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

RE: Wilder, Bellows Falls, and Vernon Hydroelectric Projects (FERC Nos. 1892, 1855, & 1904)
Comments on updated study reports and supplemental information

Dear Secretary Bose:

The Vermont Agency of Natural Resources (Agency) herein provides comments on the revised study reports filed by Great River Hydro, LLC. (GGR) for the Wilder (FERC No. 1892), Bellows Falls (FERC No. 1855), and Vernon (FERC No. 1904) hydroelectric projects.

Great River Hydro filed an revised study reports with the Federal Energy Regulatory Commission (FERC) for the lower Connecticut River hydroelectric projects on November 15, 2017 and February 9, 2018. GRH held a study report meeting on March 8, 2018. After reviewing the revised study reports and participating in the meeting, the Agency offers the following comments on the revised study reports.

Comments on Study Reports

Study 2 & Study 3- River Transect and Riverbank Erosion Study Supplement to Final Report

General Comment

Comment: In FERC's Determination on Requests for Study Modifications and New Studies for the River Transect and Riverbank Erosion Study dated July 21, 2017, FERC staff recommended "that Great River Hydro include, in the November 15, 2017 addendum, near-bank velocities associated with multiple water surface elevations (e.g., minimum flow, average project operating range, maximum project hydraulic capacity), as measured at the six sites with ADCPs." This information was not included in the supplemental report.

Section Specific Comment

Section 3.0 – Results and Discussion states, "only 8 out of 21 sites show any potential for sediment entrainment."
Comment: The Agency notes that 8 out of 21 site equates to over 35 percent of sites showing potential for sediment entrainment, which is a significant portion of the sites.

Section 4.0 Conclusion states, "the analysis of sediment entrainment at the monitoring sites further supports the conclusions of Field Geology and Normandeau (2016 and 207[sic]) that flood discharges exceeding operational flows are needed to remove sediment accumulating at the base of the river banks and sustain the erosion cycle that drives the bank erosion within project affected areas."
Comment: While the conclusion above is that flood flows are needed to remove the accumulated sediment at the base of the river banks to sustain the erosion process, the supplemental study indicates that 18 of the 21

sites exhibited a beach features. A number of the features were described as being a wide or narrow "beach fronts bank where the water surface at the minimum and average operating flow rest" in Appendix A – Sediment Entrainment Summary. This statement indicates that water level fluctuation from project operations continual water and dewater the beach type feature at these sites. Daily water level fluctuation has been found to prohibit the growth of natural vegetation. The continual effect of daily water level fluctuations from project operations on beach features is expected to prevent the re-establishment of vegetation on the bank which would provide greater stability and resistance of the river bank to erosional forces. Therefore, in is likely, in part, that operations of the projects play a role in sustaining the erosional cycle in the project affected areas.

Study 18 – American Eel Upstream Passage Supplement No. 2

General Comments

Comment: The stated goals of the 2017 supplemental effort was to collect information on upstream migration of American eels at the Vernon Project throughout the upstream migration season and when the Vernon fish ladder was operated on a normal seasonal schedule. The standard operating window for the Vernon fish ladder is April 15 – July 15. However, during the 2017 supplemental effort the fish ladder remained open until August 7, well into the course of the study. This is problematic given that a primary goal of the study was to determine how well a temporary eel pass might work when the ladder is not operational (i.e., usually after July 15). During this unplanned, extended operating period eels continued to use the fish ladder, with an additional 194 eels passing via the ladder from July 15-27, for a season total of 581 eels (Note: ladder counts beyond July 27 are uncertain due to poor viewing conditions). In summary, results are confounded by the fact that the ladder was open three weeks beyond the normal operating period.

Comment: During the March 8, 2018 updated study report meeting, GRH proposed modifications it intended to make to the fish ladder prior to operations in 2018. The aim of the proposed modifications is to enhance eel passage and improve the reliability of fish passage counts for American eel. The proposed improvements include, installing a mesh floor at the counting window and diffuser outlet and testing substrate (eel tiles) at the exit weir orifice and other locations within the ladder. The Agency support these measures and recommends that dedicated monitoring take place to validate their effectiveness.

