

July 14, 2013

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85 School Street, # 3
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Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
88 First Street, N.E.
Washington, DC 20426

Stakeholder Comments, RE: FirstLight Hydro Generating Company's *Updated Proposed Study Plan (PSP)* 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 ***Updated Proposed Study Plan (PSP)*** 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 operating licenses for hydropower generation at these two projects.

Comments refer to Updated PSP #s: 2.2.1; 2.3.1; 3.2.2; 3.3.1; 3.3.2; 3.3.3; 3.3.5; 3.3.6; 3.3.7; 3.3.8; and 3.3.19.

Comments:

2.2.1 & 2.3.1: Proposed Changes to Project Operation

FL Updated Proposed Study Plan, Numbers 2.2.1 and 2.3.1: Operator is considering additional generation by adding volume, flow and velocity in, 1(p.2-15): the Turners Falls Power Canal at either **Station #1** or **Cabot Station**, or operating **Cabot Station** at full capacity; and, 2(p-2-35): at the **Northfield Mountain Project**. Hydraulic capacity increase at TF/Cabot sites, and at Northfield Mountain would be near 2,000 CFS respectively.

Any back-dated decisions in adding generation at these two licensed sites may impact the effectiveness and criteria of studies that will be implemented in the interim, and may prove confounding to the two-year study regimen. Both would certainly impact downstream habitats and flows. **What criteria** is FirstLight looking at when deciding on new generation requests—and when will they reveal their choices?

3.2.2: Hydraulic Study of the Turners Falls Impoundment, Bypass Reach, ("power canal"—now omitted by FL) and below Cabot Station

Note: Hydraulic study of the TF Power Canal is a **key need** if this is again to be considered an **upstream route for migratory American shad**. After 14 years of continuous study and project improvements near the head of the Turners Falls Canal, Gate House fish passage numbers are no more improved--nor consistent, compared to numbers of fish passing Holyoke Fish Lift, than they were a quarter century ago: Holyoke Lift versus the actual percent that were able to pass

up through the TF Power Canal and through the Gatehouse: *(Figures from the Connecticut River Atlantic Salmon Commission Tech. Committee Meeting, Secretary's Report: 6/18/2013)*

Gatehouse passage success: 1989: 2.7%; 1990:7.8%; 1991:10.5%; 1992: 8.3%; 1993:3.0%

Gatehouse passage success: 2009: 2.4%; 2010:10.0%; 2011:6.9%; 2012:5.4%; 2013: 9.2%.

(p. 3-50) *"FERC has requested that FirstLight develop an unsteady state HEC-RAS model in the Turners Falls Impoundment, bypass reach, **power canal**, and below Cabot Station to the upper limit of the Holyoke Impoundment."*

FirstLight states that a hydraulic study of the TF power canal is **unnecessary**, as surface (WSEL) elevations fluctuate very little. *"Given the power canal's limited WSEL fluctuations, FirstLight does not believe a hydraulic model of the power canal is warranted."*

FERC is correct. A full hydraulics study of the TF Canal is needed. It is necessary as baseline information if migratory fish continue to be diverted into the power canal. It will also be critical information if generating capacity in the TF Canal and upstream at the Northfield Project is increased by 2,000 cfs, respectively(**2.2.1 & 2.3.1**). This would certainly impact hydraulics at the head gates and downstream in the power canal.

There are 14 head gates at the TF Gatehouse flushing directly into the TF Power Canal. Surface level elevations have very little to say about actual flow hydraulics at this site. Those head gate openings and the fluctuating head-levels from the TF Impoundment behind the dam create a region of extreme turbulence in the canal running some 500 feet downstream from Gatehouse. This is one of the bottlenecks in the power canal route that has not been overcome after 43 years of study and structural changes in this upstream route.

When the agencies and the public were taken on FERC site visits, only one group in three was given a tour of this side of the TF Gatehouse. At that time, only 4 head gates were open. The canal appeared a relatively calm place. When all head gates are open—as the Northfield Project and Cabot are run in peaking modes, or the TF Canal is run at baseload capacity through the day, this region is a boiling-roll of water. Surface speeds reach nearly 10 mph (as monitored by cyclists on the canal path). We need to know how this affects velocity and turbulence throughout the water column

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**. Nor has the TF canal ever been investigated as **spawning habitat**—which would have been logical, given those lengths of stopover. American shad notably do not do well with stress. Piling up the population in a power canal will likely **result in major migratory delays and increased mortality**—which needs a full investigation if this path remains an option.

This should be a two-year effort, to control for differences in flow years, fish tagging and handling, and to assure that full acoustic coverage is gained through proper array deployment.

