

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**FirstLight MA Hydro LLC
Northfield Mountain LLC**

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)

**Project No. 1889-085
Project No. 2485-071**

**RESPONSE OF FIRSTLIGHT MA HYDRO LLC AND NORTHFIELD
MOUNTAIN LLC TO COMMENTS ON FLOWS AND FISH PASSAGE
SETTLEMENT AGREEMENT**

June 12, 2023

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Pursuant to Rule 602(f) of the Federal Energy Regulatory Commission’s (“FERC” or “Commission”) Rules of Practice and Procedure (“Rules”),¹ and in accordance with the Commission’s April 7, 2023 Notice of Settlement Agreement and Soliciting Comments and the extended deadline noted in the May 4, 2023 Notice of Revised Deadline for Comments on Settlement Agreement, FirstLight Hydro MA LLC, owner and operator of the Turners Falls Hydroelectric Project (“Turners Falls Project”), and Northfield Mountain LLC, owner and operator of the Northfield Mountain Pumped Storage Project (“Northfield Mountain Project”) (collectively, “FirstLight”), hereby respond to comments filed on the March 2023 Flows and Fish Passage Settlement Agreement (“Agreement”).² FirstLight also moves to strike the comments filed by the

¹ 18 C.F.R § 385.602(f).

² Flows and Fish Passage Settlement Agreement and Explanatory Statement, Project Nos. 1889-085 and 2485-071 (filed Mar. 31, 2023).

Connecticut River Conservancy (“CRC”) as an unauthorized and unattested filing under the Commission’s Rules.³

I. BACKGROUND

The Agreement was negotiated and signed by FirstLight and the National Marine Fisheries Service (“NMFS”), the U.S. Fish and Wildlife Service (“USFWS”), the Massachusetts Division of Fisheries and Wildlife (“MDFW”), The Nature Conservancy (“TNC”), American Whitewater (“AW”), Appalachian Mountain Club (“AMC”), Crab Apple Whitewater, Inc., New England FLOW, and Zoar Outdoor (“Settling Parties”). The Agreement is a package that, by its terms, addresses all issues among the Settling Parties for relicensing of the Projects pertaining to: fish passage; flows for fishery, ecological conservation, and recreation purposes; and protected, threatened, and endangered species.⁴

None of the elements of the Agreement can be viewed in isolation, including the timing of when fish passage and other improvements will be implemented. Because the Projects serve multiple purposes—clean, emissions free energy production and storage, reliability of the electric grid, recreation, and fish and wildlife protection—the Agreement necessarily reflects tradeoffs among these various purposes. No one Project purpose is maximized in the Agreement at the expense of the others, except as necessary to avoid

³ Comments of Connecticut River Conservancy in Opposition to Offer of Settlement, Project Nos. 1889-085 and 2485-071 (filed May 25, 2023) (“CRC Comments”). FirstLight nevertheless responds in this filing to the substance of the CRC Comments.

⁴ FirstLight notes that the opposing commenters did not object to every aspect of the Agreement. Under Rule 602, “failure to file a comment constitutes a waiver of all objections to the offer of settlement.” 18 C.F.R § 385.602(f)(3). Any aspect of the Agreement to which no one objects is uncontested. *Id.* § 385.602(h)(1)(i) (Commission will decide the merits of the contested settlement issues in a case where an offer of settlement is contested in part). No commenter may be heard to object later to any aspect of the Agreement to which it failed to object within the time set by the Commission for comments. *Exxon Corp. v. FERC*, 114 F.3d 1252, 1259-60 (D.C. Cir. 1997) (“*Exxon Corp.*”). Thus, any elements of the Agreement to which no one timely objected must be considered uncontested in this relicensing proceeding.

jeopardy to listed species under the Endangered Species Act. This is consistent with the Commission's obligation under the Federal Power Act ("FPA") to balance competing resources in the public interest.⁵ It is also consistent with Massachusetts clean energy and climate goals that rely on the Projects to achieve those goals. Understanding that the Commission will independently review the proposed license articles,⁶ the Settling Parties nevertheless have reserved the right to withdraw from the Agreement if the Commission makes material modifications to those proposed license articles.⁷

Further, the Settling Parties negotiated the fish passage provisions of the Agreement with the expectation that NMFS and USFWS ("Services") will incorporate these provisions into their fishway prescriptions under Section 18 of the FPA.⁸ The Commission has no discretion to reject or modify a Section 18 prescription.⁹ FPA Section 18 reflects Congress' intent to defer to the expertise of the Services in setting fish passage requirements for FERC hydroelectric licenses. If relicensing participants disagree with the Services' fish passage requirements, their remedy is not with FirstLight or with FERC.

Relicensing participants and other members of the public filed numerous comments on the Agreement. In particular, the CRC Comments constituted 110 pages of material, including affidavits of three expert witnesses. FirstLight has done its best to address these comments within the limited time permitted for this Response. FirstLight's

⁵ 16 U.S.C. §§ 797(e), 803(a)(1).

⁶ These are set forth in Appendices A and B of the Agreement.

⁷ See Agreement, Sections 1.3.6, 6.1.

⁸ 16 U.S.C. § 811. See Agreement, Section 4.2.2.1.

⁹ *Am. Rivers v. FERC*, 201 F.3d 1186, 1210 (9th Cir. 1999).

silence as to any particular argument or factual assertion by CRC or any other commenter should not be read as an admission to such argument or assertion.

II. RESPONSE TO COMMENTS

A. Summer/Fall Minimum Bypass Flows

1. Fish Habitat

CRC and other commenters disagree with Proposed Article A110's requirement for FirstLight to release a minimum flow of 500 cubic feet per second ("cfs") from the Turners Falls Dam into the bypass reach of the Connecticut River during the period July 1 to November 15 of each year. Although outside the fish migration season, CRC asserts that 500 cfs fails to protect habitat for resident fluvial (riverine) species and macroinvertebrates. In particular, CRC focuses on longnose dace and tessellated darter. It relies on affidavits by Julian Burgoff, a graduate student, and Donald Pugh, to argue that increasing minimum flows into the bypass reach to 1,400 cfs during this time period would increase habitat for these species to an acceptable level.

As further detailed in the attached report prepared for FirstLight by Gomez and Sullivan Engineers and Kleinschmidt,¹⁰ CRC's assertions regarding inadequate habitat for fluvial fish species at 500 cfs are exaggerated and misleading because of CRC's selective use of data and exclusive focus on Reach 1 of the bypass reach, the one-mile reach of the river between Turners Falls Dam and Station No. 1. Mr. Burgoff's affidavit acknowledges that habitat for and abundance of native fish species improve in the rest of the bypass reach below Station No. 1, even under current minimum flow conditions.

¹⁰ Technical Responses to Comments on FirstLight's Flows and Fish Passage Settlement Agreement at 1-6 (June 2023) ("FirstLight's Technical Response") (attached hereto as Attachment A).

CRC argues that conditions for fluvial species are presently degraded in Reach 1 as a result of limited flows, citing FirstLight's fish assemblage study. However, CRC fails to point out that this reach has very limited habitat for longnose dace and tessellated darter as these species' optimal habitat consists of steep gradient streams with gravel or cobble rubble substrate. The steep gradient subsection of Reach 1 is approximately 0.1 miles long and is dominated by bedrock substrate. Thus, limited presence of these species in Reach 1 is to be expected regardless of flow conditions.

Further, CRC only examined the electrofishing results from one sampling station in Reach 1, rather than the two sampling stations that were actually used. Combining the results of both sampling stations documents the presence of two fluvial species in the reach, which satisfies applicable river health criteria even under current conditions.

In any case, the fish assemblage study results reflect existing conditions, including the current minimum flow requirements for the Turners Falls Project, not the increased minimum flow requirements included in the Agreement. The minimum flow regimes in the Agreement are designed to address any existing habitat impairments and meet applicable designated uses in the bypass reach. CRC does not show that river health would not improve in Reach 1 under the proposed minimum flow requirements for the new license.

Mr. Pugh asserts that higher Turners Falls Dam releases would increase wetted area, but more wetted area does not equate to more habitat since there are other factors to consider in a fish habitat analysis (e.g., depth, velocity, and substrate). Reach 1 is primarily bedrock substrate, which is not preferred habitat for longnose dace, fallfish

juveniles, or white sucker. Running higher flows over bedrock will not enhance habitat for these species.

CRC's simplistic approach to analyzing instream flows ignores that there are always trade-offs relative to the quantity of flow needed to support habitat needs for multiple species and life stages. Its myopic focus on Reach 1 also ignores the extent of fish habitat improvements in the bypass reach taken as a whole for fluvial species under the proposed flow regime in the Agreement.

2. Recreational Boating

CRC complains that the river is not navigable at 500 cfs for recreational boating.¹¹ In the Recreation Settlement Agreement for the relicensing filed today by FirstLight,¹² FirstLight agreed to construct a new river access and put-in to accommodate pass-through boaters immediately downstream of Peskeomskut Island, as well as a new river access immediately upstream of Peskeomskut Island for boaters to use during natural high flow events and scheduled variable flow releases.¹³ These new river access points, among other things, will mitigate for navigability constraints in the upper bypass reach during the low flow period, and will provide better access for whitewater boating under proposed Article A150.¹⁴

CRC also fails to acknowledge that the choice of a 500 cfs minimum flow from July 1 to November 15 reflects a balancing of competing resource uses and considerations. For example, FirstLight's relicensing studies identified state-listed plants

¹¹ CRC Comments at 5. CRC cites a 2021 boating study which is not in the FERC record.

¹² Recreation Settlement Agreement and Explanatory Statement of FirstLight MA Hydro LLC and Northfield Mountain LLC, Project Nos. 1889-000 and 2485-000 (filed June 12, 2023).

