August 28, 2013

Karl Meyer, M.S., Environmental Science
85 School Street, # 3
Greenfield, MA 01301

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

Stakeholder Comments, RE: FirstLight Hydro Generating Company's ***Revised*** **Study Plan (RSP**) for Northfield Mountain Pumped Storage Project, **FERC Project No. 2485-063;** and Turners Falls Hydroelectric Project, **FERC Project No. 1889-081**

Dear Secretary Bose,

Please consider the following comments, changes and proposed improvements to FirstLight Hydro Generating Company's ***Revised*** **Study Plan** (RSP) in order to achieve the best measurable outcomes for the public's interest in a balanced and functioning Connecticut River ecosystem as you consider new licenses for hydropower generation at these two projects.

Comments refer to RSP #s: **3.2.2; 3.3.2; 3.3.3; 3.3.6; 3.3.8; and 3.3.19**.

Comments:

3.2.2 Hydraulic Study of Turners Falls Impoundment, Bypass Reach (~~power canal~~-now excluded) and below Cabot Station

Study of power canal hydraulics, as requested by FERC, is a key need. In comments filed in response to FirstLight's Updated Proposed Study Plan, (UPSP) the Connecticut River Watershed Council also cited the need for this information: *"This study should include a hydraulic analysis of the Turners Falls canal, since upstream and downstream passage goes through the canal. "*

FirstLight's desire to exclude the power canal from this study as unnecessary due to fairly steady WSEL values does not address need for a full understanding of canal hydraulics. The canal's role as the main channel for the bulk of the Connecticut's flow throughout the year makes this information critical. In this sense, the canal should also be fully considered as a **littoral zone**.

UNDER **Study Goals and Objectives**: "Provide WSEL (depth) and mean channel velocity information to help inform other environmental, geologic and recreation studies as listed above. For example, a study will be conducted to locate spawning habitat in the Turners Falls Impoundment. As part of that study, data will be collected on the depth of the spawning habitat. The hydraulic model results will be used by that study to assess whether Turners Falls Impoundment fluctuations could impact spawning habitat."

FirstLight also notes that their proposed model *"also yields information on the river's depth and mean channel velocity at a given location(transect)."*

Depth and mean channel velocity information for the canal are key needs—as the canal is proposed as the major route for migratory fish. Steady and Unsteady State Modeling is necessary for the canal. Turbulence, depth and velocity information will be key to revealing the reasons for the "canal bottleneck" which has crippled this migration channel since it was adopted. The upper canal and extreme turbulence extending downstream of the head gates needs full-scale modeling, as does the thalweg, depth and velocity in the mid-canal region, and the Cabot forebay area.

Information gained by pursuing this study will inform other studies including, Study No. 3.3.6 Impact of Project Operations on Shad Spawning, Spawning Habitat and Egg Deposition in the area of the Northfield Mountain and Turners Falls Projects, Study No. 3.3.13 Impacts of the Turners Falls Project and Northfield Mountain Project Operations on Littoral Zone Fish Habitat and Spawning. Canal hydraulic information would also inform erosion and deposition Study No. 3.1.2 Northfield Mountain/Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability, as it is also a major receptacle for silt, accumulations reaching depths of 3 – 4 feet in drawdown operations.

Given recent fish passage increases at Holyoke Dam, it is feasible that building a facility to lift migratory fish out of the CT River and into the TF Canal below Cabot Station **could divert as many as 100,000 fish into the canal over a period of a few days**. Recent work by USGS Conte Anadromous Fish Research Center showed **American shad spending an *average* of 25 days in the power canal**. Researchers did not investigate whether this was a signature of **fish mortality, spawning, or milling**.

The entire canal needs inclusion, both in Steady and Unsteady State Model testing.

Existing Information and Need for Additional Information (18 CFR § 5.11(d)(3))

FirstLight's Water Level Recorders (River Stage)" The Water Level Recorders deployed by FL in 2012 that supplied **"limited data"** from the By Pass Reach and below Station 1 **should be removed from "existing information" status**. WSEL monitoring in this reach needs to be redone. Several more monitors at key sites are needed to protect resident and migratory fish, as well as the **federally-endangered shortnose sturgeon**, which gathers for **pre-spawning*(see note below) in the pool immediately below the Rock Dam**, and--when flow allows, chooses to spawn there.

"For 10 years between 1993 and 2007, adult sns were present at Rock Dam for 5 years prior to spawning occurring anywhere (Rock Dam or Cabot Station). During the 5 years they were present, the mean number of adults present was 10.4 (range, 3-25***). Thus, many adults moved to the Rock Dam spawning site before any spawning occurred at Cabot Station suggesting they preferred to spawn at Rock Dam***."