American shad have not been able to negotiate this region of high turbulence since this canal route was chosen for them in 1980. At Holyoke, as well as at Vernon Dam, fish follow attraction water that leads them directly upstream to the dams. Rates of passage at both are within the acceptable range of 40-60% that the agencies have set as targets. When the Connecticut River above Cabot Station—aka, the Bypass Reach, was allowed to be de-watered in deference to this power canal route, ***shad and herring were expected to locate and negotiate a series ladders, turns, turbines, and turbulence at a half dozen canal sites in order to reach upriver spawning areas.*** It's a migratory knot; created by humans.

The Connecticut River migratory fisheries restoration effort risks repeating **four new decades of failure** if it again ignores logic. The TF Power Canal is in need of a full hydraulic study.

Hydraulic modeling must be done here in order to avoid another migratory fisheries restoration disaster at Turners Falls. Northern Massachusetts, Vermont and New Hampshire have yet to see their guaranteed shares of the targeted shad and herring runs, nor has the program achieved anything near its stated goals: **“The intent of this program is to provide the public with high quality sport fishing opportunities in a highly urbanized area as well as to provide for the long term needs of the population for food,”** as stated in the **New England Cooperative Fisheries Statement of Intent in 1967.**

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

Please **ADD** to Existing Information: ***Life history and behaviour of Connecticut River shortnose and other sturgeons, 2012***, Kynard et al, World Sturgeon Conservation Society publications, **ISBN: 978-3-8448-2801-6**. Available through the North American Sturgeon and Paddlefish Society at: www.nasps-sturgeon.org/#!/publications , or directly from Dr. Kynard at: kynard@eco.umass.edu. ***Chapter 3-Migrations, Effect of River Regulation*** documents over a decade of highly relevant studies.

FirstLight's Water Level Recorders (River Stage)” The Water Level Recorders deployed by FL in 2010 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 in the pool immediately below the Rock Dam**, and--when flows allow, chooses to spawn there.

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

“For 10 years between 1993 and 2007, adult snos 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.” (Refer to chapters 1 & 3, ***Life history and behaviour of Connecticut River shortnose and other sturgeons, 2012***, Kynard et al, World Sturgeon Conservation Society publications, **ISBN: 978-3-8448-2801-6**. Available through the North American Sturgeon and Paddlefish Society at: www.nasps-sturgeon.org/#!/publications , or directly from Dr. Kynard at: kynard@eco.umass.edu

Need for Additional Information (3-53): Where, exactly, did FL locate WSEL monitors in the By Pass Reach? How do they intend to guard against “vandalism” ruining further data collections?

Add to information list for specific information on this reach: Life history and behaviour of Connecticut River shortnose and other sturgeons, 2012, Kynard et al, World Sturgeon Conservation Society, publications, **ISBN: 978-3-8448-2801-6**.

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.

3.3.1 *Conduct Instream Flow Habitat Assessments in the Bypass Reach and below Cabot Station*

If migratory fish are again to be **diverted into the TF Power Canal via a new lift** in the river near Cabot outflows (proposed), special consideration needs to be made when considering siting the lift facility.

Federally-endangered shortnose sturgeon will likely enter the lift, and there exists the risk of putting them into the power canal where there is potential for **turbine mortality**.

Migratory delay: another reason for special care in considering diversion is **migratory delay for American shad and blueback herring at this site. If a lift gets built at Cabot, there will be a need for full-time monitoring personnel in order not to risk sending SNS into the canal.** Just as at Holyoke, with Atlantic salmon monitoring, **the lift would then have to shut down—sometimes for weeks at a time, due to turbidity and the risk of NOT identifying a migrant salmon**(or in this case, a federally endangered SNS). This type of migratory delay would not likely be acceptable to the agencies, or FL (see **FL’s added text** about “**without delay**” under **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 (18 CFR § 5.11(d)(3))

The IFIM Study needs to be conducted with increased WSEL monitors given FL’s stated intent to potentially increase generation and flow at the Northfield Project, Station 1, and Cabot Station.

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 in the pool immediately below the Rock Dam, and--when flows allow, chooses to spawn there.

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

“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.” (Refer to chapters 1 & 3, ***Life history and behaviour of Connecticut River shortnose and other sturgeons***, 2012, Kynard et al, World Sturgeon Conservation Society publications, ISBN: 978-3-8448-2801-6. Available through the North American Sturgeon and Paddlefish Society at: www.nasps-sturgeon.org/#!/publications , or directly from Dr. Kynard at: kynard@eco.umass.edu

Need for Additional Information (3-53): Where, exactly, did FL locate WSEL monitors in the By Pass Reach? How do they intend to guard against “vandalism” ruining further data collections?

