the Proposed Project Operation described in Exhibit B, Section 1.3. Exhibit A Section A3 fully describes the proposed modifications and enhancement at the Project and Exhibit B, Appendix A, Figure A-9 shows the location of the new proposed minimum flow unit on the dam. The proposed 681 kW minimum flow unit will increase the nameplate capacity of the Project to 41,481 kW. The estimated maximum discharge capacity of the proposed unit is 340 cfs based on a net head of head of 34 feet.

~~Great River Hydro has no specific plans for future efficiency improvements, incremental development, or re-development of the Project.~~

[1] See Island Corp. Motion to Intervene dated December 29, 2016 (FERC accession number 20161229-5107).

[2] Voltage is regulated through reactive power production and consumption, and resources on the grid may be compensated for providing this reactive power capability. VAR is the unit of measurement for reactive power.

B5 Literature Cited

ISO-NE (New England Independent System Operator). 2020. ISO New England CELT report – 2020–2029 forecast report of capacity, energy loads and transmission. May 2, 2016. Available at: https://www.iso-ne.com/system-planning/system-plans-studies/celt/?document-type=CELT%20Reports&publish-date=[2016-01-01T00:00:00Z%20TO%20*. Accessed August 3, 2020.

USGS (U.S. Geological Survey). 2020. National Water Information System web page, Water data for the Nation. Available at: https://waterdata.usgs.gov/nwis/rt. Accessed February 18, 2020.

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Attachment A

Great River Hydro's Proposed Alternative Operation for the Projects

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Exhibit A

Great River Hydro's Proposed Alternative Operation for the Projects

INTRODUCTION

Great River Hydro, LLC (Great River Hydro or GRH) proposes to operate each of the Wilder, Bellows Falls and Vernon Projects (Projects or Facilities) in a similar manner under the terms of a new License, as the preferred (or proposed) alternative over the No-Action Alternative. The proposed alternative (also referred to herein as the Proposal) focuses on

- creating more stable impoundment water surface elevations,
- reducing the magnitude and frequency of sub-daily changes in discharge from the stations,
- increasing the amount of time that the project is operated as inflow equals outflow (IEO) and at full impoundment,
- reducing the magnitude and rate of change in flows downstream of the dams, and
- reducing the average frequency, average duration and average range of impoundment fluctuation under conditions when inflow to the Project at the dam is within the range of the Project powerhouse hydraulic capacity.

At the same time, the proposed alternative maintains Great River Hydro's capability to be flexible and responsive to current wholesale energy, forward capacity, reserve and other ancillary services markets managed by the New England Independent System Operator (ISO-NE). Great River Hydro also proposes to remain responsive to ISO-NE system emergencies and critical events and other emergencies involving dam and public safety. The proposal ensures the Project's ability to address future regional energy demands and system needs as those evolve over time. Additional non-operational elements of the proposal are also specified.

This Proposal is largely based on model simulations (simulations) provided by GRH that compared historic to proposed operation at each Project for the months of February, June, August and November in 2009, 2015, 2016 and 2017. GRH believes the simulations present an overly opportunistic representation with respect to the utilization of flow and managing to operational limits, which may result in overstatement of the actual impact of proposed Flexible Operations on the natural resources. This is because the simulations were created with perfect foresight with regards to pricing and inflow. Such perfect foresight will not be available during implementation of the proposal which will likely result in the Projects being operated more conservatively than indicated in the simulations in order to ensure compliance with the operational requirements specified herein.

The term agencies, resource agencies, or relevant resource agencies, used herein includes, but may not be limited to, the United States Fish and Wildlife Service, the New Hampshire Department of Environmental Services, the New Hampshire Fish and Game Department, the Vermont Department of Environmental Conservation, and the Vermont Department of Fish and Wildlife.

DEFINITIONS

1. **Cobblestone Tiger Beetle (CTB) Management Goal**: Maintain multiple consecutive-day periods (≥3) in which Flexible Operations (item 6) do not exceed flow thresholds that maintain ≥75% uninundated habitat at most sites for each month during the CTB active period (June through September), excluding periods when inflows are above these thresholds.

   Rationale: Existing Project operations impact the State listed Cobblestone Tiger Beetle (CTB). The thresholds stated in the goal are intended to increase the duration and area of available CTB habitat to facilitate CTB reproduction and survival from June 1 through September 30. This time period is considered the primary active period for CTB adults and larvae. Lack of persistent habitat can reduce the available time for feeding and/or prey availability. Limited habitat availability resulting from prolonged or repeated inundation also can cause delays in pupae and larvae development, decrease survival of larvae and affect the mating behavior of adults. Based on analysis of IEO/ Flexible Operation simulations provided by GRH, the expectation is that the limited number of Flexible Operation hours allowed during the active season for these species will meet this species-specific goal.

2. **Dwarf Wedgemussel (DWM) Management Goal**: Increase habitat stability by stabilizing/reducing impoundment fluctuations and providing multiple consecutive-day periods (≥3) at IEO each month during the period April 1 through October 15.

   Rationale: Existing operations impact the State and Federally listed Dwarf Wedgemussel. The identified goal is intended to facilitate DWM growth, breeding, and juvenile settlement in the riverine section below the Wilder Project and in the Wilder and Bellows Falls impoundments. Time spent moving in response to relatively rapid changes in water level that could occur due to Flexible Operation is time not spent feeding, which can lead to increased energy expenditure and predation risk, resulting in reduced growth and/or increased susceptibility to mortality. Periods of IEO are also intended to facilitate successful breeding (male gamete release/fertilization in females), believed to occur in the months of August and September, by maximizing the chance male gametes will reach females and not be mobilized to points downstream. Similarly, extended periods of IEO will increase the potential for metamorphosed glochidia released from host fish to successfully settle on a DWM bed versus being mobilized and settling off-bed. Based on analysis of Flexible Operation simulations provided by GRH, the expectation is that the limited number of Flexible Operation hours allowed during the active season for these species will meet this species-specific goal.

3. **Dwarf Wedgemussel Pre-Winter Habitat Operation**: Dwarf Wedgemussel pre-winter habitat protection operation is intended to create overwintering habitat that is protected from potential water drawdown that could expose mussel beds to freezing air temperatures. Mussels reduce their mobility and settle into the substrate for the winter as water temperatures drop below 15° Celsius (° C). By lowering the water surface elevation (WSE), the habitat they occupy will remain submerged over the winter, protecting largely immobile mussels from exposure and freezing air temperatures. To accomplish this, GRH will lower the WSE at the Wilder and Bellows Falls dams to an elevation at or above the low limit of each of the respective Flexible Operating Impoundment Ranges (specified below in item 9) and maintain that WSE for the limited period of time during which water temperatures consistently drop from 15° C to 10° C.

This period is typically 10-21 days in length, occurring in the late-October to early-November timeframe. Once water temperatures are consistently below 10° C within identified DWM habitats within the Wilder and Bellows Falls Project impoundments, the WSE can be adjusted upward to the Target WSE (item 17) and utilize the elevation range above the low limit described above for Flexible Operations. The WSE at each the Wilder and Bellows Falls dams will remain at or above this DWM habitat winter protection WSE throughout the subsequent period when water temperatures are at or below 10° C and no earlier than March 1 unless inflow exceeds respective station capacity and inflow levels require flood profile operation WSE at the dams (item 11).

4. **Emergency and System Operation Requirements** are when a Project must respond to:

   a. Emergencies outside the control of GRH when dam safety, public safety or flood control require action or response.

   b. Emergency System Operations, Conditions and Emergencies when the ISO-NE requires GRH to be fully available and if necessary responsive. Examples include ISO-NE Reserve Deficiencies (a.k.a. Reserve Constraint Penalty Factors) when reserves are depleted on the power grid, for fuel security emergencies or scarcity events, for ISO-NE system (or system) stability (e.g., VAR support), and system over supply (negative prices). GRH is not informed as to how the Projects are called upon or held in reserve to respond to specific system conditions or emergencies. However, based on ISO-NE Reserve Constraint Penalty Factors (RCPF) reports, which indicate when the region's power grid is short of operating reserves, there were 109 activations between 2011 and July 2013 within the entire ISO-NE System that may or may not have required actions at the Wilder, Bellows Falls or Vernon Projects. A summary of information gleaned from these reports for the period 2014 through 2018 is provided in the table below which shows that, in general, these events occurred relatively infrequently and are often short in duration. This information only provides a sense of the limited scale, frequency and number of these events; it does not mean any action actually took place with regard to the GRH projects. GRH facilities are often held in reserve even in a portion of the events referred to below. With regards to ISO-NE declared "Minimum Generation Emergencies" or "MIN GEN Emergencies" which may initiate and produce negative pricing, GRH consulted ISO-NE staff who stated that, to the best of their knowledge, the last MIN GEN Emergency occurred in March 2016.

YEAR	# of System Events	System Event Duration Range	# of Local * Events	Local Event Duration Range
2014	20	5-110 minutes	Cannot determine	
2015	3	10-65 minutes	6	5-20 minutes
2016	3	5-115 minutes	1	5 minutes
2017	2	15-20 minutes	8	5-305 (5-19-17) minutes
2018	2	10-160	0 listed	

*Local event but precisely where is not identified in the RCPF report

5. **ISO-NE required audits, demonstrations and tests** are requirements necessary for participation in and to qualify resources for systems support and markets. Present audits include Claimed Capacity Audits and Reactive Power Demonstrations (see below).

a. Claim Capacity Audit (CCA) is an ISO-NE audit currently required at the Wilder Project and may be (unanticipated presently) required in the future at the Bellows Falls and Vernon Projects. A CCA demonstrates maximum capacity for the Project through a two-hour generation run and is used by the ISO-NE for calculating capacity related market participation. Wilder Project requires a CAA to be performed annually to address summer capacity capability and every three years to demonstrate winter capacity capability. CCAs are performed under conditions specified by the ISO-NE and are performed under the best conditions related to head and inflow in order to maximize the generation within the two-hour audit as specified in the table below. While the ISO-NE does not require CCAs at Vernon and Bellows Falls, Great River Hydro may need to perform a similar test on occasion in order to demonstrate claimed capacity to the ISO-NE should a disparity arise between ISO-NE and GRH capacity numbers.

