



MASSWILDLIFE

DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

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May 14, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: FirstLight Power
Turners Falls and Northfield Mountain Pumped Storage
FERC Nos. 1889 and 2485
COMMENTS ON UPDATED STUDY REPORTS

Dear Secretary Bose:

The Massachusetts Division of Fisheries and Wildlife (the Division) is the agency responsible for the protection and management of the inland fish and wildlife resources of the Commonwealth. The Division's mission also includes conserving and protecting endangered, threatened and species of special concern pursuant to the Massachusetts Endangered Species Act (MESA; M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). As such, we monitor operations at hydroelectric projects within the Commonwealth, as well as comment on proposed hydroelectric facilities.

The Division has received and reviewed study report addendums filed by FirstLight Power Resources (FL) in March and April 2019 as part of the relicensing of the Turners Falls (TF) and Northfield Mountain Pumped Storage (NMPS) projects (collectively, the Project) located on the Connecticut River in Massachusetts. We offer the following comments based on our review of the study report addendums.

UPDATED STUDY REPORT COMMENTS

Study No. 3.3.1, Conduct Instream Flow Habitat Assessments in the Bypass Reach and below Cabot Station (IFIM) Study Report

- Addendum 5, Yellow Lampmussels in Reach 3 (filed March 2019)
- Addendum 6, Yellow Lampmussels in Reach 4 (filed April 2019)

FERC directed FL to undertake supplemental habitat persistence analyses to better evaluate potential Project impacts to state-listed mussel species in Reaches 3 and 4. The Division appreciates the additional analyses undertaken by FL to assess habitat persistence for state-listed mussels in Reach 3 (requested by the Division in its December 15, 2016 and December 7, 2018 comments to FERC, accession numbers 20161215-5260 and 20181206-5300, respectively, included by reference herein) and Reach 4 (requested by the Division in its December 7, 2018 comments). As detailed below, we recommend that FL: (1) provide previously requested analyses for Reaches 4 and 5 that were not included in Addendums 5 or 6; and (2) revise its methodology for assessing habitat persistence for state-listed mussels and present an updated analyses in a supplemental study report for stakeholder review and comment.

As outlined in our December 7, 2018 comments, habitat persistence for juvenile Yellow Lampmussels in Reach 3 appears to be significantly impacted by variable, peaking flows from Cabot Station. The figures presented in Addendum 3 of the Study Report (May 2018, Appendix B-1) clearly show that peaking flows from Cabot Station – which tend to occur on a daily or near daily basis during the summer months – result in significant shifts in the location of suitable habitat for juvenile mussels from the southern to the northern portions of Reach 3. These shifts are the result of elevated velocities and shear stress, which likely preclude settlement and render otherwise suitable habitats (particularly in the southern portion of Reach 3) inaccessible to juvenile mussels. These shifts also confirm that relying solely on total weighted usable area (WUA) to assess potential impacts of Project operations on state-listed mussels would be misleading because the geographic location of suitable habitat changes considerably across variable Cabot flows.

Elevated velocities and shear stress from peaking flows also appear to be a limiting factor for juvenile state-listed mussels (Yellow Lampmussel, state-listed as Endangered; Tidewater Mucket and Eastern Pondmussel, state-listed as Special Concern) in significant portions of Reach 5, with shear stress exceedance increasing within increasing proximity to Cabot Station (see our December 7, 2018 comments). Increased shear stress exceedance with increasing proximity to Cabot Station mirrors both the distribution and relative abundance of state-listed mussels in Reach 5. Severe impacts are documented in the 22.73 miles of the Connecticut River between Cabot Station and the Mill River confluence, representing the northernmost area where live state-listed mussels have been observed (Figure 2.3-2 of Addendum 2). The abundance (and catch per unit effort) of state-listed mussels doesn't increase significantly (>10 mussels per survey transect) until reaching River Mile 94.87, 4.5 miles further downstream and 27.23 miles south of Cabot Station.