¹³ *Id.*, App. E, Recreation Management Plan, Section 6.1.5.

¹⁴ FirstLight's Technical Response at 6-7.

in the upper bypass reach¹⁵ and such plants could be adversely affected by constant inundation at the higher flow levels recommended by CRC. The MDFW, a signatory to the Agreement, presumably is in the best position to determine how to protect the state-listed plants in the bypass reach even if that results in a decision not to maximize use of the upper bypass reach for recreational boating.

CRC mistakenly assumes that FirstLight has an obligation to prioritize flow conditions for recreational boating, as well as habitat for select fluvial fish species, at any cost. According to FirstLight's calculations, the lost energy that would result from increasing the minimum flow in the bypass reach from 500 cfs to 1,400 cfs from July 1 to November 15 would cost FirstLight over \$900,000 per year.¹⁶ This would be in addition to the over \$2.6 million per year in foregone energy revenues from all of the other minimum flow requirements and operating restrictions in the Agreement. The limited benefits to recreational boating and certain fluvial fish species in a very short section of the bypass reach below Turners Falls Dam would be substantially outweighed by the cost of the higher flows.¹⁷ As reflected in the Agreement, both recreational boaters and the

¹⁵ Relicensing Study 3.5.1 Report: Baseline Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species (2016), Project Nos. 1889-000 and 2485-000 (filed Mar. 2, 2016); Relicensing Study 3.5.1 Report: Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species Addendum, Project Nos. 1889-000 and 2485-000 (filed Oct. 14, 2016); Relicensing Study 3.5.1 Report: Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species Addendum 2, Project Nos. 1889-000 and 2485-000 (filed Apr. 3, 2017); Relicensing Study 3.5.1 Report: Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species Addendum 3, Project Nos. 1889-000 and 2485-000 (filed Mar. 1, 2019).

¹⁶ FirstLight's Technical Response at 7.

¹⁷ See, e.g., *Ala. Power Co.*, 153 FERC ¶ 61,298 at P 67 (2015), *order on reh'g & clarification*, 157 FERC ¶ 61,100 (2016) (rejecting recommendation for minimum flows to enhance long-term habitat conditions for rainbow trout, finding that they would not be effective and would substantially reduce annual generation at the project); *Pub. Util. Dist. No. 1 of Pend Oreille Cnty.*, 112 FERC ¶ 61,055 at P 66 (2005) (rejecting recommendation to seasonally lower reservoir to improve rainbow and brown trout spawning,

state and federal fish and wildlife agencies agree. In addition, further decreasing renewable energy generation for minor fishery and recreational benefits creates net harm to the environment.

3. Cultural Resources

The Nolumbeka Project in coalition with the Chaubunagungammaug Band of Nipmuck Indians and the Elnu Abenaki Tribe (“Tribes”) raise a concern that 500 cfs in the bypass reach is inadequate to restore the health and ecology of a stretch of the river that is culturally important to the Tribes.¹⁸ The Tribes recommend a minimum flow of 1,600 cfs to restore fisheries and river health but provide no scientific or other justification for it.

The Tribes also express concern over low flows exposing riverbed, which allows foot access to “looters and sightseers” to “ancient cultural resources.”¹⁹ However, the Tribes do not document this problem or explain what cultural resources are being looted. The Tribes do not identify any cultural resources eligible or potentially eligible for the National Register of Historic Places within the bypass reach and FirstLight is aware of none. Although the Tribes reference “cultural and spiritual practices” that they say have been adversely affected by “dewatering of the ancient riverbed,”²⁰ and such practices undoubtedly existed at one time, the Tribes do not explain how this area today would

finding that the \$3,000,000 per year cost would have only a minor effect on habitat conditions with very little benefit to trout).

¹⁸ Notice to Intervene and Comments of The Nolumbeka Project Inc. at 4-5, Project Nos. 1889-000 and 2485-000 (filed May 25, 2023) (“Tribal Comments”).

¹⁹ *Id.* at 4.

²⁰ *Id.* at 2.

meet the definition of a “traditional cultural property” under National Register criteria.²¹ Rather, they call for additional study of the issue, which is beyond the scope of the Agreement.

B. Secondary Release Point for Station 1 Minimum Bypass Flows

CRC objects to footnote 1 in the table in Article A120 that provides if FirstLight is unable to make minimum flow releases from Station No. 1 for some reason during the first three years of the new license, the flows will be met by a combination of releases from Turners Falls Dam, the Fall River, Turners Falls Hydro, LLC and/or Milton Hilton, LLC.²²

FirstLight recognizes that it would need to install a monitoring gage to provide real-time flows on the Fall River, and would need agreements with Turners Falls Hydro, LLC and Milton Hilton, LLC to provide real-time discharges before it would seek to take credit for these sources of flow. *See also* FirstLight’s May 11, 2023 response to FERC’s Additional Information Request No. 4.²³

C. Consultation on Variable Recreation Flows

CRC requests that FERC require FirstLight to include CRC as a consulted entity in establishing the annual schedule of variable releases for recreational boating and

²¹ *See* National Park Service, National Register Bulletin 38 (1992), *available at* <https://www.nps.gov/subjects/nationalregister/upload/NRB38-Compleweb.pdf> (explaining the criteria that must be met for a traditional cultural property to qualify for eligibility for the National Register). The Tribes refer to an eligibility finding by the U.S. Department of the Interior at a nearby airport, Tribal Comments at 3, but that determination was for the Turners Falls Sacred Ceremonial Hill Site consisting of stone features. Contrary to the Tribes’ assertion, the eligibility finding for this archeological site did not extend in a 16-mile radius to include the river, the river’s edge, and many of its tributaries. The eligibility finding discussed the ceremonial hill site as contributing to a larger rural historic landscape that may be eligible for inclusion in the National Register but made no actual finding with respect to such an expanded district or its boundaries. *See* Relicensing Study 3.7.3, Traditional Cultural Properties Study (Mar. 2015), Project Nos. 1889-000 and 2485-000 (filed Sept. 14, 2015).

²² CRC Comments at 9.

²³ Response to FERC Additional Information Requests at 3, Project Nos. 1889-085 and 2485-071 (filed May 11, 2023) (“FirstLight AIR Response”).

ecological purposes under Article A150.²⁴ Article A150 already includes a broad array of interests and experts including whitewater boating groups, the Massachusetts Department of Environmental Protection, MDFW, the National Park Service, and USFWS as consulted entities. CRC does not explain why its interests and those of the public are not adequately represented by these federal and state agencies and recreational boating groups. Moreover, FirstLight will post on its website the recreational flow release schedule after it is finalized each year so CRC will have access to it.

D. Vernon Project Flow Release Information

Great River Hydro objects to MDFW's request²⁵ that it be required in its new license for the Vernon Hydroelectric Project No. 1904 ("Vernon Project") to provide to FirstLight by 8:00 a.m. each day the next day's 24 hour anticipated Vernon Project total discharge and the instantaneous Vernon Project total discharge and tailwater elevation. Great River Hydro states that it already provides this information to FirstLight under an agreement between the licensees pursuant to its current Vernon Project license Article 304 and has no objection to FERC including a similar requirement to enter into an agreement with FirstLight under the new Turners Falls Project license, leaving the details to the licensees to negotiate and modify from time to time based on changing circumstances. Great River Hydro further states that it does not provide anticipated hourly discharge at Vernon before bids are due into the ISO-New England market because it considers this commercially sensitive market information.

²⁴ CRC Comments at 9.

²⁵ Comments of Massachusetts Division of Fisheries and Wildlife on FirstLight Settlement Agreement at 1, Project Nos. 1889-085 and 2485-071 (filed May 24, 2023).

In its Amended Final License Application for the Turners Falls Project (December 2020),²⁶ FirstLight set out the information it needed from Great River Hydro in order to operate its Projects in compliance with the new license operating restrictions. FirstLight proposed at the time:

1. Day ahead hourly projections of total Vernon outflow (generation flows and spillage) provided by 8:00 am each day to FirstLight River Operations Personnel. FirstLight River Operations Personnel will use this information to schedule their river operations within the constraints of their license and hourly inflow from Vernon. FirstLight will take appropriate steps to ensure that the Vernon flow discharge information provided to its River Operations Personnel will not be communicated to individuals involved in marketing operations on behalf of FirstLight or any of its affiliates;
2. Day ahead hourly total Vernon outflow projections will be updated once the day ahead power bidding market closes and ISO-NE issues the day ahead schedule;
3. If ISO-NE updates the day ahead hourly total Vernon outflow schedule then that schedule will be provided to FirstLight within two (2) hours of Great River Hydro receiving an update from ISO-NE;
4. In same day operations Great River Hydro will supply FirstLight with deviations in the total Vernon outflow schedule in real time as well as an updated hourly projection for the remainder of the day. Great River Hydro will provide this information each time its outflow deviates from the last hourly projection.²⁷

The information needs have not changed with FirstLight’s execution of the Agreement—indeed, the operating conditions in the Agreement provide FirstLight even less room for error to manage its system and maintain compliance with the new license conditions than with FirstLight’s AFLA flow proposals. The Agreement operating conditions represent a completely new paradigm for FirstLight operators. Whereas FirstLight now has some flexibility to respond to unanticipated Vernon discharges, there

²⁶ Amended Final License Applications for the Turners Falls Project and Northfield Mountain Pumped Storage Project, Project Nos. 1889-092 and 2485-079 (filed Dec. 4, 2020) (“FirstLight AFLA” or “FirstLight AFLAs”).