Project	Maximum Impoundment Elevation at start of CCA (NGVD29)	Maximum Impoundment Drawdown during 2-hour CCA and prior to Refill (feet)	Impoundment Refill
Wilder	385.00	0.60	See item 19.c
Bellows Falls	291.63		
Vernon	220.13		

b. Reactive Capacity Demonstration (RCD) is a 2-step ISO-NE audit currently required at the Wilder, Bellows Falls and Vernon Projects every five years, to verify capability to provide voltage reactive power or VAR to the regional power grid. Hydro generators are excellent sources of VAR support to the power grid, through which voltage can be increased or decreased depending upon the need to boost or reduce voltage of the grid. This audit requires GRH to demonstrate capability in both a minimum [station] generation and a maximum generation condition. Minimum station generation would typically be less than the required minimum base flow specified in item 16. Maximum station generation (item 15) would typically be higher than the calculated inflow. A 5-business day advance notice must be given to the ISO-NE, which determines if system conditions are suitable for a test before authorizing GRH to conduct the audit on a specified date/time. The duration of each portion (minimum generation and maximum generation condition) of the audit generally last an hour if things perform as planned; otherwise the audit could require an additional hour(s). The minimum generation audit will pass inflow either through generation, spill or a combination of both. The maximum generation audit will require a maximum pond elevation (Top of Boards) as specified in item 10 (Full Operating Impoundment Range) below.

c. Other future requisites are requirements specified by the ISO-NE, which are unknown and unanticipated at this time, to demonstrate and meet performance capability requirements, in accordance with ISO-NE market rules that may be changed from time to time. Great River Hydro will notify and consult with the relevant resource agencies a minimum of 60 days in advance of ISO-NE's implementation if GRH determines there is a significant modification to ISO-NE CCAs or RCDs as described above, or present additional requisites or requirements which require GRH to deviate from present demonstration capabilities and which cannot be reasonably accomplished through IEO/Flexible Operation as proposed and implemented under a new License.

6. **Flexible Operation** is when the Projects are operated at the Licensee's discretion and deviate from operation at IEO and stable pond (item 13) in accordance with this Proposal.

7. **Flexible Operation Hours** are the hours of Flexible Operation (item 6) that will count towards the maximum number of hours of Flexible Operation allowed each month as specified in item 23. Determination of the number of Flexible Operation hours that have been used each month for comparison to the maximum number of Flexible Operation hours allowed, will be as follows:

a. The minimum duration of a Flexible Operation event is one hour. Should an event be less than an hour for any reason, the event will be counted as one hour. ISO-NE is responsible for the dispatch of a unit or station and as such GRH is not able to precisely determine or dictate when a unit starts or stops. ISO-NE typically dispatches units at or near the top of the hour (e.g., 1:00, 2:00, etc.) under non-emergency situations. Should an event last more than 15 minutes past the top of the hour that event will be considered to have lasted and counted as if it were for that entire hour (e.g., if an event ends and Down-ramping Transition Operation is initiated within 15 minutes past the top of the hour, it will not be considered an additional hour; if after 15 minutes past the top of the hour, it will count as an additional Flexible Operation hour.) Examples are provided below.

When Up-ramping is implemented in accordance with item 19.a, hours for Flexible Operation begin the hour immediately following the Up-ramp hour. If Up-ramping is not implemented in accordance with item 19.a, due to Real-Time pricing, hours for Flexible Operation begin as soon as Flexible Operation begins as specified above. In all cases, the time that Flexible Operation ends for the purpose of determining the number of allowed hours which have been used each month (item 23) is when Down-ramping begins.

Examples (assuming no Up-ramping)

Approximate Time Flexible Operation Event Begins*	Time Flexible Operation Event Ends and Down-ramping Begins	Number of Flexible Operation Hours
2:00 pm	2:57 pm	1
2:00 pm	3:15pm	1
2:00 pm	3:16 pm	2

* ISO-NE dispatches units near the top of the hour.

b. Should GRH need to conduct more than two CCA tests per year at a single Project (due to problems, changing conditions, or failure to reach expected levels), GRH will alert the relevant resource agencies that 1) it must conduct additional tests, 2) that each additional test will require maximum impoundment elevation (see table under item 5.a) and no ramping, and 3) that the number of Flexible Operation hours for each additional test will be determined in accordance with 7.a above and counted either in the current or in the next month's allocation (item 23) if none were available in the current month.

8. **Flexible Operation Maximum Discharge** (item 27) is the maximum discharge from the Project powerhouse during Flexible Operation and is a function of inflow (item 12) and the maximum station generating capacity (item 15).

9. **Flexible Operating Impoundment Range** is bounded by the following Water Surface Elevation (WSE) limits except during the Dwarf Wedgemussel (DWM) pre-winter habitat protection operation (item 3). These limits are no greater than the current typical range of operation under normal operating condition for Bellows Falls and Vernon, one foot less than current operation for Wilder [which is 382.0 to 384.5 ft (msl NGVD 29)], 0.5 feet less at Bellows Falls during the active DWM period, and will be no greater than 1.5 feet at any of the Projects.

Project	WSE Range (msl NGVD 29)	Maximum Fluctuation During Any Flexible Operation Event (feet)
Wilder	383.0 and 384.5	1.5
Bellows Falls	Oct 1 – May 31: 289.6 and 291.1 June 1-Sept 30: 290.1 and 291.1	Oct 1 – May 31: 1.5 June 1-Sept 30: 1.0
Vernon	218.3 and 219.63	1.33

It is anticipated that the typical impoundment operating range as a function of Flexible Operation will be on average less than the Proposed Flexible Operating Impoundment WSE Range measured at each dam and as specified in the table above. GRH may, at some future date and at its discretion, after gaining more operating experience with the proposed operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth (Item 18) and/or modifying the Flexible Operating Impoundment Range, by raising both the upper and lower limits of the range, but not increasing the difference between the upper and lower limits (i.e., the maximum fluctuation shown in the table above).

10. **Full Operating Impoundment Range** is the historic full operating range for each Project that generally corresponds with the maximum height (top) of the flashboards or gates down to the low limit. This range is utilized for managing high flows and not for power generation. Water surface elevations (WSE) must be lower if extreme high water or dam safety emergencies require stanchion flashboards and beams to be removed from the concrete dam crest. In order to rebuild the stanchion flashboards, the impoundment WSE must be lowered to the crest before rebuilding the structures can be accomplished.

Wilder Project: Top of Boards 385.0 ft; Low limit to manage flood flows 380.0 ft; Concrete Stanchion Flashboard Crest 368.0 ft (msl NGVD 29).

Bellows Falls Project: Top of Boards 291.63 ft; Low limit to manage flood flows 288.63 ft; Concrete Stanchion Flashboard Crest 278.63.0 ft (msl NGVD 29).

Vernon Project: Top of Boards 220.13 ft; Low range to manage flood flows between 218.6 - 212.13 ft; Concrete Stanchion Flashboard Crest 212.13 ft (msl NGVD 29).

11. **High Water Operation** is when inflow at the dam exceeds the maximum station generating capacity (item 15). In most cases this requires each project to follow its Flood Profile Operating procedures, that require specific elevations be maintained at the dam for specific ranges of flow. These elevations fall within the Full Operating Impoundment Range of each Project (item 10).

12. **Inflow** to each Project is estimated based on anticipated inflow arriving at the dam from upstream. In real-time it is calculated and monitored through actual change in WSE measured at the dam on an hourly basis and adjusted through actual discharge from the Project.

13. **Inflow Equals Outflow (IEO) Operation** is defined as follows:

    a. When the Project maintains discharge through the powerhouse equal to inflow at the dam by maintaining a stable target WSE together with any required non-generation flow (e.g., Bellows Falls bypass flow, fish passage related flow) or,

    b. When inflow exceeds the maximum station generating capacity (item 15) and all inflow is passed via a combination of spillage and discharge through the powerhouse or if the station were out of service, via spillage alone.

14. **Maintenance Requirements** are either scheduled periodic maintenance or unscheduled maintenance due to an unanticipated situation or condition. Maintenance requirements can, in some cases, be pre-planned and executed accordingly or unplanned and require various elements such as investigation and problem identification, engineering, planning and execution.

15. **Maximum Station Generating Capacity** (in cfs) is the maximum flow that can be passed through the powerhouse for each Project as shown in the last column of the table below:

Project	Number and Type of Turbines	Maximum Flow / Turbine (cfs)	Minimum Flow / Turbine (cfs)	Maximum Nameplate Rated Capacity * (cfs)	Maximum Station Generating Capacity** (cfs)
Wilder	2- Kaplan 1-Vertical Francis	6000 700	400 400	12,700	11,700
Bellows Falls	3- Vertical Francis	3670	700	11,010	11,400

Project	Number and Type of Turbines	Maximum Flow / Turbine (cfs)	Minimum Flow / Turbine (cfs)	Maximum Nameplate Rated Capacity * (cfs)	Maximum Station Generating Capacity** (cfs)
Vernon	4- Vertical Francis	1465	400	17,130	15,400
	4-Vertical Kaplan	1800	300		
	2-Vertical Francis	2035	500		

* The maximum nameplate hydraulic capacity is based on design specifications of the turbine (or nameplate rating) and is the sum of the hydraulic capacities of all units in the powerhouse. It is not a realistic representation of what the Station can actually pass through the turbines at the same time, which is largely determined by net head.

** The maximum station generating capacity represents the maximum Station discharge based on operating data and represents the maximum discharge that can actually be passed through the turbines.

16. **Minimum Base Flows** are minimum flows required to be maintained below each dam at all times. As described below, flows are expected to be equal to inflow and significantly higher than these base flows the vast majority of time. The proposed Minimum Base Flows are all greater than the minimum base flows required in the current FERC licenses and include a seasonal component.

During the following periods the requirement will be to provide, at a minimum, the approximate inflow as measured at the dam.

- While operating in the Inflow Equals Outflow (IEO) mode (item 13) – discharging inflow will require maintaining Target WSE within the bandwidths specified (item 18) and hourly (minimum required frequency) adjustments necessary to maintain proximity to Target WSE.
- While operating in Flexible Operation and Up-ramping and Down-ramping Transition Operation (item 19), flows will be maintained above or equal to inflow. Instantaneous inflow measurements will be calculated in accordance with item 12.
- The economic minimum dispatch flow (Eco-Min) specified to the ISO-NE will be the estimated hourly inflow. When prices go negative, station discharge will be set to the specified Eco-Min (i.e., the estimated inflow). When a System Minimum Generation Emergency is declared by the ISO-NE, a combined spill plus station discharge will equal the Eco-Min. Both of these situations will resemble IEO and any discrepancy between estimated Eco-Min and real-time inflow would be captured within the Target Elevation Bandwidth and adjusted once either the negative pricing situation or the System Minimum Generation Emergency has ended.

While operating in Transition Refill Operation (item 19.c) discharge will be approximately 70% of estimated inflow and adjusted as necessary through hourly real-time monitoring and calculation of estimated inflow. Discharge during refill will not fall below the seasonal Minimum Base Flow thresholds shown below.

For the purpose of establishing a base flow below the dams for IEO/Flexible Operational Planning purposes and deciding whether or not to implement Flexible Operation by utilizing allocated hours (item 23) in the Day-Ahead (DA) market or in responding to Real-Time (RT) price signals in the RT market, all flows associated with Transition Operation Up-ramping; Flexible Operation; Transition Operation Down-ramping and; Transition Operation Refill will be maintained above the following Project and seasonal Minimum Base Flow thresholds. The only time Project flows prior to or following these periods may be less than these thresholds is when the inflow calculated in accordance with item 12 is less. It is anticipated that flows will be higher than the base flows the vast majority of the time.