Overall, FL Study Reports demonstrate that Project operations – and peaking from Cabot Station during the summer months specifically – result in elevated velocities and shear stress. Elevated velocities and shear stress reduce habitat persistence and likely preclude settlement and colonization by juvenile state-listed mussels in otherwise suitable habitats, controlling and limiting the distribution and abundance of state-listed mussels within significant portions of the Connecticut River influenced by the Project.

Given these impacts, the Division recommended and FERC ultimately required that FL evaluate Project effects on Yellow Lampmussels in Reach 4. In our December 7, 2018 comments, the Division specifically recommended that FL fulfill the following tasks: (1) expand the Reach 5 mussel assessment to Reach 4, including in evaluation of how Project operations affect shear stress (juvenile mussels) and WUA (juvenile mussels and host fish guilds); and (2) conduct a habitat persistence analysis for state-listed mussels in Reaches 3 and 4. Although not specifically addressed in FERC's January 22, 2019 study plan determination, the Division also recommended that FL (3) conduct a habitat persistence analysis in Reach 5.

Based on a review of Addendums 5 and 6 of the Study Report, the Division finds that FL failed to expand the Reach 5 mussel assessment to Reach 4 (Task #1) or conduct a habitat persistence analysis for Reach 5 (Task #3). **Therefore, we request that FERC direct FL to provide** WUA figures, dual flow analysis tables and shear stress analysis maps (similar to Appendices C, D and E of Addendum 2) for state-listed mussels at representative transects in Reach 4. FL should also provide WUA figures for host fishes in Reach 4, as well as updated WUA figures for host fishes in Reach 5 with WUA shown as a percentile based curve (with percent of maximum WUA on the vertical axis). **In addition, we request that FERC direct FL to**

conduct a revised habitat persistence analysis for Reach 5, consistent with the Division's recommendations below regarding appropriate methodologies for this analysis. These updated analyses should be provided in a supplemental study report.

In Addendums 5 and 6 of the Study Report, FL analyzed habitat persistence for Yellow Lampmussel in Reaches 3 and 4, respectively. FL has not yet analyzed habitat persistence for state-listed mussels in Reach 5, as noted above. In these Addendums FL uses a cohort-specific analysis based on flows from the operations model between 1962 and 2003, and evaluates habitat persistence over the entire range of natural and operational flows during that period. For early lifestage juvenile mussels, the analysis correctly focuses on the June 1 through September 31 period, the critical time in which early lifestage juveniles release from host fishes and seek to settle into suitable habitat. Based on its analysis, FL concludes that suitable habitat for Yellow Lampmussel mussels within Reaches 3 and 4 is highly limited, and that the primary driver is high flow events (beyond the control of the Project, defined here as flows exceeding 16,000 cfs) that greatly reduce habitat availability / persistence for early lifestage juvenile mussels.

Unfortunately, this methodology is fundamentally flawed because FL assumes that natural high flow events between June and September are the key driver of habitat persistence for early lifestage juvenile mussels. Using FL's assumptions, habitat for early lifestage juveniles would have to persist without a high flow event for four months straight (between June and September) in order to be considered persistent habitat. Use of natural high flow events as the primary driver of habitat persistence for early lifestage juveniles therefore drastically underestimates the actual extent of suitable habitat in Reaches 3 and 4. As a result, FL's methodology masks the impacts of Project operations on early lifestage juveniles and state-listed mussels overall.

As stated in the Division's previous comments, natural high flow events are drivers of habitat suitability for adults and later lifestage juveniles. These natural high flow events – including both winter/spring freshets as well as occasional but short-lived summer high flows associated with significant rainfall events - determine the location and stability of suitable substrates. However, natural high flows do not establish the baseline for determining the extent of suitable and persistent habitat, as FL argues; instead, they are a natural part of riverine systems to which native mussels are adapted. For example, based on an analysis of estimated natural flows between 2003 and 2011 in the Connecticut River, high flow events in the Connecticut River occur an average of 5 times (and vary between 3 and 7 times) between June and September. With high flow events lasting an average of 4 days in duration, summer high flows characterize between 12 and 28 days (or 10 – 23%) of this 122 day period. This represents the expected, normal frequency and duration of high summer flow events to which the species are adapted.