²⁷ *Id.*, Ex. E at E-23.

will be much less flexibility in the future. The Agreement’s new requirements for minimum flows, variable releases, and flow stabilization are all tied to the Naturally Routed Flow (“NRF”). The NRF is primarily comprised of Vernon Project discharges and flows from two tributaries to the Turners Falls Impoundment (“TFI”). The Vernon Project drainage area represents 87% of the total drainage area at the Turners Falls Dam.²⁸ The Vernon Project also has a hydraulic capacity of 17,130 cfs,²⁹ which is greater than the hydraulic capacity of the Turners Falls Project at 15,938 cfs.³⁰ Thus, it is critical that FirstLight has dependable, forecasted Vernon Project hourly discharge information from Great River Hydro so that it has the ability to plan and manage its hydroelectric operations, releases from Turners Falls Dam, and TFI levels, to meet license requirements.

The situation is complicated by Great River Hydro’s proposal to maintain “flexible operation,” whereby Great River Hydro may peak one of its three hydroelectric projects within certain constraints during certain times of the year.³¹ Yet, FirstLight in the Agreement has committed to maintain a stabilized flow regime below Cabot Station for a portion of the year when Great River Hydro may be implementing its flexible operations. FirstLight’s ability to “smooth out” Great River Hydro’s flexible operations will depend on obtaining dependable hourly Vernon discharge data.

Given the stringent requirements of the new licenses and the critical nature of the information it is requesting from Great River Hydro, FirstLight does not agree that a

²⁸ *Id.*, Ex. B, Section 2.2.

²⁹ Amended Final License Application for New License, Vernon Hydroelectric Project, Ex. A, Section A1.3, FERC Project No. 1904-078 (filed Dec. 7, 2020) (“Vernon AFLA”).

³⁰ FirstLight AFLA, Ex. A, Section 1.6.

³¹ *See, e.g.*, Vernon AFLA, Ex. B, Att. A.

license requirement to enter into an agreement with FirstLight for coordinated operations, with all the details to be worked out between the licensees, is sufficient. FirstLight has entered into the Agreement which, if adopted by the Commission, will result in FERC-enforceable license conditions. FirstLight's ability to comply with those conditions should not be dependent on an informal agreement with Great River Hydro that FirstLight has no practical way of enforcing. Great River Hydro should have a FERC-enforceable license condition that specifies the information Great River Hydro will be obligated to provide.³²

E. Reservoir Elevation Levels

CRC and other commenters object to the reservoir elevation levels in Articles A190 and B100. Article A190 specifies that FirstLight must maintain the TFI within elevation 176.0 and 185.0 feet National Geodetic Vertical Datum of 1929 ("NGVD29"), the same as under the existing license. Article B100 requires FirstLight to operate the Northfield Mountain Project upper reservoir between 1004.5 and 920.0 NGVD29. This will provide an additional 18 feet of usable storage compared to the current license, enhancing FirstLight's ability to support the regional electric grid when needed. For this reason, ISO New England, Inc. supports the expanded upper reservoir range, stating: "Issuing a relicensing of the Projects, with the proposed expanded upper reservoir range at the Northfield Mountain Project, will further assist in meeting the region's current and future energy security risks by providing a reliable supply of electricity."³³

³² FirstLight has acknowledged Great River Hydro's concerns about providing commercially sensitive market information by committing to screen the day-ahead hourly projections from FirstLight marketing personnel.

³³ ISO New England Inc. Comments in Support of FirstLight Relicensing for Turners Fall and Northfield Mountain at 2, Project Nos. 1889-000 and 2485-000 (filed Mar. 17, 2021).

CRC has two objections. First, CRC claims that under the current license, fluctuations in the TFI due to pumped storage operations exacerbate shoreline erosion, and that this erosion will worsen due to increased fluctuation from expanded use of the upper reservoir.³⁴ CRC relies on a 2016 Princeton Hydro “peer review” of FirstLight’s BSTEM erosion model, as well as a 1991 U.S. Army Corps of Engineers (“Corps”) study.

As explained in FirstLight’s Technical Response,³⁵ FirstLight has conducted state-of-the-science, FERC-approved studies of the causes of bank erosion in the TFI that demonstrate the dominant cause of erosion is naturally occurring high flows in the Connecticut River, except in the Barton Cove area where boat waves are the dominant cause. Moreover, FirstLight has previously analyzed both the Princeton Hydro report and the Corps study, debunking the Princeton Hydro analysis and explaining the limitations of the Corps study. FirstLight’s proposed changes in operations under the Agreement do not change the basic finding that FirstLight’s operations are an insignificant cause of bank erosion in the TFI. Because FirstLight’s operations under the Agreement will not be a significant cause of erosion, it is not within FirstLight’s control to prevent it; and neither should FirstLight be responsible for remediating it.

Second, CRC asserts that under the current TFI minimum impoundment elevation, Barton Cove has been dewatered on occasion, preventing boater and angler access to the river.³⁶ CRC alleges that increasing usable storage in the upper reservoir will worsen this problem.

³⁴ CRC Comments at 10-11.

³⁵ FirstLight’s Technical Response at 7-9.

³⁶ CRC Comments at 11-12.

FirstLight's Technical Response³⁷ explains that FirstLight simulated the operating conditions in the October 31, 2022 Flows and Fish Passage Agreement in Principle in its operations model, including expanded upper reservoir operating conditions. FirstLight summarized the impact on TFI water levels in its Supplemental BSTEM Modeling Report which it filed with the Commission on May 11, 2023.³⁸ The results showed that TFI water levels will be very similar to 2022 baseline conditions, and actually higher during the period June 1 to November 30 which is generally representative of the recreational boating season. CRC's speculation that expanded use of the upper reservoir would worsen dewatering problems at Barton Cove is unfounded.

Neither CRC nor any other commenter recommends a specific change in Article A190 to raise the minimum TFI level such that erosion would not occur³⁹ or that boating access would be guaranteed. FirstLight does not believe there is a workable alternative as it will need all the flexibility it can get in managing the TFI to comply with the myriad new operational restrictions imposed by the Agreement.

F. Timing of Fish Passage Improvements

CRC and other commenters complain that the timeframes for fish passage improvements at the Turners Falls Project are unnecessarily long. Relying on the affidavit of Edwin Zapel, CRC disagrees with the Agreement's prioritization of downstream

³⁷ FirstLight's Technical Response at 9.

³⁸ FirstLight AIR Response, Supplemental BSTEM Modeling Report (May 2023).

³⁹ CRC even concedes that "[t]he operating regime of the last 50 years has allowed time for the streambank along TFI and Connecticut River to adjust, to some extent, to current operating conditions." CRC Comments at 11.

passage over upstream passage and claims that all the fish passage improvements could be implemented sooner than required in Article A300.⁴⁰

FirstLight's Technical Response⁴¹ explains that Mr. Zapel underestimates the extent to which the agency review and consultation requirements in the Agreement must be factored into the time for fish passage facility construction and operation. He also underestimates the time it takes to obtain the necessary permits to do the work. Other factors not addressed by Mr. Zapel include the time for modeling needed in the design process, seasonal limitations on when construction can occur, and the time of year FERC issues the licenses. In the Agreement, the years from license issuance are based on when each fish passage facility would be operational for the fish passage season.

Fish passage requirements are within the discretion of the Services under Section 18 of the FPA. The Agreement reflects the views of the Services and they will be in the best position to provide their rationale for the timing and sequencing of fish passage improvements when they submit their preliminary prescriptions in response to FERC's notice that the applications are ready for environmental analysis.

G. Fish Passage Effectiveness Testing

Similar to its disagreements with the timing of fish passage improvements, CRC takes issue with the timing of fish passage effectiveness testing and implementation of adaptive management measures ("AMMs") under Articles A310, A320, and A330.⁴²

FirstLight's Technical Response⁴³ addresses CRC's criticisms.

⁴⁰ *Id.* at 12-14.

⁴¹ FirstLight's Technical Response at 9-11.

⁴² CRC Comments at 14-15.

⁴³ FirstLight's Technical Response at 11-13.

CRC also objects to the provisions in Article A330 that (i) if certain performance thresholds are achieved after two rounds of AMMs that are lower than the fishery agencies' initial performance objectives, no further AMMs will be required; and (ii) the agencies will not exercise reserved authority under Section 18 to require AMMs other than those listed for the first 25 years of the license.⁴⁴

The provision allowing future adoption of lower performance thresholds for upstream passage simply acknowledges the possibility that the current agency passage goals may not ultimately be achievable at the Projects, and that after years of trying different methods and technologies, the performance goals may need to be adjusted. The agreement not to require FirstLight to implement additional AMMs other than those provided in the proposed license articles for the first 25 years of the license is a reasonable sideboard on adaptive management that provides a measure of economic certainty to FirstLight. This is perfectly consistent with the FPA's requirement to balance competing uses of a waterway.

Again, fish passage requirements are within the discretion of the Services under Section 18 of the FPA. The Agreement reflects the views and priorities of the Services and they will be in the best position to provide their rationale for the timing of the fish passage effectiveness testing and adaptive management measures when they submit their preliminary prescriptions.

⁴⁴ CRC Comments at 15. The limitation on further AMMs in the first 25 years of the license also applies to downstream passage under Article A320.

H. Consultation on Fish Passage Operations and Maintenance Plan

CRC requests that Article A350 be modified to include CRC as a consulted entity on the Fish Passage Facilities Operations and Maintenance Plan (“FOMP”).⁴⁵ As currently written, the FOMP will be developed by FirstLight in consultation with and require approval by MDFW, NMFS, and USFWS prior to FirstLight submitting the FOMP to FERC for its final approval. FirstLight will submit annual reports to these same agencies.