Comment: If eel passage objectives will be most efficiently met using the ladder, as data collected to date suggest may be the case, additional information will still be needed to maximize the effectiveness of this structure for conveying eels. For example, understanding how fish of varying sizes move through the ladder, levels of fallback, etc., before and after eel-focused ladder modifications are made will help ensure that such fixes are beneficial. Thus, we recommend the following: (a) GRH should develop a clear plan to describe proposed fish ladder modifications (with intended benefits), fish ladder operating dates, and how these modifications will be evaluated in terms of effectiveness. Ideally GRH would implement a PIT tag study in concert with these efforts so that bottlenecks/problem areas can be efficiently identified and resolved; and (b) to eliminate confounding results, we recommend that the eel ramp be suspended during 2018 eel passage investigation and that the ladder be operated beyond the normal closing date of July 15 to capture the full eel migration period.

Specific section comments

Section 4.3 Length Distribution of Eels provides information on the length of individual eels observed or measured during the supplemental effort. The report indicates that "Eels collected from the ramp trap ranged from 6.5 to 14.2 inches and averaged 9.6 inches." While the majority of the eels observed in the fish ladder were 12 to 18 inches. The report postulates that larger eels use the fish ladder more than some other monitoring sites potential due to their relative ability to navigate the (higher) velocities.

Comment: The data in Table 4.3-3 indicates that over 30 percent of the eels observed in the fish ladder were in the size class of 6 to 12 inches. Although the size class distribution is skewed towards larger eels in the ladder, the observations of smaller eels in the ladder appear indicate the smaller size classes are capable of entering and passing (or attempting to pass) via the ladder.

Study 21 – American Shad Telemetry Study – Vernon Supplement to Final Report

General Comments

Comment: As was discussed during a May 2017 study planning conference call, and embodied in the original study request, a key purpose of Study 21 was to evaluate downstream passage routing and route-specific survival. Whereas the 2017 study improved the understanding of shad's use of different passage routes, and an opportunity to link route use with operating conditions (below), it provides no information about the latter component (survival). Yet, this information is essential to determining how to optimize overall downstream passage success (a function of route, and route-specific survival). In the absence of additional field studies, the Agency would appreciate a proposal from GRH on how it plans to fill this important information gap.

Comment: The report and supplements communicate the data well for independent stakeholder review and analysis (e.g., Appendix 1), particularly for evaluating of linkages between operations and fish routing. Based on this information and the report's discussion of results, the data suggest that (a) passage via spill is the dominant route when flows exceed station capacity and large spill flows occur, and (b) under lower flow conditions, fish have >50% chance of getting downstream without going through the turbine (i.e., via pipe, tube, sluice, or ladder). However, this is only cursory insight and more could have been done to quantify the probability that fish pass via specific routes in relation to operational or flow conditions. Without this information (and the survival info noted above), it will not be possible inform operational scenarios that optimize downstream passage success. We suggest that GRH consider doing such an analysis using the 2017 data and (possibly) 2015 results (for observations of fish with known passage routing).

Comment: Similar to concerns about the 2015 study, flows during the 2017 downstream migration period were consistently above long-term average levels. In the absence of an analysis that narrows the focus (or accounts for analytically) to passage events occurring under more 'typical' conditions, study findings cannot fully inform an understanding of how normal operating conditions impact downstream passage success. Although an additional year of field study may not be necessary, treatment of this issue, at least analytically, is justified.

Comment: More information and analysis about the operational conditions coinciding with individual passage attempts is needed. For example, while the (instantaneous) conditions coinciding with successful downstream passage events are presented, the time that fish spend in the forebay before passing (if successful at all) varies widely. It seems that there is insight to be gained from broadening the temporal view of operations coinciding with successful passage to something wider (e.g., averaged over the period that a fish spent in the forebay area before passing downstream or leaving and returning upstream). This information may help to distinguish flow or operational conditions leading to rapid passage, passage with extensive forebay delay, or failed passage (i.e., fish approaching the dam and then returning upstream to never be seen again).

Thank you for the opportunity and consideration of our comments.

Sincerely,

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Supervising River Ecologist

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