Wilder	**Bellows Falls***	**Vernon**
Oct 1 - March 31: 1,500 cfs April 1 - May 31: 2,000 cfs June 1 - Sept 30: 1,100 cfs	Oct 1 - March 31: 1,600 cfs April1 - May 31: 3,000 cfs June 1 - Sept 30: 1,400 cfs Bypass Reach below dam: 300 cfs year round	Oct 1 - March 31: 1,600 cfs April 1 - May 31: 3,000 cfs June 1 - Sept 30: 1,400 cfs

***** Minimum Base Flow is the combined flow below dam and station.

Emergencies, facility outages, station trips that result in unanticipated reductions in station discharge will be considered unavoidable flow reductions, and GRH will restore flows below the Project to at least the estimated inflow as quickly as possible. When spill, other than the continuous 300 cfs in the Bellows Falls bypassed reach, is required during non-business hours to respond to emergencies or System minimum generation emergencies noted above, to maintain IEO, transition flows or the base flows as described, GRH will require personnel to come to the affected station(s) and check for public safety risks below the gates and confirm none exist before opening a spill gate. As soon as that is accomplished a gate(s) will be opened to provide the proper flows. This entire process typically takes one hour or less.

17. **Target Water Surface Elevation (WSE)** is a specified elevation (item 21) at each Project dam to be maintained under IEO Operation by adjusting station discharge. The Target WSE would be monitored no less frequently than hourly, and station discharge would be adjusted as frequently as reasonably possible to ensure accurate WSE. Station discharge is calculated and adjusted based on unit discharge curves and formulas within the accuracy of the unit's control systems.

18. **Target WSE Bandwidth** is a range, 0.5 ft above and 0.5 ft below the Target WSE, available for use during IEO Operation, in order to absorb unanticipated changes in inflow at the dam or slight deviations or imbalances between hourly inflow and hourly discharge due to miscalculation of inflow or unit discharge. See item 21 for elevations associated with the bandwidth. GRH may, at some future date and at its discretion, after gaining more operating experience with the proposed operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth and/or modifying the Flexible Operating Impoundment Range (item 9) by raising both the upper and lower limits of the range, but not increasing the difference between the upper and lower limits (i.e., the maximum fluctuation shown in the table under item 9).

19. **Transition Operation** describes actions required to precede Flexible Operation in some cases and follow Flexible Operation in all cases. There are three elements associated with Transition Operation:

a. **Up-ramping**: A flow increase for the hourly period that would precede most (exceptions specified below) initial Flexible Operation hours at a specified flow depending upon the Project, so that the overall flow difference between the IEO flow and the scheduled Flexible Operation flow is gradual and not instantaneous. Up-ramping rates are specific to each Project and would only apply when Flexible Operation is scheduled in advance (i.e., in the Day-Ahead market) and not when Flexible Operation is initiated in Real-Time or for CCA and RCD audits. Up-ramp rates are specified at each Project as:

Wilder Project: the lesser of 1 of 2 large units (approximately 5000 cfs) or half-way between the IEO flow and the Flexible Operation flow;

Bellows Falls Project: the lesser of 1 cfs/square mile of drainage area (cfsm) (approximately 5,414 cfs) or the flow half-way between current IEO flow and the Flexible Operation flow;

Vernon Project: the lesser of 1 cfsm (approximately 6,266 cfs) or half-way between current IEO flow and the Flexible Operation flow.

b. **Down-ramping**: A flow decrease at a specified rate for the period following Flexible Operation until the flow is equal to inflow at the dam. Decreases will occur on an hourly basis, as a percentage of the previous hourly flow. The first hour after the Flexible Operation hour will be no greater than approximately 70% of the Flexible Operation flow and each successive hour will be approximately 70% of the previous hour.

c. **Refill**: A maximum 48-hour period subsequent to post-Flexible Operation Down-ramping when the impoundment WSE is restored to the stable Target WSE by passing a fraction of the inflow at the dam and retaining the remaining fraction as impounded water above the dam. The hourly flow rate below each Project dam during refill will be the greater of approximately 70% of inflow or the base flow specified in item 16.

The 48-hour maximum refill period begins immediately following Down-ramping after a Flexible Operation event and ends no more than 48 hours later unless the reservoir is within 0.1 foot of the Target WSE (item 21). The 48-hour period includes any temporary interruptions during refill (e.g., purposely pausing refill and passing all inflow, or decisions to implement another Flexible Operation event prior to the impoundment reaching a WSE equal to the Target WSE minus 0.1 feet.) GRH expects to only pause refill for extended periods as needed when participating in the Real-Time Market, as described in 19.a above. Based on analysis of Flexible Operation simulations provided by GRH, it is expected that the number and duration of pauses will be minimal especially during the critical spawning months spanning from April through July 15.

PROJECT OPERATION DESCRIPTIONS

20. All Projects will comply with IEO Operation (item 13), applying Target WSE (item 17) and associated Target WSE Bandwidths (item 18) as described below, unless:

    a. Flexible Operation (item 6) along with Transition Operation (item 19) are applied as specified herein, and implemented;

    b. IEO Operation is suspended due to either High Water Operation (item 11), or Emergency and System Operation, Requirements and Audits (items 4 and 5); or

    c. IEO Operation is suspended due to non-emergency Maintenance Requirements that mandate deviating from IEO Operation, but only after consultation with relevant State and Federal resource agencies prior to initiating a necessary deviation and developing a suitable refill plan and schedule.

21. Target WSEs and Target WSE Bandwidths for each Project are described in the following table (all elevations are mean sea level (msl), NGVD 29):

	Wilder Project	**Bellows Falls Project**	**Vernon Project**
Target WSE	384.5 ft *	291.1 ft *	219.63 ft
Target WSE Bandwidth	Between 385.0 and 384.0 ft, representing 0.5 ft above and below the Target WSE	Between 291.6 and 290.6 ft, representing 0.5 ft above and below the Target WSE	Between 220.13 and 219.13 ft, representing 0.5 ft above and below the Target WSE

*Except during DWM pre-winter habitat protection operation period, triggered and maintained as water temperatures drop from 15° Celsius (° C) to 10° C within identified DWM habitats within the projects (item 3).

22. Rates of change in station discharge to maintain a Target WSE (matching inflow with outflow) will be limited to reasonable changes necessary to continue or adjust the actual WSE to the Target WSE within the Target WSE Bandwidth, largely dependent upon rate of change in inflow, the degree of flow control using MW setpoints on the generator and the monitoring accuracy of WSE at the dam. Changes in station discharge necessary to match inflow should not occur more than once per hour (unless rate of change in inflow is rapidly accelerating or declining) and would not be greater than reasonably necessary to restore a balanced IEO condition at the Target WSE. Specifics regarding how to distinguish between flow adjustments for IEO and Flexible Operation for compliance purposes will be addressed in the operation compliance and monitoring plans (OCMPs) required by the §401 Water Quality Certifications and the FERC Licenses.

23. Flexible Operations are limited, in part, by maximum allowable hours specified below, which are allocated on a monthly basis in order to reflect the seasonal criticality of instream aquatic resources as well as the criticality and fuel security concerns associated with winter peaking loads in New England:

    December, January, February, March: no more than 65 hours in each month

    April, May, June: no more than 10 hours in each month

July: A total of 20 hours with no more than 10 hours from July 1 through July 15. Although a maximum of 10 hours is allowed from July 1 through July 15, in order to further enhance the potential for successful Sea Lamprey spawning, GRH will strive to minimize the hours of Flexible Operation at each Project during this period when conditions allow.

August, September, October: a total of no more than 20 hours in each month.

November: a total of 42 hours with no more than 10 hours from November 1 through 15.

24. Flexible Operations (item 6) will comply with the Flexible Operating Impoundment Range (item 9).

25. The duration (in hours) of each Flexible Operation event will be determined in accordance with item 7.

26. The minimum duration of a Flexible Operation event will be one hour in most cases.

27. Flexible Operation Maximum Discharge will be based upon the calculated inflow at the hour in which the Flexible Operation will occur as follows:

    a. When calculated inflow is approximately 1800 cfs or less, Flexible Operation Maximum Discharge is 4,500 cfs.

    b. When calculated inflow is greater than approximately 1800 cfs, the Flexible Operation Maximum Discharge is limited to 2.5 times the calculated inflow and will not exceed the maximum station generating capacity (item 15).

28. For the purpose of protecting Dwarf Wedgemussels (DWM) from freezing in the winter, the Wilder and Bellows Falls Project impoundments will be temporarily lowered in the Fall of each year as described in item 3.

29. There are no limitations on the number of Flexible Operation events per day or the duration of Flexible Operation events other than those indirect limitations due to inflow and Transition Operation requirements as specified herein.

30. Scheduled Flexible Operation will require one hour of Transition Operation Up-ramping (item 19.a). Unscheduled (in response to Real-Time price signals) Flexible Operation, and Emergency and System Operation, Requirements and Audits (Items 4 and 5) will not require Up-ramping.

31. All Flexible Operation events will require Transition Operation Down-ramping and Refill as specified in item 19.

32. The Transition Operation elements specified in item 19 will be applied at the Projects as follow:

	Up-Ramping	**Down-Ramping**	**Refill**
IEO Operations	Not Applied	Not Applied	Not Applied
Flexible Operations, Scheduled	Applied during the hour prior	Applied as Defined	Applied as Defined
Flexible Operations, Un-Scheduled	Not Applied	Applied as Defined	Applied as Defined

High Water Operations	Not Applied	Not Applied	Not Applied
CCA and RPD Audits	Not Applied	Applied as Defined	Applied as Defined
Emergencies and System Emergencies	Not Applied	Not Applied	Not Applied

33. **Compliance:** Specifics regarding how compliance with this Proposal will be determined and the information that will be provided by GRH for this purpose, will be included in the operation compliance and monitoring plans (OCMPs) required by the §401 Water Quality Certifications and the FERC licenses. Should review of information submitted to the relevant resource agencies pursuant to the OCMPs indicate that operation of any Project is not complying with this Proposal, GRH will consult with the State and Federal resource agencies to discuss their concerns and, if necessary, will identify and implement appropriate corrective actions.

34. **Consultation**: If after evaluating operation data pursuant to Item 33, the relevant resource agencies observe instances where operations do not appear to adequately represent a) the simulations discussed in the last paragraph of the Introduction, b) attain the five bulleted focus areas in the Introduction, or c) attain CTB and DWM management goals (items 1 and 2) at levels suggested by GRH simulations, GRH will, if requested, meet with the agencies to discuss their concerns and possible corrective actions.