The fish passage requirements are within the discretion of the Services under Section 18 of the FPA. In any case, CRC does not demonstrate that it possesses the requisite technical expertise in fish biology or fish passage engineering to make any unique contribution to the development or ongoing implementation of the FOMP.

I. Barrier Net

CRC and other commenters have a number of objections relating to the fish barrier net required by Article B200. First, CRC states that the barrier net should be operational beginning April 4 instead of June 1 each year to match the period when downstream passage facilities are in operation under Article A340.⁴⁶ Second, CRC maintains that the barrier net could be operational within three years after license issuance rather than seven years as required in Article B200.⁴⁷ Third, CRC asserts there are a number of reasons to believe the barrier net will not work, and therefore the license should specify alternative adaptive management measures to provide for that

⁴⁵ *Id.* at 15-16.

⁴⁶ *Id.* at 16.

⁴⁷ *Id.* at 17.

contingency.⁴⁸ CRC argues that alternative measures should include a requirement for restrictions on pumped storage operations during the fish migration season,⁴⁹ even though Article B220 stipulates that such restrictions will not be considered as an adaptive management measure during the new Northfield Mountain Project license.

As explained in FirstLight's Technical Response,⁵⁰ FirstLight's relicensing fish passage studies showed a high proportion of adult shad successfully migrate between Turners Falls Dam and Vernon Dam, indicating a low risk of adult shad entrainment due to pumped storage operations. There is no reason to have the barrier net in place in the spring when adult shad are migrating upstream. Additionally, spring high flows would pose practical difficulties in maintaining the barrier net, both for logistical reasons and safety of FirstLight personnel.

Regarding the timing of when the barrier net should be in place, as discussed above fish passage measures require time to obtain multi-agency approvals of 30%, 60%, 90% and 100% design drawings as required by the Agreement, to complete and secure multiple permits, and to construct the facility. Additionally, the design of the net will require detailed hydraulic models for purposes of maximizing the passage effectiveness. All of these steps include ongoing multi-agency involvement and thus time for coordination, engagement, and agreement. The in-water work will ideally be timed with the low-flow season during the summer period, which is another factor to consider in the schedule. The timing of when the license is issued will also factor into when the construction work can occur during the low flow season. FirstLight sees no reason to

⁴⁸ *Id.* at 17-19.

⁴⁹ *Id.* at 19.

⁵⁰ FirstLight's Technical Response at 14.

change the timeframes for design and construction of the barrier net as they are practical and grounded in years of Massachusetts-specific permitting experience and the time of year for in-water work.

CRC's speculation that the barrier net may not work is contradicted by CRC's expert Mr. Zapel, who discusses his experience with similar large barrier nets. CRC itself acknowledges that even larger barrier nets than Northfield have been in use at other hydroelectric projects for decades. CRC's assertion that the barrier net may not work and that backup measures, which the Settling Parties themselves have ruled out, need to be in place is completely unsubstantiated.⁵¹

Finally, CRC expresses concern for the loss of fish eggs and larvae to pumped storage operations, and opines that the ichthyoplankton mitigation fund included as an off-license measure in Appendix C of the Agreement is insufficient. FirstLight's relicensing studies estimated the number of equivalent juvenile and adult shad lost as a result of ichthyoplankton entrainment and concluded that due to the extremely low survival fractions of shad eggs and larvae in nature, Northfield Mountain Project operations have an insignificant effect on the Connecticut River shad population.⁵² CRC offers no data or analysis to contradict these reports. FirstLight negotiated the off-license measure with USFWS as a good faith compromise contributing to the overall value of the Agreement. CRC has no valid basis for second-guessing that outcome and FirstLight would strenuously object to any attempt to impose mitigation for ichthyoplankton entrainment as a license requirement.

⁵¹ *Id.*

⁵² *Id.* at 14-15.

J. Bald Eagle Protection

CRC maintains that the Bald Eagle Protection plan required by Article A400 and included as part of the Agreement is insufficient because it has no provisions for control of hydrilla, which CRC states is harmful to eagles.⁵³ As CRC acknowledges, however, hydrilla is not present in the Project area. CRC’s recommendation appears to be a solution in search of a problem.⁵⁴

K. Invasive Species

CRC criticizes the Agreement for failure to address invasive species at the Turners Falls Project.⁵⁵ This topic is not within the scope of the Agreement, so CRC’s assertions regarding FirstLight’s obligations to monitor and control invasive species are not pertinent.

L. Additional Studies

Faculty and student representatives of programs at the University of Massachusetts-Amherst filed comments generally in favor of the Agreement but asserting that the Agreement leaves certain environmental impacts of the Projects unaddressed.⁵⁶ The UMass Comments assert that this is due to “crucial gaps in our knowledge” about the Projects’ effects.⁵⁷ Consequently, the UMass Comments propose that FirstLight be required to study, among other things: (1) passage of other aquatic, riparian, and

⁵³ CRC Comments at 16.

⁵⁴ *See Pac. Gas & Elec. Co.*, 120 FERC ¶ 62,001 at PP 55-57 (rejecting recommendation for a water quality monitoring plan at cost of \$106,580 annually, finding that there was no evidence of project-related water quality problems to justify the measure), *reh’g denied*, 121 FERC ¶ 61,072 (2007).

⁵⁵ CRC Comments at 20-21.

⁵⁶ Comments of Energy Policy and Rivers, a subgroup of the UMass Energy Geographies and Politics Project With input from UMass RiverSmart Communities, Project Nos. 1889-081 and 2485-063 (filed May 26, 2023) (“UMass Comments”).

⁵⁷ *Id.* at 3.

floodplain species besides fish (with no explanation of what these species are or what “passage” of such species even means); (2) fish passage through the TFI (though FirstLight did study this and it has never been identified as a problem); (3) decommissioning and removal of Turners Falls Dam (although no relicensing participant or resource agency has advocated this); (4) mitigation, including offsite mitigation, for the existence of the TFI (even though this would be inconsistent with the Commission’s longstanding policy on the environmental baseline at relicensing); (5) macroinvertebrate surveys; (6) blockage of sediment and large woody debris (stated as a general proposition about dams but with no evidence this is a problem at Turners Falls Dam); (7) impacts of pumped storage operations on resident fish in the TFI; (8) a plan for potential future decommissioning of pumped storage operations; and (9) a plan for evaluating future grid needs and deployment of pumped storage operations and how that could impact environmental resources at the Projects (clearly speculative).

The time to request studies has long since passed in this relicensing proceeding. Moreover, if federal and state resource agencies and other relicensing stakeholders had thought these studies were important, they would have requested them at the appropriate time in the application pre-filing process. If FERC had agreed, FERC would have ordered FirstLight to do the studies. All that is academic, however, as the UMass Comments come simply too late. FERC should not order any of the requested studies.

M. Financial Assurances for Decommissioning

CRC asserts that the Projects likely will reach the end of their useful lives within the terms of the new licenses and thus FirstLight should be required to create a

decommissioning plan to remove the facilities and provide financial assurances that it will have the means to carry out that plan when the time comes.⁵⁸

This comment is beyond the scope of the Agreement and thus is not pertinent here. However, FirstLight would observe that FERC has started including the following standard condition in every license:

Reservation of Authority to Require Financial Assurance Measures. The Commission reserves the right to require future measures to ensure that the licensee maintains sufficient financial reserves to carry out the terms of the license and Commission orders pertaining thereto.⁵⁹

Because the new Project licenses will contain this reservation of authority, it is not necessary for FirstLight now to prepare a decommissioning plan and provide financial assurances for an event that, despite CRC's speculations, may or may not happen during the next license term. The Commission has previously rejected the idea of any kind of general requirement for licensees to establish decommissioning funds because of such uncertainties.⁶⁰

N. License Term

CRC and other commenters object to 50-year new licenses for the Projects. CRC cites the Commission's 2017 Policy Statement on license terms⁶¹ in an attempt to support

⁵⁸ CRC Comments at 21-23.

⁵⁹ *E.g.*, *Cochecho Falls Assocs.*, 183 FERC ¶ 62,045 (2023); *Mad River Power Assocs.*, 182 FERC ¶ 62,179 (2023); *N. Hartland, LLC*, 182 FERC ¶ 61,086 (2023); *S.C. Pub. Serv. Auth.*, 182 FERC ¶ 61,025 (2023).

⁶⁰ Project Decommissioning at Relicensing; Policy Statement, 60 Fed. Reg. 339, 346 (Jan. 4, 1995) (Noting, "[i]n light of the practical problems involved in trying to deal with events far in the future, and because in many cases the time horizon and general financial strength of the licensee may be such that there is no substantial need for a pre-retirement funding program, the Commission will not act generically to impose such programs on all licensees.").

⁶¹ Policy Statement on Establishing License Terms for Hydroelectric Projects, 82 Fed. Reg. 49,501 (Oct. 26, 2017), 161 FERC ¶ 61,078 (2017) ("2017 Policy Statement").

its objection.⁶² The 2017 Policy Statement sets forth three circumstances in which FERC will consider departing from its “default” policy of issuing a 40-year license: (1) if necessary to coordinate license terms for projects located in the same river basin; (2) if explicitly agreed upon in a generally-supported comprehensive settlement agreement, provided such term does not conflict with coordination; and (3) based on significant measures required under the new license or implemented voluntarily during the prior license, provided that doing so is consistent with coordination.⁶³

FirstLight’s Projects meet all of these criteria. First, as discussed further below, FERC can ensure coordination of license terms with Great River Hydro’s three upstream projects⁶⁴ by issuing 50-year terms to all five projects. All five are undergoing relicensing at the same time so it is not necessary to issue license terms of different lengths.