Note *: *personal communication* from Dr. Boyd Kynard, fish behaviorist and CT River shortnose sturgeon expert:

Need for Additional Information

Hydraulic modeling and WSEL monitors should remain in place a full year to capture the range of generational and seasonal flow conditions.

Additional WSEL monitors needed. In order to protect pre-spawning and spawning of shortnose sturgeon in this reach of river **additional WSEL monitors** should also be placed at: **1.** In the pool immediately below Rock Dam, **2.,** on the west side of the river, in the main stem channel, **upstream** of **Rawson Island** which is adjacent to, and just west of the Rock Dam. That Rock Dam ledge continues through the island and reemerges as part of the thalweg near the river's west bank, **3., in the river channel above Station 1 tailrace.**

3.3.2 ***Evaluate Upstream and Downstream Passage of Adult American Shad***

USFWS, in response to FL's Updated Proposed Study Plan (UPSP), states that **two years** of study are required. The National Marine Fisheries Service (NMFS) and Trout Unlimited (TU) also requested a two year study in their UPSP comments. I concur; **two years of evaluation are required**.

Study Goals and Objectives (18 CFR § 5.11(d)(1))

"The goal of this study is to identify the effects of the Turners Falls and Northfield Mountain Projects on adult shad migration. The study objectives are to:"

Add: "Determine route selection, behavior and **migratory delays** of upstream migrating American shad through **the entire Turners Falls Power Canal.**"

Add to "Describe the effectiveness of the gatehouse entrances;" …

ADD IN: "and describe the behavior of migratory American shad in the Turners Falls Power Canal **within 500 feet** of the gatehouse entrances."

ADD IN: "Evaluate attraction for shad reaching the dam spillway under a range of spill conditions." **Note**: Since **a lift** is being considered at this site, evaluating **spillway attraction** is most important.

"Evaluate attraction, entrance efficiency and internal efficiency of the spillway ladder for shad reaching the dam spillway, under a range of spill conditions;" ***see immediately below***.

Footnote 35 *"This may be achieved with existing information; FirstLight is awaiting data from the USGS Conte Laboratory."*

NOTE: USGS has done 6 years (2008 – present) of study and data collection at Spillway and Gate House. All of it remains **"preliminary"**—hence never finalized, or peer-reviewed. Only "finalized" study data and findings should be included in FERC study plan design, and made available to all stakeholders for review. All studies are partially FirstLight funded.

The Need for Additional Information

Under **Task 1**. "Review existing information:" Only finalized USGS study information should be considered.

Task 2: Study Design and Methods

Sample Size:

USFWS, in response to FL's Updated Proposed Study Plan (UPSP), requests an increase in the number of tagged fish across the study. I concur. USFWS also specifically cited a need for **50 double-tagged, and 50 PIT tagged (100 total)** shad to be released into the TF canal at the Cabot Station Forebay. I concur. This is much-needed, missing information in evaluating route selection and delay through a main migratory route—TF canal.

Monitoring Locations:

I also concur with USFWS's UPSP request for a **monitoring station in the vicinity of the Conte fish passage building** with detection extending across the entire width of the power canal. This would begin to fill in information in the black hole of shad passage through the canal.

USFWS commented in their UPSP response on the need for **active radio telemetry monitoring stations at the entrance and exits to the three fish ladders (Cabot, Spillway and Gatehouse ladders)**. I concur with this also. There is a critical need to understand where fish are aggregating at these key passage sites. Deploying telemetry to sweep data from these sectors will provide a clearer picture of migratory fish route selection and delay. (Deployment will also enrich the information about migratory fish movement when Study **3.3.19** *Evaluate the Use of an Ultrasound Array to Facilitate Upstream Movement to Turners Falls Dam by Avoiding Cabot Station Tailrace* is conducted.)

Again concurring with USFWS's July 2013 UPSP comments, I agree that **two monitoring arrays are needed at Station 1 in the By Pass Reach: one to detect fish attracted to the Station 1 discharge, and one to document fish that continue upstream toward the dam.** This will produce data to ensure that fish are not relegated to a migratory dead end, or continual delay due to the secondary attractions flows encountered at Station 1 tailrace.

In their RSP, FirstLight proposes that "**Manual tracking will also occur at least once per week** to determine the locations of the tagged shad. The tracking crew will cover the entire study area until the entire project area from Holyoke to Mount Herman School is checked or until all radio-tagged fish have been located."

Twice per week manual tracking should be undertaken—given the brief (five week) period of study, unforeseen weather and flow conditions, and the broad sweep of river to be covered.