Attachment B

Evidence of Support for Proposed Alternative Operation,

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MEMORANDUM OF UNDERSTANDING
WILDER, BELLOWS FALLS AND VERNON
HYDROELECTRIC PROJECTS FERC RELICENSING

The parties to this Memorandum of Understanding, dated as of December 1, 2020, are **Great River Hydro, LLC** ("Great River Hydro"), together with the following: **the United States Fish and Wildlife Service**, **the New Hampshire Department of Environmental Services**, **the New Hampshire Fish and Game Department**, **the Vermont Department of Environmental Conservation**, **the Vermont Department of Fish and Wildlife** (collectively, the "Resource Agencies"), **The Nature Conservancy**, and **the Connecticut River Conservancy** (such two parties, together with the Resource Agencies, the "Stakeholders").

Recitals

Great River Hydro is the owner and licensee of the Wilder Hydroelectric project (FERC No. 1892) ("Wilder Project"), the Bellows Falls Hydroelectric Project (FERC No. 1855) ("Bellows Falls Project"), and the Vernon Hydroelectric Project (FERC No. 1904) ("Vernon Project"), collectively, the "Projects".

The licenses for each of the Projects expire on April 30, 2021. If issuance of a new license (or other disposition) does not take place on or before April 30, 2021, pursuant to 18 C.F.R. 16.18(c), annual licenses under section 15(a)(1) of the FPA are renewed automatically. In accordance with the Federal Energy Regulatory Commission's ("FERC") Integrated Licensing Process regulations set forth in 18 C.F.R. Part 5, Great River Hydro submitted applications for new licenses for each of the Projects on May 1, 2017.

Great River Hydro and the Stakeholders have been engaged in discussions focused on reaching agreement on proposed operations of the Projects under new FERC licenses. The parties to this memorandum concur with the Proposed Alternative Operation for the Projects, attached as **Exhibit A**.

Understanding Between the Parties

The parties hereby recite as follows:

A. FERC License Application and WQC Proceedings. The Proposed Alternative Operation will be presented in the amended license applications as Great River Hydro's proposed operation of each Project (the "FERC License Application") and, pending any new information that would suggest otherwise, as its proposed operation of each Project in Great River Hydro's applications for water quality certifications from the New Hampshire Department of Environmental Services and the Vermont Department of Environmental Conservation in accordance with Section 401 (a)(1) of the Clean Water Act (the "WQC Proceedings").

B. Stakeholder Representations. Subject to the Resource Agency Reservations below, the Stakeholders represent the following:

The Stakeholders support the Proposed Alternative Operation as representing an agreed upon operation of the Projects, addressing many flow, impoundment and operational related resource concerns that are a result of, or are perceived to be a result of, operations of the Projects.

The Proposed Alternative Operation will be acceptable and supported by the Stakeholders in the FERC License Application process and, pending any new information that would suggest otherwise, included in the draft WQC issued for public comment. No further data or information related to the Proposed Alternative Operation is anticipated to be required to support the inclusion of the Proposed Alternative Operation in the draft WQC. However, if additional data or information is necessary to support the inclusion of the Proposed Alternative Operation in the draft WQC, the Stakeholders will confer with Great River Hydro.

The Stakeholders represent they will not propose additional or alternative operation proposals or license conditions that are inconsistent with the Proposed Alternative Operation, or would require a modification to the Proposed Alternative Operation.

Nothing in this Memorandum shall preclude the state and federal resource agencies from complying with their obligations under the National Environmental Policy Act, the Clean Water Act, the Endangered Species Act, the Federal Power Act, the Fish and Wildlife Coordination Act or any other applicable state or federal laws or regulations. However, by entering into this Memorandum the Resource Agencies represent, based on the information available to them as of the date of this Memorandum and subject to the Resource Agency Reservations below, that they believe their statutory obligations are, or can be, met consistent with the Proposed Alternative Operation.

Nothing in this Memorandum shall be interpreted to limit the right of The Nature Conservancy and the Connecticut River Conservancy from providing information or giving testimony in any regulatory, administrative or judicial proceeding, or to fully pursue any issue that, in its opinion, is not adequately addressed by Exhibit A.

C. Resource Agency Reservations. Nothing in this Memorandum shall preclude the state resource agencies responsible for issuing water quality certifications:

- from modifying the format or language of Exhibit A to better match typical water quality certification format or language provided it is consistent with the Proposed Alternative Operation;
- from including, if necessary, conditions in the WQCs related to potential resource issues not specifically addressed by the Proposed Alternative Operation, including, but not limited to, fish passage, whitewater rafting, recreation and monitoring;

- from including other conditions in the water quality certification provided they are not inconsistent with the Proposed Alternative Operation;
- from making revisions to the Proposed Alternative Operation in the draft Water Quality Certification prior to issuance for public comment based on any new information that would suggest revisions are necessary to support the inclusion of the Proposed Alternative Operation (as revised), in the draft WQC; and
- from issuing a final Water Quality Certification with revisions to the Proposed Alternative Operation based on comments received on the draft Water Quality Certification.

Prior to issuing the final Water Quality Certification, the States shall confer with Great River Hydro and the other Stakeholders in an effort to reach agreement on any substantive amendments to the draft Water Quality Certification made as a result of public comment or new information.

Nothing in this Memorandum shall be interpreted to preclude or otherwise limit EPA from complying with its obligations under the Clean Water Act, Clean Air Act, and National Environmental Policy Act, or other federal statutes. Nothing herein shall preclude EPA or the States of New Hampshire and Vermont from fully and objectively considering all public comments received in any regulatory process related to the Project, from conducting an independent review of the Projects under applicable statutes, or from providing comments to FERC.

Nothing in this Memorandum shall be interpreted to preclude or otherwise limit the U.S. Fish and Wildlife Service from completing consultation with FERC under Section 7 of the Endangered Species act, or as predetermining the outcome of such consultation.

D. Great River Hydro Representations. Great River Hydro supports the Proposed Alternative Operation as representing a reasonable balance between power and non-power resources by significantly increasing a broad range of resource protection while maintaining the Projects' capabilities to be flexible and responsive to current wholesale energy, forward capacity, reserve and other ancillary services markets managed by the New England Independent System Operator (ISO-NE). Under the Proposed Alternative Operation, the Projects can remain responsive to ISO-NE system emergencies and critical events, other emergencies involving dam and public safety and ensures their ability to address future regional energy demands and system needs as those evolve over time.

E. Confidentiality. Other than information regarding how Great River Hydro currently participates and intends to participate in ISO-NE wholesale energy, capacity, reserve and ancillary markets, any data or technical supporting information shared as a part of the Mitigation Discussions that supports the conclusion of this Memorandum that the Proposed Alternative Operation meets the regulatory obligations of a Resource Agency shall be

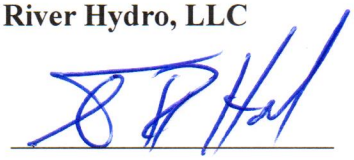
considered public and may be used by the Stakeholders to support its decision, provided that the terms of the Confidentiality Agreement for Mitigation Discussions shall continue to govern the use of proposals, counterproposals, meeting notes and informal discussions.

F. Representations and Warranties. The Parties represent and warrant to each other that: (1) this Memorandum has been duly authorized, signed and delivered by each party; (2) this Memorandum shall not, in any manner, limit any regulatory function of a Resource Agency; (3) this Memorandum shall not grant any person the right to initiate a suit to enforce its terms against a Resource Agency; (4) this Memorandum shall not be construed as a waiver of sovereign immunity or any other defense any Resource Agency may raise to any claim in a suit related to the subject matter of this agreement; and (5) this Memorandum shall not be construed to limit the right of The Nature Conservancy and the Connecticut River Conservancy to provide information or give testimony in any regulatory, administrative or judicial proceeding, or to fully pursue any issue that, in its opinion, is not adequately addressed by Exhibit A.

G. Counterpart Signatures and PDF Signatures. This Memorandum may be executed by the parties in separate counterparts, each of which when so executed and delivered shall be an original, but all such counterparts shall together constitute one and the same instrument. Signatures to this Memorandum transmitted by fax, by electronic mail in "portable document format" (.pdf), or by any other electronic means intended to preserve the original graphic and pictorial appearance of the Memorandum, shall have the same effect as physical delivery of the paper document bearing the original signature. The parties agree that any such reproduction shall, to the extent permitted by law, be as admissible in evidence as the original itself in any judicial or administrative proceeding (whether or not the original is in existence and whether or not the reproduction was made in the regular course of business) and that any enlargement, facsimile or further reproduction shall likewise be admissible in evidence.

[*signatures on following page*]

Great River Hydro, LLC

By: 

Name: Scott D. Hall

Title: President and CEO

United States Fish and Wildlife Service

By: _____

Name: _____

Title: _____

New Hampshire Department of Environmental Services

By: _____

Name: _____

Title: _____

New Hampshire Fish and Game Department

By: _____

Name: _____

Title: _____

Vermont Department of Environmental Conservation

By: _____

Name: _____

Title: _____

Vermont Department of Fish and Wildlife

By: _____

Name: _____

Title: _____

The Nature Conservancy

By: _____

Name: _____

Title: _____

Connecticut River Conservancy

By: _____

Name: _____

Title: _____

Great River Hydro, LLC

By: _____

Name: _____

Title: _____

United States Fish and Wildlife Service

By: THOMAS CHAPMAN Digitally signed by THOMAS CHAPMAN Date: 2020.12.03 12:36:34 -05'00'

Name: _____

Title: _____

New Hampshire Department of Environmental Services

By: _____

Name: _____

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New Hampshire Fish and Game Department

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Vermont Department of Environmental Conservation

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Title: _____

Vermont Department of Fish and Wildlife

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The Nature Conservancy

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Connecticut River Conservancy

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Name: _____

Title: _____

Great River Hydro, LLC

By: _____

Name: _____

Title: _____

United States Fish and Wildlife Service

By: _____

Name: _____

Title: _____

New Hampshire Department of Environmental Services

By: _____ 4 DEC '20

Name: THOMAS E. O'DONOVAN

Title: DIRECTOR, WATER DIVISION

New Hampshire Fish and Game Department

By: Scott R Mason

Name: Scott R. Mason

Title: Executive Director

Vermont Department of Environmental Conservation

By: _____

Name: _____

Title: _____

Vermont Department of Fish and Wildlife

By: _____

Name: _____

Title: _____

The Nature Conservancy

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Connecticut River Conservancy

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Great River Hydro, LLC

By:_____

Name:_____

Title: _____

United States Fish and Wildlife Service

By:_____

Name:_____

Title: _____

New Hampshire Department of Environmental Services

By:_____

Name:_____

Title: _____

New Hampshire Fish and Game Department

By:_____

Name:_____

Title: _____

Vermont Department of Environmental Conservation

By:_____

Name: Peter LaFlamme

Title: Director, Watershed Management Division

Vermont Department of Fish and Wildlife

By:_____

Name:_____

Title: _____

The Nature Conservancy

By:_____

Name:_____

Title: _____

Connecticut River Conservancy

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Great River Hydro, LLC

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United States Fish and Wildlife Service