In an unmanaged riverine system, early lifestage juveniles release from host fishes over the course of an entire season (June through September). They settle and establish themselves in suitable habitat during the lower flow periods that persist for long stretches in between the infrequent, typically short duration high flow events described above. Once settled, early lifestage juveniles quickly burrow down into suitable substrates, where they are not subject to displacement from high flows. In these protected depths, they feed and grow until large enough to feed at the substrate-water interface as later lifestage juveniles. Except for flow events great enough to result in bedload mobilization, later lifestage juveniles and adults are large enough to avoid re-suspension by the periodic high flows it would naturally experience at the substrate-water interface.

Occasional high flow events would temporarily affect the ability of early lifestage juveniles to settle in otherwise suitable habitat while the natural high flows persist. An abnormally wet year with regular and persistent high flow events during the summer months could reduce early juvenile recruitment that year in whole or part. However, abnormally wet years are balanced by more typical years with fewer high flow events as well as drought years with only occasional high flow events. In typical as well as drought years, early lifestage juveniles have time to settle and establish themselves in otherwise suitable habitat during the low flows that persist between occasional high flow events. Although these species are adapted to stochastic variation in recruitment, they are not adapted to the significant and widespread annual recruitment losses that occur under current peaking operations from the Project.

As stated in our December 7, 2018 comments, “natural high flow events are only drivers of habitat suitability for adults and later lifestage juveniles and need not be included in the analysis.” **The Division has and again requests that FL assess habitat persistence for early lifestage juveniles using various base and peak flow combinations within the limits of Project operations.** FL correctly employed this approach for immobile target species in Reach 3 in its October 2016 Final Study Report (Section 5.5.3), so the Division is requesting that FL employ the framework of an existing methodology and apply it to state-listed mussels. This assessment should generate habitat persistence tables similar to those included in Appendix H of the October 2016 Study Report, which will show how the amount of persistent habitat varies across a variety of bypass (0-14,000cfs) and Cabot (0-14,000cfs) flow combinations.

Although the Division did not specifically request FL to compare habitat persistence between baseline Project operations and run-of-river (ROR) conditions, we appreciate FL’s effort and agree that this comparison could provide useful information *if* the habitat persistence analysis is conducting per the guidelines above. Unfortunately, the flaws in the analysis articulated above make FL’s comparison unusable. We encourage and support FL comparing habitat persistence between baseline Project operations and ROR conditions, but **the Division requests that FL clarify how it proposes to define / model ROR conditions and that it use the revised habitat persistence analysis detailed herein.**

The errors in the habitat persistence analyses highlight that FL is not adequately consulting with the Division in its assessment of how Project operations are impacting state-listed mussels in the Connecticut River. Unfortunately, in some cases FL has also ignored science-based recommendations from the Division. As a result, FL has employed flawed methodologies that have yielded inaccurate and misleading results, leading to repeated analyses and an inefficient evaluation process. Therefore, and in advance of preparing its updated habitat persistence analysis for state-listed mussels in Reaches 3, 4 and 5, the Division highly recommends that FL submit a draft methodology for conducting (and reporting) the updated habitat persistence analysis to the Division and the U.S. Fish and Wildlife Service for review and confirmation. More consistent consultation with the Division will help ensure a more efficient and accurate evaluation of Project operations.

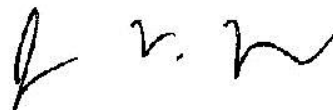
Thank you for this opportunity to comment. If you have any questions regarding this letter, please contact Jesse Leddick, Chief of Regulatory Review, at (508) 389-6386 or jesse.leddick@state.ma.us.

Sincerely,



Caleb Slater, Ph.D.
Anadromous Fish Project Leader

Sincerely,



Jonathan V. Regosin, Ph.D.
Deputy Director