Second, the Agreement contains an explicit agreement among the Settling Parties on 50-year terms for FirstLight’s Projects.⁶⁵ CRC asserts the Agreement does not qualify because it is a partial settlement;⁶⁶ but CRC understates the significance of the Agreement for the overall relicensing. The Agreement is signed by all of the federal and state fish and wildlife agencies, a nationally recognized conservation organization, and five national, regional, and local recreational boating groups. The Agreement resolves the most important issues regarding how the Projects will be operated and upgraded under the new licenses for the protection and enhancement of fish and wildlife. In contrast, only

⁶² CRC Comments at 2-3.

⁶³ 2017 Policy Statement at P 16.

⁶⁴ These are the Vernon Project, Bellows Falls Hydroelectric Project (FERC Project No. 1855), and Wilder Hydroelectric Project (FERC Project No. 1892) in downstream to upstream order.

⁶⁵ Agreement, Section 4.5.2.

⁶⁶ CRC Comments at 2.

four groups filed comments opposing certain aspects of the Agreement: CRC, Franklin Regional Council of Governments (“FRCOG”) (comments limited to erosion), the faculty and students from the University of Massachusetts-Amherst, and the Tribes. The remainder of the opposing comments were postcard-type comments from individuals that appear mostly scripted and parrot many of the talking points of CRC. Further, the parties to the Recreation Settlement Agreement filed today also have agreed to support 50-year license terms for the Projects.⁶⁷ The signatories to the Recreation Settlement Agreement include a number of entities who were not parties to the Flows and Fish Passage Settlement Agreement, including the National Park Service, the Massachusetts Department of Conservation and Recreation, recreation groups, and local communities – including FRCOG.

Third, the Agreement commits FirstLight to significant measures for the new license term. Per FirstLight’s AIR Response, the total cost of the fish passage measures at the Projects is estimated at \$91.3 million,⁶⁸ including capital costs, periodic costs, annual operation and maintenance costs, and effectiveness testing costs. The cost in lost energy production over 50 years due to increased minimum flows and other operational restrictions will be \$131.3 million.⁶⁹ These costs are in addition to the approximately \$5.8 million (capital costs and annual operation and maintenance costs) in recreation

⁶⁷ Recreation Settlement Agreement, *supra* note 12, Section 4.3.2.

⁶⁸ FirstLight AIR Response at 1 (Turners Falls AIR Response No. 1), 9 (Northfield Mountain AIR Response 1). These costs are based on following the Commission’s Mead Paper Corp. approach. *See Mead Corp., Publ’g Paper Div.*, 72 FERC ¶ 61,027 (1995), *reh’g denied*, 76 FERC ¶ 61,352 (1996).

⁶⁹ FirstLight AIR Response at 2, 6 (Table AIR1-1), 11 (Table AIR2-1).

improvements to which FirstLight has committed in the Recreation Settlement Agreement.⁷⁰

Even further, CRC fails to mention that Congress modified FERC's license term policy when it amended the FPA in 2018 to add Section 36.⁷¹ Section 36 expanded the factors FERC must consider in setting license terms at relicensing to include investments that "resulted in redevelopment, new construction, new capacity, efficiency, modernization, rehabilitation or replacement of major equipment, safety improvements, or environmental, recreation, or other protection, mitigation, or enhancement measures conducted over the term of the existing license."⁷² As documented in the AFLA Exhibit Ds, FirstLight and its predecessors have spent tens of millions of dollars on modernization work at both Projects over the years.⁷³ These investments must be considered by FERC, together with FirstLight's substantial suite of environmental and recreational proposed measures for the new Project licenses, in setting the new license terms.

CRC claims that Great River Hydro is only expecting 40-year license terms and that FirstLight should therefore be limited to 40-year terms. This would elevate coordination of license terms to be the overriding factor in any consideration by FERC, and arguably would be inconsistent with FPA Section 36, which does not even mention coordination of license terms let alone prioritize it. It also assumes that Great River Hydro's projects do not merit 50-year licenses in their own right, which they may,

⁷⁰ Recreation Settlement Agreement, *supra* note 12, Transmittal Letter at 2.

⁷¹ 16 U.S.C. § 823g.

⁷² *Id.* § 823g(b)(2)(A).

⁷³ FirstLight AFLAs at D-2.

especially given Congress' expansion of the factors FERC must consider in deciding new license terms.

In classic *non sequitur* fashion, CRC simply assumes that if one project in a river basin undergoing relicensing does not qualify for a 50-year license, all projects in the basin must receive the same, lesser license term. On the contrary, FERC's policy favoring coordination of license terms can just as easily be met by giving all five projects 50-year licenses. By any measure, FirstLight's Projects should receive 50-year licenses.⁷⁴

FirstLight supports coordination of its Project license terms with those of Great River Hydro as long as the Commission is willing to grant 50-year licenses to all five projects.

In any case, this is not an issue the Commission needs to decide now. The final license requirements for the new Project licenses are not yet known. FirstLight plans to submit additional information in support of its request for 50-year license terms at a time closer to license issuance.

III. MOTION TO STRIKE

FirstLight moves to strike the CRC Comments for failure to comply with Rules 2005 and 2101 of the Commission's Rules. Rule 2005 requires that a filing must be signed: in the case of a "corporation, trust, association, or other organized group," by "[a]ny officer" thereof; or by a "representative qualified to practice before the Commission under Rule 2101 who possesses authority to sign."⁷⁵ Rule 2101 states that:

⁷⁴ CRC claims that FirstLight does not merit 50-year licenses because it has been operating the Projects under annual licenses since 2018. CRC Comments at 3. CRC cites no FERC precedent and nothing in the 2017 Policy Statement to support the novel argument that licensees should be penalized by a *de facto* backdating of their new licenses to compensate for having operated under annual licenses. The timing of the new licenses is under the control of FERC and other agencies that provide regulatory approvals necessary for FERC to issue the licenses. It is not under the control of FirstLight.

⁷⁵ 18 C.F.R. § 385.2005(a)(3)(ii) and (iv).

“A participant may appear in a proceeding in person or by an attorney or other *qualified* representative. . . . [A] bona-fide *officer* of a corporation, trust, association or organized group may represent the corporation, trust, association or organized group.”⁷⁶

The CRC Comments are in the form of an unsigned legal pleading, with a cover letter signed by Kelsey Wentling, identified as River Steward MA. Ms. Wentling does not identify herself as an officer of CRC or an attorney, and it does not appear from CRC’s website that she is either one.⁷⁷ Rule 2005(a)(2)(iii) provides that a signature on a filing⁷⁸ constitutes a certificate that the signer possesses full power and authority to sign the filing.⁷⁹ There is no indication, however, that Ms. Wentling is an officer of CRC with authority to sign the filing under the Commission’s Rules.⁸⁰

CRC touts its long-time involvement in the Project relicensing proceedings as well as its engagement in other FERC hydroelectric proceedings, such as the relicensing for the Holyoke Gas & Electric Project No. 2004, to bolster its arguments opposing the Agreement.⁸¹ Clearly CRC has had ample opportunity and is a sufficiently sophisticated organization to have familiarized itself with the Commission’s Rules. Therefore, the Commission should either strike the CRC Comments as an unauthorized and unattested

⁷⁶ *Id.* § 385.2101(a) (emphases added).

⁷⁷ See Connecticut River Conservancy, Meet CRC’s Staff, <https://www.ctriver.org/about-us/staff/> (last visited June 2, 2023).

⁷⁸ It is not clear to FirstLight that, even if Ms. Wentling were authorized to sign for CRC, her signature on a cover letter would comply with 18 C.F.R. § 385.2005(a) (“Any filing with the Commission must be signed.”). Under one reading of the rule, CRC’s signed cover letter would signify only that CRC attests to the contents of the cover letter, not the attached unsigned legal pleading.

⁷⁹ 18 C.F.R. § 385.2005(a)(2)(iii).

⁸⁰ *Algonquin Gas Transmission*, LLC, 171 FERC ¶ 61,148 at P 8 & n.11 (2020).

⁸¹ *E.g.*, CRC Comments at 1, 16, 21.

filing,⁸² or alternatively give it no weight in the Commission’s consideration of the Agreement.⁸³

IV. CONCLUSION

WHEREFORE, for the foregoing reasons, the Commission should: (1) reject all proposed license conditions from the commenters beyond those included in the Agreement; (2) accept the proposed license articles in the Agreement as filed; and (3) either strike the CRC Comments as an unauthorized filing under the Commission’s Rules or give CRC’s comments no weight.

Respectfully submitted,

/s/ Michael A. Swiger

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Dated: June 12, 2023

Attachment

⁸² At most, the three affidavits attached to the CRC Comments may be admissible to the extent the Commission determines that they stand on their own. The opinions contained in the affidavits are addressed and rebutted in FirstLight’s Technical Response.

⁸³ CRC calls for the Commission to “establish procedures to resolve contested issues.” CRC Comments at 1. However, further proceedings are not required where the Commission determines there is substantial evidence in the record on which to resolve contested issues. *Exxon Corp.*, 114 F.3d at 1258-59. CRC should not be given a second bite at the apple to present evidence or arguments contesting the Agreement.