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New Hampshire Department of Environmental Services

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New Hampshire Fish and Game Department

By: _____

Name: _____

Title: _____

Vermont Department of Environmental Conservation

By: _____

Name: _____

Title: _____

Vermont Department of Fish and Wildlife

By: Eric Palmer

Name: Eric Palmer

Title: Fish Division Director

The Nature Conservancy

By: _____

Name: _____

Title: _____

Connecticut River Conservancy

By: _____

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Great River Hydro, LLC

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United States Fish and Wildlife Service

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New Hampshire Department of Environmental Services

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Title: _____

Vermont Department of Environmental Conservation

By: _____

Name: _____

Title: _____

Vermont Department of Fish and Wildlife

By: _____

Name: _____

Title: _____

The Nature Conservancy

By: Mark Zankel

Name: Mark Zankel

Title: NH State Director

Connecticut River Conservancy

By: _____

Name: _____

Title: _____

Great River Hydro, LLC

By: _____

Name: _____

Title: _____

United States Fish and Wildlife Service

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New Hampshire Department of Environmental Services

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Vermont Department of Environmental Conservation

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Title: _____

Vermont Department of Fish and Wildlife

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Title: _____

The Nature Conservancy

By: _____

Name: _____

Title: _____

Connecticut River Conservancy

By: _____

Name: ___Andrew Fisk_____

Title: ____Executive Directo___

EXHIBIT A

Proposed Alternative Operation

Exhibit A

Great River Hydro's Proposed Alternative Operation for the Projects

INTRODUCTION

Great River Hydro, LLC (Great River Hydro or GRH) proposes to operate each of the Wilder, Bellows Falls and Vernon Projects (Projects or Facilities) in a similar manner under the terms of a new License, as the preferred (or proposed) alternative over the No-Action Alternative. The proposed alternative (also referred to herein as the Proposal) focuses on

- creating more stable impoundment water surface elevations,
- reducing the magnitude and frequency of sub-daily changes in discharge from the stations,
- increasing the amount of time that the project is operated as inflow equals outflow (IEO) and at full impoundment,
- reducing the magnitude and rate of change in flows downstream of the dams, and
- reducing the average frequency, average duration and average range of impoundment fluctuation under conditions when inflow to the Project at the dam is within the range of the Project powerhouse hydraulic capacity.

At the same time, the proposed alternative maintains Great River Hydro's capability to be flexible and responsive to current wholesale energy, forward capacity, reserve and other ancillary services markets managed by the New England Independent System Operator (ISO-NE). Great River Hydro also proposes to remain responsive to ISO-NE system emergencies and critical events and other emergencies involving dam and public safety. The proposal ensures the Project's ability to address future regional energy demands and system needs as those evolve over time. Additional non-operational elements of the proposal are also specified.

This Proposal is largely based on model simulations (simulations) provided by GRH that compared historic to proposed operation at each Project for the months of February, June, August and November in 2009, 2015, 2016 and 2017. GRH believes the simulations present an overly opportunistic representation with respect to the utilization of flow and managing to operational limits, which may result in overstatement of the actual impact of proposed Flexible Operations on the natural resources. This is because the simulations were created with perfect foresight with regards to pricing and inflow. Such perfect foresight will not be available during implementation of the proposal which will likely result in the Projects being operated more conservatively than indicated in the simulations in order to ensure compliance with the operational requirements specified herein.

The term agencies, resource agencies, or relevant resource agencies, used herein includes, but may not be limited to, the United States Fish and Wildlife Service, the New Hampshire Department of Environmental Services, the New Hampshire Fish and Game Department, the Vermont Department of Environmental Conservation, and the Vermont Department of Fish and Wildlife.

DEFINITIONS

1. **Cobblestone Tiger Beetle (CTB) Management Goal**: Maintain multiple consecutive-day periods (≥3) in which Flexible Operations (item 6) do not exceed flow thresholds that maintain ≥75% uninundated habitat at most sites for each month during the CTB active period (June through September), excluding periods when inflows are above these thresholds.

   Rationale: Existing Project operations impact the State listed Cobblestone Tiger Beetle (CTB). The thresholds stated in the goal are intended to increase the duration and area of available CTB habitat to facilitate CTB reproduction and survival from June 1 through September 30. This time period is considered the primary active period for CTB adults and larvae. Lack of persistent habitat can reduce the available time for feeding and/or prey availability. Limited habitat availability resulting from prolonged or repeated inundation also can cause delays in pupae and larvae development, decrease survival of larvae and affect the mating behavior of adults. Based on analysis of IEO/ Flexible Operation simulations provided by GRH, the expectation is that the limited number of Flexible Operation hours allowed during the active season for these species will meet this species-specific goal.

2. **Dwarf Wedgemussel (DWM) Management Goal**: Increase habitat stability by stabilizing/reducing impoundment fluctuations and providing multiple consecutive-day periods (≥3) at IEO each month during the period April 1 through October 15.

   Rationale: Existing operations impact the State and Federally listed Dwarf Wedgemussel. The identified goal is intended to facilitate DWM growth, breeding, and juvenile settlement in the riverine section below the Wilder Project and in the Wilder and Bellows Falls impoundments. Time spent moving in response to relatively rapid changes in water level that could occur due to Flexible Operation is time not spent feeding, which can lead to increased energy expenditure and predation risk, resulting in reduced growth and/or increased susceptibility to mortality. Periods of IEO are also intended to facilitate successful breeding (male gamete release/fertilization in females), believed to occur in the months of August and September, by maximizing the chance male gametes will reach females and not be mobilized to points downstream. Similarly, extended periods of IEO will increase the potential for metamorphosed glochidia released from host fish to successfully settle on a DWM bed versus being mobilized and settling off-bed. Based on analysis of Flexible Operation simulations provided by GRH, the expectation is that the limited number of Flexible Operation hours allowed during the active season for these species will meet this species-specific goal.

3. **Dwarf Wedgemussel Pre-Winter Habitat Operation**: Dwarf Wedgemussel pre-winter habitat protection operation is intended to create overwintering habitat that is protected from potential water drawdown that could expose mussel beds to freezing air temperatures. Mussels reduce their mobility and settle into the substrate for the winter as water temperatures drop below 15° Celsius (° C). By lowering the water surface elevation (WSE), the habitat they occupy will remain submerged over the winter, protecting largely immobile mussels from exposure and freezing air temperatures. To accomplish this, GRH will lower the WSE at the Wilder and Bellows Falls dams to an elevation at or above the low limit of each of the respective Flexible Operating Impoundment Ranges (specified below in item 9) and maintain that WSE for the limited period of time during which water temperatures consistently drop from 15° C to 10° C.

This period is typically 10-21 days in length, occurring in the late-October to early-November timeframe. Once water temperatures are consistently below 10° C within identified DWM habitats within the Wilder and Bellows Falls Project impoundments, the WSE can be adjusted upward to the Target WSE (item 17) and utilize the elevation range above the low limit described above for Flexible Operations. The WSE at each the Wilder and Bellows Falls dams will remain at or above this DWM habitat winter protection WSE throughout the subsequent period when water temperatures are at or below 10° C and no earlier than March 1 unless inflow exceeds respective station capacity and inflow levels require flood profile operation WSE at the dams (item 11).

4. **Emergency and System Operation Requirements** are when a Project must respond to:

   a. Emergencies outside the control of GRH when dam safety, public safety or flood control require action or response.

   b. Emergency System Operations, Conditions and Emergencies when the ISO-NE requires GRH to be fully available and if necessary responsive. Examples include ISO-NE Reserve Deficiencies (a.k.a. Reserve Constraint Penalty Factors) when reserves are depleted on the power grid, for fuel security emergencies or scarcity events, for ISO-NE system (or system) stability (e.g., VAR support), and system over supply (negative prices). GRH is not informed as to how the Projects are called upon or held in reserve to respond to specific system conditions or emergencies. However, based on ISO-NE Reserve Constraint Penalty Factors (RCPF) reports, which indicate when the region's power grid is short of operating reserves, there were 109 activations between 2011 and July 2013 within the entire ISO-NE System that may or may not have required actions at the Wilder, Bellows Falls or Vernon Projects. A summary of information gleaned from these reports for the period 2014 through 2018 is provided in the table below which shows that, in general, these events occurred relatively infrequently and are often short in duration. This information only provides a sense of the limited scale, frequency and number of these events; it does not mean any action actually took place with regard to the GRH projects. GRH facilities are often held in reserve even in a portion of the events referred to below. With regards to ISO-NE declared "Minimum Generation Emergencies" or "MIN GEN Emergencies" which may initiate and produce negative pricing, GRH consulted ISO-NE staff who stated that, to the best of their knowledge, the last MIN GEN Emergency occurred in March 2016.

YEAR	# of System Events	System Event Duration Range	# of Local * Events	Local Event Duration Range
2014	20	5-110 minutes	Cannot determine	
2015	3	10-65 minutes	6	5-20 minutes
2016	3	5-115 minutes	1	5 minutes
2017	2	15-20 minutes	8	5-305 (5-19-17) minutes
2018	2	10-160	0 listed	

*Local event but precisely where is not identified in the RCPF report

5. **ISO-NE required audits, demonstrations and tests** are requirements necessary for participation in and to qualify resources for systems support and markets. Present audits include Claimed Capacity Audits and Reactive Power Demonstrations (see below).

a. Claim Capacity Audit (CCA) is an ISO-NE audit currently required at the Wilder Project and may be (unanticipated presently) required in the future at the Bellows Falls and Vernon Projects. A CCA demonstrates maximum capacity for the Project through a two-hour generation run and is used by the ISO-NE for calculating capacity related market participation. Wilder Project requires a CAA to be performed annually to address summer capacity capability and every three years to demonstrate winter capacity capability. CCAs are performed under conditions specified by the ISO-NE and are performed under the best conditions related to head and inflow in order to maximize the generation within the two-hour audit as specified in the table below. While the ISO-NE does not require CCAs at Vernon and Bellows Falls, Great River Hydro may need to perform a similar test on occasion in order to demonstrate claimed capacity to the ISO-NE should a disparity arise between ISO-NE and GRH capacity numbers.