Under: **Video Monitoring**

In comments on the UPSP, USFWS recommends a video monitor be placed at the entrance to Cabot Ladder. I agree with USFWS that video monitoring be again used at the Cabot Ladder entrance. It has been important to preceding studies. No good rationale is supplied for excluding it at this time.

FirstLight, in the RSP, now states in response that "**Video monitoring will not occur at the Cabot ladder** since this facility has been studied numerous times over many years."

This rationale is insufficient and unfounded. Information garnered from using this equipment will also inform Studies **3.3.2**, *Upstream and Downstream Movements of Shad*, **3.3.6**, *Impact of Project Operations on Shad Spawning*, and **3.3.19**, *Evaluate the Use of an Ultrasound Array to Facilitate Upstream Movement to Turners Falls Dam by Avoiding Cabot Station Tailrace.* Given the test flow regimes and ensonification testing to be employed at this site during relicensing,

this is a critical site in which to deploy video verification equipment to detect the presence or absence of fish.

Video monitoring at the Spillway Ladder is also insufficient. Video monitoring should be done at the entrance to the Spillway Ladder. Again, this will inform Studies **3.3.2**, *Upstream and Downstream Movements of Shad*, **3.3.6**, *Impact of Project Operations on Shad Spawning*, and **3.3.19**, *Evaluate the Use of an Ultrasound Array to Facilitate Upstream Movement to Turners Falls Dam by Avoiding Cabot Station Tailrace.*

3.3.3 *Evaluate Downstream Passage of Juvenile American Shad*

Task 3: *Turbine and Dam Passage Survival*

Evaluations should be done for **all turbines**, **with all turbines operating**, at both Cabot and Station 1, to capture the broadest range of conditions at these sites.

3.3.6 *Impact of Project Operations on Shad Spawning, Spawning Habitat and Egg Deposition in the Area of the Northfield Mountain and Turners Falls Projects*

Under: ***Existing Information and Need for Additional Information (18 CFR § 5.11(d)(3))***

Task 2: *Examination of Known Spawning Areas Downstream of Turners Falls Dam*

In comments on FL's UPSP, Massachusetts Division of Fish & Wildlife (MDFW) and the Connecticut River Watershed Council (CRWC) state that shad spawning in the Turners Falls Power Canal needs to be investigated. I concur, and again restate my position that a critical need is to know whether these fish are spawning in the TF Power Canal, milling in the canal, or whether they have expired.

Information on American spawning and spawning habitat ***is missing*** for the pool where *shortnose sturgeon spawn*, **the Rock Dam Pool**, immediately downstream of that notched ledge in the river. Impact of project operation on this spawning site is needed.

3.3.8 *Computational Fluid Dynamics Modeling in the Vicinity of the Fishway Entrances and Powerhouse Forebays*

Existing Information and Need for Additional Information (18 CFR § 5.11(d)(3))

I concur with MADFW and CRWC—both state in their responses to FL's UPSP **that CFD modeling in the Station No. 1 tailrace is needed to determine potential impacts to upmigrating fish through the bypass reach.**

Note: **Three-dimensional CFD Modeling should be conducted--extending 500 feet downstream of the Gate House** in the **Turner Falls Power Canal** to capture the influence of the 14 head gates at the dam on migratory **fish behavior and delay**.

3.3.19 *Evaluate the Use of an Ultrasound Array to Facilitate Upstream Movement to Turners Falls Dam by Avoiding Cabot Station Tailrace*

Existing Information and Need for Additional Information

USFWS and TU both state in their response to FL's UPSP that this is a needed study—hence, not contingent on prior study results. I agree. **This study should be conducted regardless of any results from 3.3.1 and 3.3.2.** FL's rationale potentially excluding this study is tepid, at best.

This study should have a two-year deployment.

USFWS also responded to the UPSP stating that hydroacoustics should be used to evaluate how shad respond to the ultrasound array: "Hydroacoustic data should be analyzed to determine the relationship between the number of targets in the vicinity of the Cabot tailrace and ultrasound treatment." The use of hydroacoustics, already adopted for some of FL's study proposals, would add a critical element to this study—understanding how aggregations of fish near Cabot Station Tailrace respond to the on/off ultrasound array.

I also agree with USFWS and TU in their response to the UPSP that **video cameras should be deployed inside the Cabot ladder and outside of the entrance to capture the presence/absence and directional movement of fish when the ultrasound array is switched on and off.**

TU further requests that this study cover a four-week time frame in order to have a chance to produce significant results. I agree, a four-week trial is necessary to control for unforeseen flows, weather, etc.

End of Formal Comments

Thank you for this opportunity to participate in improving license requirements and protecting the Connecticut River ecosystem for future generations.

Sincerely,
Karl Meyer, M.S.

Document Content(s)