Attachment A

Technical Responses to Comments on FirstLight's Flows and Fish Passage
Settlement Agreement (June 2023)

Technical Responses to Comments on FirstLight's Flows and Fish Passage Settlement Agreement

**Turners Falls Hydroelectric Project (FERC No. 1889)
Northfield Mountain Pumped Storage Project (FERC No.
2485)**

Prepared for:



Prepared by:



JUNE 2023

Introduction

On March 31, 2023, FirstLight MA Hydro LLC, owner and operator of the Turners Falls Hydroelectric Project (Turners Falls Project) and Northfield Mountain LLC, owner and operator of the Northfield Mountain Pumped Storage Project (Northfield Mountain Project) (collectively, FirstLight), filed with the Federal Energy Regulatory Commission (FERC or the Commission) a Flows and Fish Passage Settlement Agreement (Agreement). On April 7, 2023, FERC issued a Notice of Settlement Agreement and Soliciting Comments and set a deadline for filing comments by May 7, 2023, and reply comments by May 22, 2023.

On April 26, 2023, FERC issued additional information requests (AIRs) relative to the Agreement and requested FirstLight to submit responses by May 11, 2023. On May 5, 2023, the Connecticut River Conservancy (CRC) requested FERC to extend the deadline for comments on the Agreement until after FirstLight files its response to AIRs. On May 4, 2023, FERC granted the extension of time for filing comments on the Agreement until May 26, 2023, and reply comments until June 12, 2023.

Between April 7, 2023, when FERC issued notice of the Agreement and May 26, 2023, several comments were filed on the Turners Falls Project and Northfield Mountain Project dockets. FirstLight reviewed the various comments filed on the Agreement.

The most comprehensive comments were filed by the CRC while other commenters had similar or comparable comments. The purpose of this document is to address some of the technical issues raised in the CRC comment letter.

Summer/Fall Minimum Bypass Flows (CRC Comments at pages 4-8)

Introduction

CRC in their submittal and associated affidavits addresses the Agreement proposal of 500 cfs flow in the reach of the Connecticut River from Turners Falls Dam to Station No. 1 during the period July 1 to November 15 from four different perspectives, as follows:

1. Non-Attainment of Aquatic Life Use based on the Index of Biological Integrity (IBI) (Julian Burgoff Affidavit);
2. Habitat and Wetted Perimeter Analysis (Donald Pugh Affidavit);
3. Recreation;
4. Cultural Resources

This report addresses the first three issues raised in CRC's filing but does not address cultural resources.

Geographic Context

In their submittal, at page 4, CRC references the Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle¹. CRC points out that under existing conditions (minimum flows from the Turners Falls Dam of 400 cfs from July 1-15 and 120 cfs from July 15-November 15) that Massachusetts River Segment MA-34-03 is listed as impaired partially due to dewatering and flow regime modification. For context River Segment MA 34-03 encompasses the Connecticut River from Turners Falls Dam to the Deerfield River confluence. It is precisely this impairment that the Settling Parties propose to address with the flow regimes included in the Agreement. With a variety of management objectives for the reach it is impossible to isolate any one subsegment or specific resource, as CRC has done, without considering benefits to the overall segment or the competing uses within the overall segment.

¹ Massachusetts Division of Watershed Management Watershed Planning Program, Final Massachusetts Integrated List of Waters for the Clean water Act 2018/2020 Reporting Cycle, available at <https://www.epa.gov/system/files/documents/2022-02/2018-2020-ma-303d-list-report.pdf>.

Non-Attainment of Aquatic Life Use - Index of Biological Integrity (Burgoff Affidavit)

CRC states the following on page 4 of its comments: *A study of fish communities in New England found that the river segment below the dam had the lowest Index of Biological Integrity (IBI) score of all river segments in the study. See Affidavit of Julian Burgoff (hereinafter “Burgoff Affidavit”).*

Mr. Burgoff’s analysis is an assessment of the IBI under existing conditions and existing FERC-required minimum flow from the dam (120 cfs for most of the season, see above). It is not an assessment of conditions as proposed in the Agreement. In addition, there are technical flaws with Mr. Burgoff’s assessment, as described below.

In Mr. Burgoff’s affidavit, he references a study conducted by Yoder et al. (2009)² and reiterates that the river segment below the Turners Falls Dam has the lowest IBI score of all river segments studied. It should be noted that the Biological Condition Gradient used to assign IBI scores, as presented by CRC, was developed for Maine rivers (Yoder et al. (2008))³, and though it was applied to a study on the Connecticut River, Yoder et al. (2009) acknowledged that the model was likely relevant to the upper Connecticut River in New Hampshire and Vermont, but that the lower Connecticut River in Massachusetts and Connecticut would likely require adjustments to the model. Therefore, assigning specific IBI scores to the river segment below the Turners Falls Dam at face value based on the Maine IBI models is not appropriate. Furthermore, this IBI model indexes fish assemblage responses to water quality (e.g., water temperature, point source discharges and dissolved oxygen and presence/absence of invasive species) and has no quantitative relationship to flow levels. Also note that according to the Massachusetts Consolidated Listing and Assessment Methodology Criteria (CALM, 2002) guidelines⁴, no formal fish IBI for Massachusetts currently exists.

Mr. Burgoff attempts to describe non-attainment of Aquatic Life Use based on the Massachusetts CALM (2022). He asserts that for Class B Warm Water Fisheries, in moderate to high gradient streams, the fish community should include two or more fluvial specialist/dependent species or at least one fluvial specialist/dependent species in moderate abundance to fully support the Aquatic Life Use. He notes that the upper portion of the bypass reach does not meet attainment because one of the electrofishing stations sampled by FirstLight during the *Fish Assemblage Study* (Study 3.3.11)⁵ did not contain those criteria. Mr. Burgoff does note (see Affidavit at page 3) that the IBI score does improve in the lower bypass reach with the flows provided by Station No. 1.

Mr. Burgoff made the conclusion regarding the upper bypass reach based on a single sampling station, rather than the two sampling stations that were actually performed within the reach of stream between Turners Falls Dam and Station No. 1 (see Study 3.3.11). Fisheries surveys were performed at two sampling stations, under existing conditions, to encompass various mesohabitats from the Turners Falls Plunge Pool to Station No. 1. When the results of sampling at these two stations are pooled, as is common practice when evaluating a river reach, two fluvial specialists/dependents (tessellated darter and white sucker) were documented in the reach under existing conditions. Despite the low abundance of tessellated darter, the presence of these two fluvial species in Reach 1 would result in attainment of the Massachusetts CALM

² Yoder, C.O., Hersha, L.E., and B.R. Apell. 2009. Fish assemblage and habitat assessment of the Upper Connecticut River: Preliminary Results and Data Presentation. MBI Technical Report MBI/2009-8-3.

³ Yoder, C.O., R.F. Thoma, L.E. Hersha, E.T. Rankin, B.H. Kulik, and B.R. Apell. (2008). Maine Rivers Fish Assemblage Assessment: Development of an Index of Biotic Integrity for Maine Rivers. MBI Technical Report 2008-11-2. Report to U.S. EPA, Region I, Boston, MA. 69 pp. [MAINE RIVERS 2007 FINAL REPORT UPDATED 20160331.pdf \(midwestbiodiversityinst.org\)](https://www.midwestbiodiversityinst.org/20160331.pdf).

⁴ Massachusetts Consolidated Assessment and Listing Methodology (CALM) Guidance Manual (2022). <https://www.mass.gov/doc/2022-consolidated-assessment-and-listing-methodology-guidance/download>.

⁵ FirstLight (2016). Fish Assemblage Study. Study No. 3.3.11.

criteria for Aquatic Life Use for moderate to high gradient streams, even under the current FERC-required minimum flows, which are considerably lower than those in the Agreement. Further, the applicability of the CALM criteria for moderate to high gradient streams in this river reach is questionable. Though this river reach is higher gradient than the surrounding impounded habitats, the upper bypass reach mesohabitats sampled, which comprise nearly the entire reach, consist of the Turners Falls Dam Plunge Pool and a low-gradient riffle/run/pool complex extending from the plunge pool downstream to the Station No. 1 tailrace. In general, most of the habitats within the reach are relatively low gradient, except for the riffle around Peskeomskut Island. According to the Massachusetts CALM guidelines, Aquatic Life Use in low gradient streams can be attained with at least one fluvial species, or macrohabitat generalist species which are intolerant or moderately tolerant to environmental perturbations. Based on Study 3.3.11, between Turners Falls Dam and Station No. 1, attainment of Aquatic Life Use criteria under existing conditions for a low gradient stream would be indicated by the presence of not only tessellated darter and white sucker (fluvial specialist/dependent species), but also by smallmouth bass, largemouth bass, pumpkinseed sunfish, and walleye (macrohabitat generalist species with moderate tolerance).

Habitat and Wetted Perimeter Analysis (Pugh Affidavit)

As described above, Massachusetts River Segment MA 34-03 covers the section of the Connecticut River from Turners Falls Dam to the Deerfield River confluence. As part of the instream flow study include-Study 3.3.1⁶ - there are three study reaches encompassing Segment MA 34-03, as shown in Table 1. Mr. Pugh’s analysis focuses on only Reach 1 (without any context for the overall Segment MA 34-03) and two select fluvial species (tessellated darter and longnose dace) while ignoring other fluvial species as well as resource trade-offs with other potential resources.

Table 1. Instream Flow Study Reach Descriptions in Segment MA 34-03

Reach	Segment of 34-03	Length (miles)
1	Turners Falls Dam to Station No. 1	1.0 ¹
2	Station No. 1 to Rock Dam/Rawson Island	1.0
3	Rock Dam/Rawson Island to the Montague United States Geological Survey (USGS) Gage	1.75
¹ The 1.0-mile-long Reach 1 is broken down as approximately: <ul style="list-style-type: none"> • 0.22 mile long plunge pool from the dam to the head of the Right Channel; • 0.10 mile long Right Channel; and, • 0.68 mile long reach from the downstream end of the Right Channel to Station No. 1. 		