Project	Maximum Impoundment Elevation at start of CCA (NGVD29)	Maximum Impoundment Drawdown during 2-hour CCA and prior to Refill (feet)	Impoundment Refill
Wilder	385.00	0.60	See item 19.c
Bellows Falls	291.63		
Vernon	220.13		

b. Reactive Capacity Demonstration (RCD) is a 2-step ISO-NE audit currently required at the Wilder, Bellows Falls and Vernon Projects every five years, to verify capability to provide voltage reactive power or VAR to the regional power grid. Hydro generators are excellent sources of VAR support to the power grid, through which voltage can be increased or decreased depending upon the need to boost or reduce voltage of the grid. This audit requires GRH to demonstrate capability in both a minimum [station] generation and a maximum generation condition. Minimum station generation would typically be less than the required minimum base flow specified in item 16. Maximum station generation (item 15) would typically be higher than the calculated inflow. A 5-business day advance notice must be given to the ISO-NE, which determines if system conditions are suitable for a test before authorizing GRH to conduct the audit on a specified date/time. The duration of each portion (minimum generation and maximum generation condition) of the audit generally last an hour if things perform as planned; otherwise the audit could require an additional hour(s). The minimum generation audit will pass inflow either through generation, spill or a combination of both. The maximum generation audit will require a maximum pond elevation (Top of Boards) as specified in item 10 (Full Operating Impoundment Range) below.

c. Other future requisites are requirements specified by the ISO-NE, which are unknown and unanticipated at this time, to demonstrate and meet performance capability requirements, in accordance with ISO-NE market rules that may be changed from time to time. Great River Hydro will notify and consult with the relevant resource agencies a minimum of 60 days in advance of ISO-NE's implementation if GRH determines there is a significant modification to ISO-NE CCAs or RCDs as described above, or present additional requisites or requirements which require GRH to deviate from present demonstration capabilities and which cannot be reasonably accomplished through IEO/Flexible Operation as proposed and implemented under a new License.

6. **Flexible Operation** is when the Projects are operated at the Licensee's discretion and deviate from operation at IEO and stable pond (item 13) in accordance with this Proposal.

7. **Flexible Operation Hours** are the hours of Flexible Operation (item 6) that will count towards the maximum number of hours of Flexible Operation allowed each month as specified in item 23. Determination of the number of Flexible Operation hours that have been used each month for comparison to the maximum number of Flexible Operation hours allowed, will be as follows:

a. The minimum duration of a Flexible Operation event is one hour. Should an event be less than an hour for any reason, the event will be counted as one hour. ISO-NE is responsible for the dispatch of a unit or station and as such GRH is not able to precisely determine or dictate when a unit starts or stops. ISO-NE typically dispatches units at or near the top of the hour (e.g., 1:00, 2:00, etc.) under non-emergency situations. Should an event last more than 15 minutes past the top of the hour that event will be considered to have lasted and counted as if it were for that entire hour (e.g., if an event ends and Down-ramping Transition Operation is initiated within 15 minutes past the top of the hour, it will not be considered an additional hour; if after 15 minutes past the top of the hour, it will count as an additional Flexible Operation hour.) Examples are provided below.

When Up-ramping is implemented in accordance with item 19.a, hours for Flexible Operation begin the hour immediately following the Up-ramp hour. If Up-ramping is not implemented in accordance with item 19.a, due to Real-Time pricing, hours for Flexible Operation begin as soon as Flexible Operation begins as specified above. In all cases, the time that Flexible Operation ends for the purpose of determining the number of allowed hours which have been used each month (item 23) is when Down-ramping begins.

Examples (assuming no Up-ramping)

Approximate Time Flexible Operation Event Begins*	Time Flexible Operation Event Ends and Down-ramping Begins	Number of Flexible Operation Hours
2:00 pm	2:57 pm	1
2:00 pm	3:15pm	1
2:00 pm	3:16 pm	2

* ISO-NE dispatches units near the top of the hour.

b. Should GRH need to conduct more than two CCA tests per year at a single Project (due to problems, changing conditions, or failure to reach expected levels), GRH will alert the relevant resource agencies that 1) it must conduct additional tests, 2) that each additional test will require maximum impoundment elevation (see table under item 5.a) and no ramping, and 3) that the number of Flexible Operation hours for each additional test will be determined in accordance with 7.a above and counted either in the current or in the next month's allocation (item 23) if none were available in the current month.

8. **Flexible Operation Maximum Discharge** (item 27) is the maximum discharge from the Project powerhouse during Flexible Operation and is a function of inflow (item 12) and the maximum station generating capacity (item 15).

9. **Flexible Operating Impoundment Range** is bounded by the following Water Surface Elevation (WSE) limits except during the Dwarf Wedgemussel (DWM) pre-winter habitat protection operation (item 3). These limits are no greater than the current typical range of operation under normal operating condition for Bellows Falls and Vernon, one foot less than current operation for Wilder [which is 382.0 to 384.5 ft (msl NGVD 29)], 0.5 feet less at Bellows Falls during the active DWM period, and will be no greater than 1.5 feet at any of the Projects.

Project	WSE Range (msl NGVD 29)	Maximum Fluctuation During Any Flexible Operation Event (feet)
Wilder	383.0 and 384.5	1.5
Bellows Falls	Oct 1 – May 31: 289.6 and 291.1 June 1-Sept 30: 290.1 and 291.1	Oct 1 – May 31: 1.5 June 1-Sept 30: 1.0
Vernon	218.3 and 219.63	1.33

It is anticipated that the typical impoundment operating range as a function of Flexible Operation will be on average less than the Proposed Flexible Operating Impoundment WSE Range measured at each dam and as specified in the table above. GRH may, at some future date and at its discretion, after gaining more operating experience with the proposed operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth (Item 18) and/or modifying the Flexible Operating Impoundment Range, by raising both the upper and lower limits of the range, but not increasing the difference between the upper and lower limits (i.e., the maximum fluctuation shown in the table above).

10. **Full Operating Impoundment Range** is the historic full operating range for each Project that generally corresponds with the maximum height (top) of the flashboards or gates down to the low limit. This range is utilized for managing high flows and not for power generation. Water surface elevations (WSE) must be lower if extreme high water or dam safety emergencies require stanchion flashboards and beams to be removed from the concrete dam crest. In order to rebuild the stanchion flashboards, the impoundment WSE must be lowered to the crest before rebuilding the structures can be accomplished.

Wilder Project: Top of Boards 385.0 ft; Low limit to manage flood flows 380.0 ft; Concrete Stanchion Flashboard Crest 368.0 ft (msl NGVD 29).

Bellows Falls Project: Top of Boards 291.63 ft; Low limit to manage flood flows 288.63 ft; Concrete Stanchion Flashboard Crest 278.63.0 ft (msl NGVD 29).

Vernon Project: Top of Boards 220.13 ft; Low range to manage flood flows between 218.6 - 212.13 ft; Concrete Stanchion Flashboard Crest 212.13 ft (msl NGVD 29).

11. **High Water Operation** is when inflow at the dam exceeds the maximum station generating capacity (item 15). In most cases this requires each project to follow its Flood Profile Operating procedures, that require specific elevations be maintained at the dam for specific ranges of flow. These elevations fall within the Full Operating Impoundment Range of each Project (item 10).

12. **Inflow** to each Project is estimated based on anticipated inflow arriving at the dam from upstream. In real-time it is calculated and monitored through actual change in WSE measured at the dam on an hourly basis and adjusted through actual discharge from the Project.

13. **Inflow Equals Outflow (IEO) Operation** is defined as follows:

    a. When the Project maintains discharge through the powerhouse equal to inflow at the dam by maintaining a stable target WSE together with any required non-generation flow (e.g., Bellows Falls bypass flow, fish passage related flow) or,

    b. When inflow exceeds the maximum station generating capacity (item 15) and all inflow is passed via a combination of spillage and discharge through the powerhouse or if the station were out of service, via spillage alone.

14. **Maintenance Requirements** are either scheduled periodic maintenance or unscheduled maintenance due to an unanticipated situation or condition. Maintenance requirements can, in some cases, be pre-planned and executed accordingly or unplanned and require various elements such as investigation and problem identification, engineering, planning and execution.

15. **Maximum Station Generating Capacity** (in cfs) is the maximum flow that can be passed through the powerhouse for each Project as shown in the last column of the table below:

Project	Number and Type of Turbines	Maximum Flow / Turbine (cfs)	Minimum Flow / Turbine (cfs)	Maximum Nameplate Rated Capacity * (cfs)	Maximum Station Generating Capacity** (cfs)
Wilder	2- Kaplan 1-Vertical Francis	6000 700	400 400	12,700	11,700
Bellows Falls	3- Vertical Francis	3670	700	11,010	11,400

Project	Number and Type of Turbines	Maximum Flow / Turbine (cfs)	Minimum Flow / Turbine (cfs)	Maximum Nameplate Rated Capacity * (cfs)	Maximum Station Generating Capacity** (cfs)
Vernon	4- Vertical Francis	1465	400	17,130	15,400
	4-Vertical Kaplan	1800	300		
	2-Vertical Francis	2035	500		

* The maximum nameplate hydraulic capacity is based on design specifications of the turbine (or nameplate rating) and is the sum of the hydraulic capacities of all units in the powerhouse. It is not a realistic representation of what the Station can actually pass through the turbines at the same time, which is largely determined by net head.

** The maximum station generating capacity represents the maximum Station discharge based on operating data and represents the maximum discharge that can actually be passed through the turbines.

16. **Minimum Base Flows** are minimum flows required to be maintained below each dam at all times. As described below, flows are expected to be equal to inflow and significantly higher than these base flows the vast majority of time. The proposed Minimum Base Flows are all greater than the minimum base flows required in the current FERC licenses and include a seasonal component.

During the following periods the requirement will be to provide, at a minimum, the approximate inflow as measured at the dam.

- While operating in the Inflow Equals Outflow (IEO) mode (item 13) – discharging inflow will require maintaining Target WSE within the bandwidths specified (item 18) and hourly (minimum required frequency) adjustments necessary to maintain proximity to Target WSE.
- While operating in Flexible Operation and Up-ramping and Down-ramping Transition Operation (item 19), flows will be maintained above or equal to inflow. Instantaneous inflow measurements will be calculated in accordance with item 12.
- The economic minimum dispatch flow (Eco-Min) specified to the ISO-NE will be the estimated hourly inflow. When prices go negative, station discharge will be set to the specified Eco-Min (i.e., the estimated inflow). When a System Minimum Generation Emergency is declared by the ISO-NE, a combined spill plus station discharge will equal the Eco-Min. Both of these situations will resemble IEO and any discrepancy between estimated Eco-Min and real-time inflow would be captured within the Target Elevation Bandwidth and adjusted once either the negative pricing situation or the System Minimum Generation Emergency has ended.

While operating in Transition Refill Operation (item 19.c) discharge will be approximately 70% of estimated inflow and adjusted as necessary through hourly real-time monitoring and calculation of estimated inflow. Discharge during refill will not fall below the seasonal Minimum Base Flow thresholds shown below.

For the purpose of establishing a base flow below the dams for IEO/Flexible Operational Planning purposes and deciding whether or not to implement Flexible Operation by utilizing allocated hours (item 23) in the Day-Ahead (DA) market or in responding to Real-Time (RT) price signals in the RT market, all flows associated with Transition Operation Up-ramping; Flexible Operation; Transition Operation Down-ramping and; Transition Operation Refill will be maintained above the following Project and seasonal Minimum Base Flow thresholds. The only time Project flows prior to or following these periods may be less than these thresholds is when the inflow calculated in accordance with item 12 is less. It is anticipated that flows will be higher than the base flows the vast majority of the time.