*Information list for specific information on this reach, ADD: ***Life history and behaviour of Connecticut River shortnose and other sturgeons***, 2012, Kynard et al, World Sturgeon Conservation Society, publications, ISBN: 978-3-8448-2801-6. Available through the North American Sturgeon and Paddlefish Society at: www.nasps-sturgeon.org/#!/publications , or directly from Dr. Kynard at: kynard@eco.umass.edu*

Additional WSEL monitors needed to capture fuller By Pass flows profile. 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.

Table 3.3.1-1: Target Species and Life Stages Proposed for the IFIM Study Reaches.

Under Reach 1 & 2: **blueback herring:** add “**spawning**”—as New England Cooperative Fisheries Research Studies document BBH spawning in this reach, at the mouth of the Fall River.

Under Reach 1 & 2: **shortnose sturgeon:** add “**pre-spawning.**”

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

“For 10 years between 1993 and 2007, adult snos 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.”

3.3.2 Evaluate Upstream and Downstream Passage of Adult American Shad

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 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: Develop Study Design

As per FERC request, a radio and PIT tag study of the **entire Turners Falls Power Canal** should be included in this study.

Task 3: Evaluation of Route Selection and Delay

Under: **Radio Telemetry Tracking:**

Add in:

“Tagged fish will be tracked throughout the **Turners Falls Power Canal** during both upstream and downstream migration with fixed antennae and mobile tracking; using PIT tags in addition to radio telemetry tags.”

“Additional tagged individuals may need to be released farther upstream (Turners Falls power canal, * **(ADD IN: “top of Cabot Station Ladder,”)** upstream of Turners Falls Dam), to ensure that enough tagged individuals encounter project dams on both upstream and downstream migrations, that these individuals are exposed to a sufficient range of turbine and operational conditions to test for project effects, and to provide adequate samples sizes in order to address the objectives.”

Under: **Video Monitoring**

Video monitoring at the Spillway Ladder is insufficient.

Note: Video monitoring is insufficient in determining the number of fish attracted to the spillway. It will only register fish that can FIND the Spillway Ladder Entrance. This is confounded by a range of competing flows, water levels present in the By Pass, and spill from the dam. A full range of telemetry tracking needs to be employed at the TF Spillway—not simply at the Spillway Ladder and SL Entrance.

Task 4: Evaluation of Mortality

Note: Preliminary USGS TF Canal studies have suggested uninvestigated data indicating mortality within the Turner Falls Power Canal. **Mortality tagged fish and data should be collected throughout the entire TF Power Canal, to correct for overall mortality.**

The number of fish suggested to be fitted with mortality tags is insufficient in all these studies, and should be increased by a factor of two.

Table 3.3.2-1: Proposed locations and types of monitoring and telemetry equipment proposed for the upstream and downstream passage of adult shad study.

ADD in: (to identify migration routes and delays):

After “Cabot Ladder”, add new location: **Eleventh Street Canal Bridge: PIT Tag Reader**
Before “Rawson Island”, **add new** location: **TF Power Canal, 400 feet downstream of Gate House.** PIT Tag Reader and Lotek SRX.

Also before “Rawson Island”, add new location: **“Rock Dam Pool, immediately downstream of Rock Dam.”** Lotek SRX.

After “Turners Falls Spillway Ladder,” **add: Turners Falls Spillway, Montague Dam.** Lotek SRX; followed by **a new location, add in: Turners Falls Spillway, Gill Dam.** Lotek SRX.

QUESTION: What is the exact location considered for “Below Turners Falls Dam” ?

3.3.3 Evaluate Downstream Passage of Juvenile American Shad

Task 3: Turbine 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.

3.3.5 Evaluate Downstream Passage of American Eel

Level of Effort and Cost (18 CFR § 5.11(d)(6))

Study ticket price is **too expensive**.

“The estimated cost for this study is approximately between **\$350,000 and \$450,000.**”

Note: Costs of this American Eel Study are **prohibitive**, particularly since there is no benchmark data on the ecosystem importance of eels above Mile 122, TF Dam.
*This rivals the costs of all studies supported to assess migration and mortality of **American shad**, a restoration target species to Vermont and New Hampshire for 46 years.*

A significant proportion of that money could best be used to increase the scope of study: **3.3.2, and 3.3.7: Evaluate Upstream and Downstream Passage of Adult American Shad; and 3.3.7 Fish Entrainment and Turbine Passage Mortality Study.** *These could then include a full study of the Turners Falls Power Canal--and increasing the number of mortality-tagged fish.*

Cost effectively, a literature survey, and results from Holyoke Dam studies and Cabot data collection should suffice to gauge survival of American eel at Turners Falls/Cabot/Northfield. A portion of the funding could be used to construct an eel-way at TF Dam—a relatively inexpensive structure.

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))***

Information as 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.

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

Note: The **Turners Falls Power Canal needs to be investigated as a spawning location** for American shad. USGS studies have registered migratory shad remaining in the TF Canal for and **average of 25 days**. Adult shad, which do not feed during spawning migration, must complete their salt-to-river-to salt spawning runs within 44 days in order to survive. 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.