On page 2 of Mr. Pugh’s affidavit, he states the following: *The Massachusetts CALM indicates that in high gradient streams (riffle/run prevalent), the fish community should include at least two fluvial specialist/dependent species; fallfish, longnose dace, white sucker and tessellated darter are each classified as fluvial specialist species.* Study 3.3.1 evaluated each of the four species listed by Mr. Pugh. The habitat suitability for these species, as documented in Study 3.3.1, is included in Table 2.

⁶ FirstLight (2016), Instream Flow Habitat Assessments in the Bypass Reach and below Cabot Station. Study No. 3.3.1. Addendum 1 (2017), Addendum 2-3 (2018), Addendum 5-7 (2019).

Table 2. Habitat Suitability Criteria (HSI) for Fluvial Specialists as Documented in Study 3.3.1

Species	Velocity		Depth		Substrate	
	(ft/s)	HSI	(ft)	HSI	Substrate	HSI
Tessellated Darter- Adult and Juvenile	0.0	0.00	0.00	0.00	Detritus/organic	0.00
	0.8	1.00	0.16	0.00	Mud/soft clay	0.93
	1.8	0.00	0.80	1.00	Silt	0.60
			1.15	1.00	Sand	0.93
			1.80	0.00	Gravel	1.00
					Cobble	0.68
					Boulder	0.53
					Bedrock	0.93
Longnose Dace- Juvenile	0.00	0.00	0.00	0.00	Detritus/organic	0.00
	0.75	1.00	0.75	1.00	Mud/soft clay	0.00
	1.50	1.00	1.15	1.00	Silt	0.00
	2.00	0.35	1.50	0.40	Sand	0.18
	2.20	0.20	1.75	0.20	Gravel	1.00
	2.50	0.13	2.00	0.14	Cobble/Rubble	1.00
	3.00	0.05	3.00	0.00	Boulder	0.50
	4.00	0.00	100.0	0.00	Bedrock	0.00
	100.0	0.00				
Longnose Dace- Adult	0.00	0.00	0.00	0.00	Detritus/organic	0.00
	0.75	1.00	0.10	0.00	Mud/soft clay	0.00
	1.75	1.00	0.75	1.00	Silt	0.00
	3.00	0.28	1.60	1.00	Sand	0.60
	3.60	0.08	2.50	0.00	Gravel	1.00
	4.50	0.00	100.0	0.00	Cobble	1.00
	100.00	0.00			Boulder	0.80
					Bedrock	0.00
Fallfish- Juvenile	0.00	0.00	0.00	0.00	Detritus/organic	0.10
	0.10	0.60	0.40	0.00	Mud/soft clay	0.00
	0.20	0.88	0.60	0.11	Silt	0.10
	0.60	1.00	1.00	1.00	Sand	0.50
	1.60	1.00	3.00	1.00	Gravel	1.00
	2.00	0.40	4.00	0.27	Cobble/Rubble	1.00
	3.50	0.04	7.00	0.24	Boulder	0.20
	4.30	0.00	8.00	0.07	Bedrock	0.00
	100.0	0.00	100.0	0.07		
Fallfish-Adult	0.00	0.00	0.00	0.00	Detritus/organic	1.00
	0.10	1.00	0.50	0.00	Mud/soft clay	1.00
	0.80	1.00	3.00	1.00	Silt	1.00
	1.50	0.40	100.0	1.00	Sand	1.00
	3.00	0.00			Gravel	1.00
	100.0	0.00			Cobble/Rubble	1.00
					Boulder	1.00
				Bedrock	1.00	
White Sucker- Juvenile/ Adult	0.00	0.00	0.00	0.00	Detritus/organic	0.00
	0.50	0.40	0.50	1.00	Mud/soft clay	0.00
	1.00	1.00	0.80	1.00	Silt	0.50
	2.00	1.00	1.00	0.80	Sand	1.00
	3.00	0.00	2.00	0.00	Gravel	0.90

Species	Velocity		Depth		Substrate	
	(ft/s)	HSI	(ft)	HSI	Substrate	HSI
	100.0	0.00	100.0	0.00	Cobble/Rubble	0.00
					Boulder	0.00
					Bedrock	0.00

To provide context for Messrs. Pugh and Burgoff assertions relative to habitat for fluvial specialist/dependent species in MA Segment 34-03, we analyzed the available habitat for these species in Reaches 1 and 2⁷ as well as in subreaches of Reach 1 with identifiable potential habitat for fluvial specialist/dependent species. As shown in Table 3, the Agreement flows of 1,800 cfs below Station No. 1 from July 1-August 31 provide near optimum habitat (maximum weighted usable area) for all fluvial species and pertinent life stages, while a flow of 1,500 cfs from September 1- November 15 provides near optimum conditions for fallfish and white sucker and very high percentages of maximum weighted usable area for tessellated darter and longnose dace.

The original instream flow study analysis in Reach 1 was divided, during the study, recognizing the discrete habitat types in the subreach downstream of Peskeomskut Island and the subreach adjacent to Peskeomskut Island. As such, the habitat results are reported separately. The part of Reach 1 located downstream of Peskeomskut Island, and represented by Transects 10 and 11, is more of run type habitat with a shallower gradient than the habitat located adjacent to Peskeomskut Island.

Based on stakeholder consultation, the part of Reach 1 adjacent to Peskeomskut Island was divided into three discrete areas - the Right Channel⁸, Center Channel, and Left Channel. As agreed upon in study plan development, habitat in the Center Channel and Left Channel were not quantified as part of the study. The Left Channel was evaluated only for a zone of passage for migratory fish and the Center Channel is a narrow bedrock cut channel offering limited habitat and flowing nearly full at all flows. Hence, the habitat for the part of Reach 1 adjacent to Peskeomskut Island was based on the Right Channel.

Table 4 illustrates habitat for all of the fluvial specialist species and pertinent life stages for Transects 10 and 11 as well as for the Right Channel adjacent to Peskeomskut Island. It should be noted that the habitat for tessellated darter, longnose dace, and fallfish (juvenile) are all close to optimum (maximum weighted usable area) for the Right Channel at Peskeomskut Island.

Habitat as a percent of maximum habitat for tessellated darter and longnose dace are lower at Transects 10 and 11 but that is not surprising given the nature of this run habitat and the narrow band of acceptable depths and velocities for the species. It should be noted, however, that habitat for white sucker and fallfish is in the range of 71.1 to 75.7% of maximum habitat.

⁷ Segment MA 34-03 also includes Reach 3. However, Reach 3 habitat is influenced not only by the quantity of bypass flow but also by Cabot Station Operations and the Deerfield River that create backwater effects in Reach 3. For simplicity we did not include Reach 3 in our analysis of fluvial species but would expect it to include significant additional habitat in the steep gradient areas on river right (looking downstream) at Rawson Island.

⁸ The “Right” Channel assumes one is looking in a downstream direction.

Table 3. Percent Maximum Weighted Usable Area in Reach 2 for Fluvial Specialists based on the Agreement

Fluvial Species	Reach 2	
	Percent of Maximum Weighted Usable Area at 1,500 cfs	Percent of Maximum Weighted Usable Area at 1,800 cfs
Fallfish-Juvenile	87.5%	95.4%
Fallfish- Adult	94.4%	100.0%
White Sucker- Juvenile/Adult	99.1%	92.8%
Tessellated Darter	73.2%	90.9%
Longnose Dace-Juvenile	71.8%	88.8%
Longnose Dace-Adult	66.2%	82.3%

Table 4. Percent Maximum Weighted Usable Area in Reach 1 (Transects 10 and 11 and the Right Channel at Peskeomskut Island for Fluvial Specialists based on the Agreement

Fluvial Specialist	Right Channel	Reach 1 (Transects 10 and 11), High Backwater
	Percent of Maximum Weighted Usable Area at Agreement Flow ¹	Percent of Maximum Weighted Usable Area at Agreement Flow
Fallfish-Juvenile	83%	74.3%
Fallfish- Adult	49%	75.7%
White Sucker- Juvenile/Adult	No habitat under any flows	71.1%
Tessellated Darter	100%	22.0%
Longnose Dace-Juvenile	83%	27.7%
Longnose Dace-Adult	98%	18.5%

¹The closest flow modeled to 500 cfs was 562 cfs. The percentages above are based on 562 cfs.

CRC states on page 5 of its comments the following: *In addition to the insufficient aquatic habitat at the proposed flow, 500 cfs does not even fill the river such that water covers the riverbed from bank to bank.* Mr. Pugh also states on page 5 of his affidavit: *Another recognized method for analyzing the amount of available habitat for aquatic species in a particular stretch of a river is the Wetted Perimeter method.*

CRC and Mr. Pugh assert that a higher Turners Falls Dam release increases wetted area, but providing more wetted area does not equate to providing more habitat, since there are other factors to consider in a habitat evaluation (e.g., depth, velocity, and substrate). Reach 1 is primarily bedrock substrate which is not preferred habitat for longnose dace, fallfish juveniles, or white sucker. Running higher flows over bedrock will not enhance habitat for these species.