Wilder	**Bellows Falls***	**Vernon**
Oct 1 - March 31: 1,500 cfs April 1 - May 31: 2,000 cfs June 1 - Sept 30: 1,100 cfs	Oct 1 - March 31: 1,600 cfs April1 - May 31: 3,000 cfs June 1 - Sept 30: 1,400 cfs Bypass Reach below dam: 300 cfs year round	Oct 1 - March 31: 1,600 cfs April 1 - May 31: 3,000 cfs June 1 - Sept 30: 1,400 cfs

***** Minimum Base Flow is the combined flow below dam and station.

Emergencies, facility outages, station trips that result in unanticipated reductions in station discharge will be considered unavoidable flow reductions, and GRH will restore flows below the Project to at least the estimated inflow as quickly as possible. When spill, other than the continuous 300 cfs in the Bellows Falls bypassed reach, is required during non-business hours to respond to emergencies or System minimum generation emergencies noted above, to maintain IEO, transition flows or the base flows as described, GRH will require personnel to come to the affected station(s) and check for public safety risks below the gates and confirm none exist before opening a spill gate. As soon as that is accomplished a gate(s) will be opened to provide the proper flows. This entire process typically takes one hour or less.

17. **Target Water Surface Elevation (WSE)** is a specified elevation (item 21) at each Project dam to be maintained under IEO Operation by adjusting station discharge. The Target WSE would be monitored no less frequently than hourly, and station discharge would be adjusted as frequently as reasonably possible to ensure accurate WSE. Station discharge is calculated and adjusted based on unit discharge curves and formulas within the accuracy of the unit's control systems.

18. **Target WSE Bandwidth** is a range, 0.5 ft above and 0.5 ft below the Target WSE, available for use during IEO Operation, in order to absorb unanticipated changes in inflow at the dam or slight deviations or imbalances between hourly inflow and hourly discharge due to miscalculation of inflow or unit discharge. See item 21 for elevations associated with the bandwidth. GRH may, at some future date and at its discretion, after gaining more operating experience with the proposed operation, request to meet with relevant resource agencies to discuss the potential for reducing the Target WSE Bandwidth and/or modifying the Flexible Operating Impoundment Range (item 9) by raising both the upper and lower limits of the range, but not increasing the difference between the upper and lower limits (i.e., the maximum fluctuation shown in the table under item 9).

19. **Transition Operation** describes actions required to precede Flexible Operation in some cases and follow Flexible Operation in all cases. There are three elements associated with Transition Operation:

a. **Up-ramping**: A flow increase for the hourly period that would precede most (exceptions specified below) initial Flexible Operation hours at a specified flow depending upon the Project, so that the overall flow difference between the IEO flow and the scheduled Flexible Operation flow is gradual and not instantaneous. Up-ramping rates are specific to each Project and would only apply when Flexible Operation is scheduled in advance (i.e., in the Day-Ahead market) and not when Flexible Operation is initiated in Real-Time or for CCA and RCD audits. Up-ramp rates are specified at each Project as:

Wilder Project: the lesser of 1 of 2 large units (approximately 5000 cfs) or half-way between the IEO flow and the Flexible Operation flow;

Bellows Falls Project: the lesser of 1 cfs/square mile of drainage area (cfsm) (approximately 5,414 cfs) or the flow half-way between current IEO flow and the Flexible Operation flow;

Vernon Project: the lesser of 1 cfsm (approximately 6,266 cfs) or half-way between current IEO flow and the Flexible Operation flow.

b. **Down-ramping**: A flow decrease at a specified rate for the period following Flexible Operation until the flow is equal to inflow at the dam. Decreases will occur on an hourly basis, as a percentage of the previous hourly flow. The first hour after the Flexible Operation hour will be no greater than approximately 70% of the Flexible Operation flow and each successive hour will be approximately 70% of the previous hour.

c. **Refill**: A maximum 48-hour period subsequent to post-Flexible Operation Down-ramping when the impoundment WSE is restored to the stable Target WSE by passing a fraction of the inflow at the dam and retaining the remaining fraction as impounded water above the dam. The hourly flow rate below each Project dam during refill will be the greater of approximately 70% of inflow or the base flow specified in item 16.

The 48-hour maximum refill period begins immediately following Down-ramping after a Flexible Operation event and ends no more than 48 hours later unless the reservoir is within 0.1 foot of the Target WSE (item 21). The 48-hour period includes any temporary interruptions during refill (e.g., purposely pausing refill and passing all inflow, or decisions to implement another Flexible Operation event prior to the impoundment reaching a WSE equal to the Target WSE minus 0.1 feet.) GRH expects to only pause refill for extended periods as needed when participating in the Real-Time Market, as described in 19.a above. Based on analysis of Flexible Operation simulations provided by GRH, it is expected that the number and duration of pauses will be minimal especially during the critical spawning months spanning from April through July 15.

PROJECT OPERATION DESCRIPTIONS

20. All Projects will comply with IEO Operation (item 13), applying Target WSE (item 17) and associated Target WSE Bandwidths (item 18) as described below, unless:

    a. Flexible Operation (item 6) along with Transition Operation (item 19) are applied as specified herein, and implemented;

    b. IEO Operation is suspended due to either High Water Operation (item 11), or Emergency and System Operation, Requirements and Audits (items 4 and 5); or

    c. IEO Operation is suspended due to non-emergency Maintenance Requirements that mandate deviating from IEO Operation, but only after consultation with relevant State and Federal resource agencies prior to initiating a necessary deviation and developing a suitable refill plan and schedule.

21. Target WSEs and Target WSE Bandwidths for each Project are described in the following table (all elevations are mean sea level (msl), NGVD 29):

	Wilder Project	**Bellows Falls Project**	**Vernon Project**
Target WSE	384.5 ft *	291.1 ft *	219.63 ft
Target WSE Bandwidth	Between 385.0 and 384.0 ft, representing 0.5 ft above and below the Target WSE	Between 291.6 and 290.6 ft, representing 0.5 ft above and below the Target WSE	Between 220.13 and 219.13 ft, representing 0.5 ft above and below the Target WSE

*Except during DWM pre-winter habitat protection operation period, triggered and maintained as water temperatures drop from 15° Celsius (° C) to 10° C within identified DWM habitats within the projects (item 3).

22. Rates of change in station discharge to maintain a Target WSE (matching inflow with outflow) will be limited to reasonable changes necessary to continue or adjust the actual WSE to the Target WSE within the Target WSE Bandwidth, largely dependent upon rate of change in inflow, the degree of flow control using MW setpoints on the generator and the monitoring accuracy of WSE at the dam. Changes in station discharge necessary to match inflow should not occur more than once per hour (unless rate of change in inflow is rapidly accelerating or declining) and would not be greater than reasonably necessary to restore a balanced IEO condition at the Target WSE. Specifics regarding how to distinguish between flow adjustments for IEO and Flexible Operation for compliance purposes will be addressed in the operation compliance and monitoring plans (OCMPs) required by the §401 Water Quality Certifications and the FERC Licenses.

23. Flexible Operations are limited, in part, by maximum allowable hours specified below, which are allocated on a monthly basis in order to reflect the seasonal criticality of instream aquatic resources as well as the criticality and fuel security concerns associated with winter peaking loads in New England:

    December, January, February, March: no more than 65 hours in each month

    April, May, June: no more than 10 hours in each month

July: A total of 20 hours with no more than 10 hours from July 1 through July 15. Although a maximum of 10 hours is allowed from July 1 through July 15, in order to further enhance the potential for successful Sea Lamprey spawning, GRH will strive to minimize the hours of Flexible Operation at each Project during this period when conditions allow.

August, September, October: a total of no more than 20 hours in each month.

November: a total of 42 hours with no more than 10 hours from November 1 through 15.

24. Flexible Operations (item 6) will comply with the Flexible Operating Impoundment Range (item 9).

25. The duration (in hours) of each Flexible Operation event will be determined in accordance with item 7.

26. The minimum duration of a Flexible Operation event will be one hour in most cases.

27. Flexible Operation Maximum Discharge will be based upon the calculated inflow at the hour in which the Flexible Operation will occur as follows:

    a. When calculated inflow is approximately 1800 cfs or less, Flexible Operation Maximum Discharge is 4,500 cfs.

    b. When calculated inflow is greater than approximately 1800 cfs, the Flexible Operation Maximum Discharge is limited to 2.5 times the calculated inflow and will not exceed the maximum station generating capacity (item 15).

28. For the purpose of protecting Dwarf Wedgemussels (DWM) from freezing in the winter, the Wilder and Bellows Falls Project impoundments will be temporarily lowered in the Fall of each year as described in item 3.

29. There are no limitations on the number of Flexible Operation events per day or the duration of Flexible Operation events other than those indirect limitations due to inflow and Transition Operation requirements as specified herein.

30. Scheduled Flexible Operation will require one hour of Transition Operation Up-ramping (item 19.a). Unscheduled (in response to Real-Time price signals) Flexible Operation, and Emergency and System Operation, Requirements and Audits (Items 4 and 5) will not require Up-ramping.

31. All Flexible Operation events will require Transition Operation Down-ramping and Refill as specified in item 19.

32. The Transition Operation elements specified in item 19 will be applied at the Projects as follow:

	Up-Ramping	**Down-Ramping**	**Refill**
IEO Operations	Not Applied	Not Applied	Not Applied
Flexible Operations, Scheduled	Applied during the hour prior	Applied as Defined	Applied as Defined
Flexible Operations, Un-Scheduled	Not Applied	Applied as Defined	Applied as Defined

High Water Operations	Not Applied	Not Applied	Not Applied
CCA and RPD Audits	Not Applied	Applied as Defined	Applied as Defined
Emergencies and System Emergencies	Not Applied	Not Applied	Not Applied

33. **Compliance:** Specifics regarding how compliance with this Proposal will be determined and the information that will be provided by GRH for this purpose, will be included in the operation compliance and monitoring plans (OCMPs) required by the §401 Water Quality Certifications and the FERC licenses. Should review of information submitted to the relevant resource agencies pursuant to the OCMPs indicate that operation of any Project is not complying with this Proposal, GRH will consult with the State and Federal resource agencies to discuss their concerns and, if necessary, will identify and implement appropriate corrective actions.

34. **Consultation**: If after evaluating operation data pursuant to Item 33, the relevant resource agencies observe instances where operations do not appear to adequately represent a) the simulations discussed in the last paragraph of the Introduction, b) attain the five bulleted focus areas in the Introduction, or c) attain CTB and DWM management goals (items 1 and 2) at levels suggested by GRH simulations, GRH will, if requested, meet with the agencies to discuss their concerns and possible corrective actions.