3.3.7 Fish Entrainment and Turbine Passage Mortality Study

Increase the number of mortality-tagged fish; run tests for all turbines at Station 1 and Cabot, with all turbines operating.

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))

Note: Three-dimensional CFD Modeling needs to extend 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

General Description of Proposed Study

FirstLight's added language: "This study will be conducted in 2015 pending the results of Study No 3.3.1 and Study No. 3.3.2, which include analysis of historic fish passage data."

Note: ***This study should be conducted for two seasons, the same time span accorded to American eel.***

Historic fish passage data likely has only minimal importance, as early spring freshet flows over the TF Spillway generally out-compete Cabot Station flows and send fish

treading water at the base of TF dam—often for weeks. Those freshet flows at the dam typically overwhelm any flow from the Spillway Ladder, and the shad essentially run down their engines treading water until the freshet subsides. At that point, flows over the Spillway are allowed to be cut to 400 cfs, which sends the shad downstream to fight their way into the spill of the canal system. **For this reason, historic data has limited value** as the quantified presence of shad at the base of TF Dam is missing, and data on the effectiveness of Spillway attraction flow does not exist.

Resource Management Goals of Agencies/Tribes with Jurisdiction over Resource (18 CFR § 5.11(d)(2))

“• American shad must be able to locate and enter the passage facility with little effort and without stress.”

“• Where appropriate, improve upstream fish passage effectiveness through operational or structural modifications at impediments to migration.”

“• Fish that have ascended the passage facility should be guided/routed to an appropriate area so that they can continue upstream migration, and avoid being swept back downstream below the obstruction.”

Note: *This study should not be contingent on results of other studies, and should be conducted for **two** seasons.*

1. Its effectiveness at another Connecticut River bottleneck has been tested.
2. It addresses the need to avoid migratory delay and failure for two key species that have topped the CT River fisheries restoration since 1967: American shad and blueback herring.
3. It keeps the fish migrating in the Connecticut River.
4. If it proves effective, it would simplify fish passage mechanisms and cut by millions of dollars the cost required for passing TF Dam. A single set of lifts at the dam would pass fish, as it has at Holyoke for decades.
5. It would avoid the expense and pitfalls of requiring fish to negotiate **two mechanisms at Cabot Station, another out of the canal, and a final grid through Gate House.**
6. It presents the opportunity to avoid the stress required of migratory fish when they are driven into the TF Power Canal, then must find their way through turbulence and fight a path through several more untried, built mechanisms.
7. **USGS studies have found the average passage time through the TF Canal is 25 days;** whereas transit times in the actual river—from Holyoke to TF Dam, or from TF Dam to Vernon Dam, are generally accomplished in a matter of 2 – 3 days.
8. This would avoid the problem of shortnose sturgeon being picked up in a lift at Cabot Station, which would be a cause for further migratory delay as lifts would have to stop to retrieve fish—and also might have to be shut for days during times of high turbidity.

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

Information from Proposed Project Changes, Flow, Hydraulics, Habitat, and Telemetry studies: **2.2.1; 2.3.1; 3.2.2; 3.3.1; 3.3.2;** should be used to inform the implementation of this study.

FirstLight's added-in text:

*“however, simply repelling shad from the Cabot tailrace is not a satisfactory result, for this behavioral barrier to be successful the fish would also have to keep going upstream, **without delay**, as opposed to dropping down below Cabot.”*

Note: this caveat does not present a satisfactory argument. In order to be proven ineffective, delays caused by sonics repelling fish from the Cabot entrance would have to out-compete any **delays American shad and blueback herring encounter by being drawn to the Spillway during spring freshet and not find a readable upstream flow or passage at the dam.** To this must be added the delay and stress of having river attraction and Spillway flow cut to 400 cfs, thus **sending them DOWNSTREAM to fight their way into the TF Power Canal.**

Question: Should FL be deciding what constitutes delay? Shouldn't American shad dropping back two miles downstream from the TF Spillway to Cabot Station be considered an “unsatisfactory result”?

Methodology (18 CFR § 5.11(b)(1), (d)(5)-(6))

Note: Ensonification coverage may need to be deployed far enough out into the main stem so as to lead fish out to the thalweg/main flows on the west side of Rawson Island. Simply steering fish out of the Cabot entrance, but then only allowing them the choice of the minimal flows coming down through Rock Dam at the time paltry 400 cfs release would likely keep the fish milling and confused below Station 1.

Study Schedule (18 CFR § 5.11(b)(2) and (c))

FirstLight's Added text: “

“If performed, the study is anticipated to conclude by mid-July 2015.”

Note: This should not be a **contingent** study.

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)

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