John Ragonese

From: Grader, Melissa <melissa_grader@fws.gov>
Sent: Monday, November 9, 2020 3:36 PM
To: John Ragonese; Jennifer Griffin
Cc: Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Comstock, Gregg; Erin O'Dea; Crocker, Jeff; Sprankle, Ken; Diers, Ted; Katie Kennedy; Carpenter, Matthew; Kathy Urffer; Will, Lael; Henderson, Carol; Davis, Eric; Simard, Betsy; Harris, Hannah
Subject: GRH's Proposed Operations for the Vernon, Bellows Falls, and Wilder Projects
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

Hello John,

The U.S. Fish and Wildlife Service has reviewed Great River Hydro's Proposal related to future operations under renewed FERC licenses for the Wilder, Bellows Falls, and Vernon Projects (attached to this email). Based on the information submitted to date, we support its adoption as the preferred alternative in Great River Hydro's amended relicensing application(s) and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment. This support does not eliminate the need for further agency consultation under Section 7 of the Endangered Species Act, which will continue to occur informally until such time as FERC has made an effects determination for all listed species within the project-affected area.

You and your team put an enormous amount of effort into the proposal and we appreciate the open discussion, exchange of information and materials, and willingness to work with the stakeholders to develop creative solutions.

Regards,

Melissa Grader
Fish and Wildlife Biologist
Migratory Fish/Hydropower Program
103 East Plumtree Road, Sunderland, MA 01375
p: (413) 548-8002 ext 8124 |
fws.gov/newengland/FERC/ | facebook.com/usfwsnortheast/

From: John Ragonese <jragonese@greatriverhydro.com>
Sent: Monday, November 9, 2020 12:45 PM
To: Comstock, Gregg <WILLIAM.G.COMSTOCK@des.nh.gov>; Crocker, Jeff <jeff.crocker@vermont.gov>; Grader, Melissa <melissa_grader@fws.gov>; Sprankle, Ken <ken_sprankle@fws.gov>; Kathy Urffer <kurffer@ctriver.org>; Will, Lael <Lael.Will@vermont.gov>; Katie Kennedy <kkennedy@tnc.org>; Simard, Betsy <betsy.simard@vermont.gov>; Davis, Eric <eric.davis@vermont.gov>; Carpenter, Matthew <mathew.a.carpenter@wildlife.nh.gov>; Henderson, Carol <Carol.B.Henderson@wildlife.nh.gov>; Harris, Hannah <hannah.harris@vermont.gov>; Diers, Ted <THEODORE.E.DIERS@des.nh.gov>
Cc: Jennifer Griffin <jgriffin@greatriverhydro.com>; Great River Hydro Coordinators

John Ragonese

From: Comstock, Gregg <WILLIAM.G.COMSTOCK@des.nh.gov>
Sent: Monday, November 9, 2020 7:28 PM
To: John Ragonese
Cc: Jennifer Griffin; Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Mark Allen; rsimmons@normandeau.com; Sarah Allen; Erin O'Dea; Grader, Melissa; Sprankle, Ken; Kathy Urffer; Will, Lael; Katie Kennedy; Simard, Betsy; Davis, Eric; Carpenter, Matthew; Henderson, Carol; Harris, Hannah; Diers, Ted; Crocker, Jeff
Subject: CONFIDENTIAL: NHDES Support of GRH Proposal for Wilder, Bellows Falls, and Vernon
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

John,

As a representative of the New Hampshire Department of Environmental Services (Department) in the confidential stakeholder mitigation discussions with Great River Hydro, regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge the Department's support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

We sincerely appreciate the time and effort devoted by the Great River Hydro team to work with the Stakeholders to achieve this milestone.

Regards,

Gregg

Gregg Comstock, P.E.
Supervisor, Water Quality Planning Section
Watershed Management Bureau
Water Division, NH Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095
Email: gregg.comstock@des.nh.gov
Phone: (603) 271-2983 (it is best to contact me by email)

John Ragonese

From: Henderson, Carol <Carol.B.Henderson@wildlife.nh.gov>
Sent: Tuesday, November 10, 2020 11:50 AM
To: Comstock, Gregg; John Ragonese
Cc: Jennifer Griffin; Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Mark Allen; rsimmons@normandeau.com; Sarah Allen; Erin O'Dea; Grader, Melissa; Sprankle, Ken; Kathy Urffer; Will, Lael; Katie Kennedy; Simard, Betsy; Davis, Eric; Carpenter, Matthew; Harris, Hannah; Diers, Ted; Crocker, Jeff
Subject: RE: CONFIDENTIAL: NHFGD Support of GRH Proposal for Wilder, Bellows Falls, and Vernon
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

Hi John and GRH staff:

As a representative of the New Hampshire Fish and Game Department (NHFGD) in the confidential stakeholder mitigation discussions with Great River Hydro (GRH), regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge the NHFGD's support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

The NHFGD staff greatly appreciates the significant time and effort that the GRH staff have applied into developing this proposal in consultation with stakeholders.

Thank you again for all your efforts.

Carol Henderson, Environmental Review Coordinator
NH Fish and Game Department

John Ragonese

From: Crocker, Jeff <Jeff.Crocker@vermont.gov>
Sent: Monday, November 9, 2020 2:50 PM
To: John Ragonese
Cc: Jennifer Griffin; Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Mark Allen; rsimmons@normandeau.com; Sarah Allen; Erin O'Dea; Comstock, Gregg; Crocker, Jeff; Grader, Melissa; Sprankle, Ken; Kathy Urffer; Will, Lael; Katie Kennedy; Simard, Betsy; Davis, Eric; Carpenter, Matthew; Henderson, Carol; Harris, Hannah; Diers, Ted
Subject: CONFIDENTIAL: VT DEC Concurrence with GRH Proposal for Wilder, Bellows Falls, and Vernon
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

John,

As a representative of the Vermont Department of Environmental Conservation (Department) in the confidential stakeholder mitigation discussions with Great River Hydro, regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge my Department support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

Thank you and GRH for engaging in these discussions,

Jeff

Due to the coronavirus (COVID-19) we are taking additional safety measures to protect our employees and customers and are now working remotely while focusing on keeping our normal business processes fully functional. Please communicate with our staff electronically or via phone to the greatest extent possible since our processing of postal mail may be slowed during this period.

Division staff contact information can be found online here: https://dec.vermont.gov/watershed/contacts.

Thank you for your patience during this challenging time. We wish you and your family the best.

Jeff Crocker, *Supervising River Ecologist*

1 National Life Drive, Davis 3
Montpelier, VT 05620-3522
802-490-6151 / Jeff.Crocker@vermont.gov
www.watershedmanagement.vt.gov

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
RIVERS PROGRAM

John Ragonese

From: Harris, Hannah <Hannah.Harris@vermont.gov>
Sent: Monday, November 9, 2020 3:18 PM
To: John Ragonese
Cc: Jennifer Griffin; Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Mark Allen; rsimmons@normandeau.com; Sarah Allen; Erin O'Dea; Comstock, Gregg; Crocker, Jeff; Grader, Melissa; Sprankle, Ken; Kathy Urffer; Will, Lael; Katie Kennedy; Simard, Betsy; Davis, Eric; Carpenter, Matthew; Henderson, Carol; Diers, Ted
Subject: CONFIDENTIAL: VT FWD Concurrence with GRH Proposal for Wilder, Bellows Falls, and Vernon
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

Dear John,

As a representative of the Vermont Department of Fish and Wildlife in the confidential stakeholder mitigation discussions with Great River Hydro, regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge my Department support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

Thank you and the Great River Hydro team for engaging in these discussions,

Hannah

VERMONT

Hannah Harris, *Streamflow Protection Biologist*

Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3522

802 279-7913/hannah.harris@vermont.gov
www.vtfishandwildlife.com

Due to the coronavirus (COVID-19), the Agency of Natural Resources is taking additional safety measures to protect our employees, partners and customers. We are now working remotely and focused on keeping our normal business processes fully functional. We encourage you to communicate electronically or via phone to the greatest extent possible. Thank you for your patience and understanding that responses may occasionally be delayed

John Ragonese

From: Katie Kennedy <kkennedy@TNC.ORG>
Sent: Monday, November 9, 2020 3:10 PM
To: John Ragonese
Cc: Jennifer Griffin; Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Mark Allen; rsimmons@normandeau.com; Sarah Allen; Erin O'Dea; Comstock, Gregg; Crocker, Jeff; Grader, Melissa; Sprankle, Ken; Kathy Urffer; Will, Lael; Simard, Betsy; Davis, Eric; Carpenter, Matthew; Henderson, Carol; Harris, Hannah; Diers, Ted
Subject: CONFIDENTIAL: TNC Concurrence with GRH Proposal for Wilder, Bellows Falls, and Vernon
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

John,

As a representative of The Nature Conservancy (TNC) in the confidential stakeholder mitigation discussions with Great River Hydro, regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge TNC's support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

Thanks to you and the Great River Hydro team for your contribution and commitment to these discussions.

Katie Kennedy

Kathryn D Mickett Kennedy, PhD
Applied River Scientist

The Nature Conservancy
136 West Street
Northampton, MA 01060

kkennedy@tnc.org
+1 413 586 2349 (office)
+1 413 588 1959 (mobile)

nature.org

John Ragonese

From: Kathy Urffer <kurffer@ctriver.org>
Sent: Monday, November 9, 2020 4:26 PM
To: John Ragonese; Jennifer Griffin
Cc: Great River Hydro Coordinators; Clinton Birch, Jr.; Rebecca Acosta; Grader, Melissa; Comstock, Gregg; Erin O'Dea; Crocker, Jeff; Sprankle, Ken; Diers, Ted; Katie Kennedy; Carpenter, Matthew; Will, Lael; Henderson, Carol; Davis, Eric; Simard, Betsy; Harris, Hannah; Andrea Donlon; Andy Fisk
Subject: GRH's Proposed Operations for the Vernon, Bellows Falls, and Wilder Projects
Attachments: CONFIDENTIAL- FINAL GRH PROPOSAL 11-9-2020.pdf

John,
CRC appreciates the significant effort that you and the GRH staff have put into developing this proposal in consultation with stakeholders.

As a non-agency representative in the confidential stakeholder mitigation discussions with Great River Hydro, regarding future operations under renewed FERC licenses for the Wilder, Bellows Falls and Vernon Projects, to the extent of my authority to do so, and based on the information submitted to date, I acknowledge Connecticut River Conservancy's support of the Proposed Alternative Operations (attached to this email) as the preferred alternative in Great River Hydro's amended relicensing application and, pending any new information that would suggest otherwise, as the proposed operation in both NH and VT Draft 401s to be issued for public comment.

We look forward to reviewing and evaluating the entire application and recognize that it will contain many elements beyond the scope of our conversations and this proposal including fish passage modifications, recreation investments, and other mitigations.

Best,
Kathy

~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Kathy Urffer, (she/her)
River Steward
Connecticut River Conservancy
PO Box 6219 | Brattleboro, VT 05302 | www.ctriver.org
802-258-0413 | kurffer@ctriver.org

Clean water. Healthy habitat. Thriving communities.
Connecticut River Conservancy

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