Recreation Boating

CRC states on page 5 of its comments: *The proposed minimum flow of 500 cfs fails to support the existing and designated use of primary and secondary contact recreation in this segment because the water level is too low to support recreational boating.* As it has done throughout its submittal, CRC focuses its comments on a 0.1-mile-long section of the Connecticut River in and around Peskeomskut Island ignoring both greater recreational boating enhancements and access provided through Segment MA 34-03. In particular, CRC ignores the fact that FirstLight has agreed to provide a boat access location immediately downstream of Peskeomskut Island that will accommodate through paddlers wishing to portage around Turners Falls Dam,

a boat access immediately upstream of Peskeomskut Island that will accommodate boaters during high flow events and scheduled variable releases, and at Station No. 1.⁹

Energy Impacts of CRC's Proposed Turners Falls Dam Release of 1,400 cubic feet per second

CRC proposes a Turners Falls Dam release of 1,400 cfs from July 1 to November 15 (138 days), while the Agreement is for 500 cfs for the same period. FirstLight evaluated the energy and economic impact of the incremental increase of 900 cfs (1,400-500 cfs), assuming the additional 900 cfs would have passed through Cabot Station. Increasing the Turners Falls Dam release another 900 cfs equates to an energy loss at Cabot Station of 12,599 megawatt-hours/year (MWh/year). Based on a 2022 realized energy value of \$71.61/MWh¹⁰, CRC's request to provide 1,400 cfs would cost an additional \$902,214/year compared to maintaining 500 cfs. The operating conditions in the Agreement are already estimated to result in an energy loss at the Turners Falls Project of 36,672 MWh/year or \$2,626,218/year. CRC's proposed 1,400 cfs minimum flow would increase the energy and economic loss by 34%. As explained above, FirstLight would incur this substantial cost for benefits to certain fluvial species and recreational boaters in a very limited reach of the Connecticut River between the Dam and Station No. 1.

Operations of the Turners Falls Impoundment Reservoir, Upper Reservoir and Turners Falls Impoundment Shoreline Erosion (CRC Comments at pages 10-12)

CRC includes the following on page 10 of its comments: *In Article A190 the Applicant proposes to maintain the existing Turners Falls Impoundment ("TFI") elevation range (measured at the dam) while, under Article B100, proposes to expand use of the upper reservoir. As discussed below, under the current TFI range, the Applicant's operations have resulted in TFI fluctuations which exacerbated erosion.*

The proposed operating range for the upper reservoir would induce further erosion along the TFI streambanks and so do not uphold the obligation of the Applicant and of FERC to avoid and minimize impacts on the Connecticut River ecosystem.

Following the release of Study 3.2.1, CRC contracted with Princeton Hydro to conduct a peer review of this study, which found that the Applicant's analysis overlooked several critical factors that contribute to streambank erosion. In particular, the peer review found that the study failed to consider the cyclical nature of streambank erosion and the relationship between hydraulic erosion at the toe of the bank and the resulting geotechnical failure, initiating a cycle of erosion along the streambanks of the impoundment.

CRC's numerous claims regarding the role that Northfield Mountain existing and proposed operations have on shoreline erosion throughout the Turners Falls Impoundment (TFI) are unfounded, devoid of any scientific support, and completely ignore the scientific evidence presented throughout the relicensing proceeding.

The findings of two studies entitled *Northfield Mountain/Turners Falls Operations Impacts on Existing Erosion and Potential Bank Instability*¹¹ (Study No. 3.1.2) and *Supplemental BSTEM Modeling Report – May 2023*¹² (Supplemental Report) have clearly demonstrated that the dominant cause of erosion throughout the TFI is naturally occurring high flows, with the exception of the Barton Cove area where boat waves are the dominant cause. Project operations, either existing or proposed, are a minor contributing cause of erosion at a handful of localized sites. Study No. 3.1.2 and the Supplemental Report were

⁹ FirstLight (2022). Agreement in Principle on Recreation and Whitewater. Accession No. 20220228-5137.

¹⁰ FirstLight (2023). Response to FERC Additional Information Requests. Accession No. 20230511-5095.

¹¹ FirstLight (2016). Northfield Mountain/Turners Falls Operations Impacts on Existing Erosion and Potential Bank Instability. Study No. 3.1.2. Addendum (2017).

¹² FirstLight (2023). Response to FERC Additional Information Requests. Accession No. 20230511-5095.

conducted based on state-of-the-science methods by a team of experts who were previously approved by the Massachusetts Department of Environmental Protection.

Furthermore, regarding the Princeton Hydro “peer review”, CRC conveniently ignores the fact that FirstLight has provided detailed responses to this review, which debunked the claims reiterated in CRC’s comment letter. FirstLight’s full response to the Princeton Hydro review can be found in the January 17, 2017, *Response to Stakeholder Requests for Study Modifications and/or New Studies based on the Study Report and Meeting Summary* filing¹³. CRC’s comment letter reiterates four primary points from the Princeton Hydro review – (1) the study failed to consider the cyclical nature of erosion and the relationship between hydraulic erosion at the toe of the bank and resulting geotechnical failure, (2) the study failed to include how geotechnical conditions would be altered if permanent vegetation was established on the banks, (3) the study included data gaps, including a failure to include entire study reaches in the TFI, and (4) the extrapolation method included arbitrary thresholds that potentially bias the study.

For brevity, we summarize key responses below but encourage FERC to review the full January 17, 2017, response.

- (1) Cyclical Nature of Erosion – this comment represents a fundamental lack of understanding of the analysis that was conducted as part of Study No. 3.1.2 and the Supplemental Report. Not only did Bank Stability Toe Erosion Model (BSTEM) evaluate the cyclical nature of erosion, it did so every hour over a 15-year period at 25 detailed study sites throughout the TFI. Thus, the process is not lost as suggested by CRC but explicitly incorporated in a quantitative way.
- (2) Geotechnical Conditions and Vegetation – examining how geotechnical conditions along the streambank would be altered if permanent vegetation was established on the bank was not part of the FERC approved study plan. BSTEM was run with the appropriate amount of vegetation according to conditions at the start of the simulation. Such conditions were based on historic photographs or field collected information at each detailed study site.
- (3) Failure to Include Entire Reaches – this claim is again factually incorrect. BSTEM modeling occurred at 25 detailed study sites that spanned the entire longitudinal extent of the TFI. The 25 detailed study sites were established through consultation with the stakeholders, including the CRC. The results of the BSTEM modeling were then extrapolated throughout the TFI, with the exception of the reach between the French King Gorge and Barton Cove where supplemental analyses were conducted to determine the causes of erosion. The potential impact of Project operations was considered in all river segments.
- (4) Extrapolation Methodology – the threshold for dominant and contributing causes of erosion were determined based on statistical analysis of the model results and were not arbitrarily determined as suggested by CRC.

Finally, in their comment letter the CRC cites a 1991 United States Army Corps of Engineer (USACE) study that they claim demonstrates the impact that Northfield Mountain Project operations have on erosion throughout the TFI. The 1991 USACE study cited by CRC is based largely on the findings of an earlier 1979 USACE study. In addition, the methodology used by the USACE in 1991 duplicated that used in 1979 in order to make comparisons between the two studies. The CRC again conveniently ignores the fact that FirstLight conducted a detailed review of the USACE work and compared it to the results of Study No. 3.1.2 (see Study No. 3.1.2, Volume II, Sections 2.3.1 and 6.1.4.2). Key takeaways from this comparison found that:

- (1) The USACE found that the natural river (i.e., unimpounded sections of the Connecticut River) is 1.34 times more susceptible to major bank erosion than impoundments created by dams. The

¹³ Accession No. 20170117-5268.

USACE concluded that the presence of impoundments reduces bank erosion by 34% compared to the natural river.

- (2) Comparison of the past USACE studies to Study No. 3.1.2 found several differences between methodologies including: (a) the 1979 USACE study focused on a much longer and broader reach of the Connecticut River with only one detailed site within the TFI whereas Study No. 3.1.2 was based on 25 representative study sites throughout the TFI; (b) the USACE studies were based on very limited datasets whereas Study No. 3.1.2 was based on a calibrated model of 22 transects surveyed annually over a 15-year period or longer; and (c) the USACE studies were limited by the technology of their time especially when compared to the tools at FirstLight's disposal during the relicensing.
- (3) Although the methodologies of the studies had some fundamental differences, the main conclusions were the same – high flows and associated shear stresses are the primary cause of erosion in the TFI. The contributing causes of erosion between the studies vary as would be expected given the significant differences in methodology noted above.
- (4) The USACE studies were largely qualitative and based on limited available data with few actual measurements or computations of velocity or shear stress and no determination of resistance to erosion, geotechnical soil strength properties, or measurements of root density or strength as was conducted for Study No. 3.1.2. In addition, the USACE studies did not conduct in-depth hydrologic and hydraulic analyses related to hydropower operations or in-depth examination of boat waves as was conducted for Study No. 3.1.2.

CRC states on page 12 of its comments the following: *With the proposed expanded use of the upper reservoir, CRC anticipates that fluctuations in TFI elevation could become more frequent and use the allowable elevation range more fully than the Applicant has in the past; CRC is concerned that this would lead to a decrease in public access and recreation in the TFI.*

FirstLight simulated the operating conditions in the October 31, 2022, Flows and Fish Passage Agreement-in-Principle (AIR 2022)¹⁴ in its operations model, including expanded Upper Reservoir operating conditions, and summarized the impact on TFI water levels and erosion in the Supplemental Report referenced above. The Supplemental Report included hourly TFI elevation duration curves reflecting both baseline conditions (Baseline2022) and the AIP2022 at Transect 18BL, located approximately 2,800 feet upstream of the Northfield Mountain Project tailrace. As shown in the Supplemental Report, the TFI water levels under the AIP2022 are very similar to Baseline2022 conditions. In fact, on an annual basis the water levels are maintained higher under AIP2022 versus Baseline2022 conditions between the 30 and 100% exceedance intervals (see Figure 3.1-3 of Supplemental Report). In addition, based on the period June 1 to November 30, which generally reflects the recreation boating season, the water levels are again maintained higher under the AIP2022 (see Figure 3.1-4 of the Supplemental Report). Specifically, the water levels under the AIP2022 are above Baseline2022 conditions from approximately the 10% to 100% exceedance interval, with the lowest water level at approximately 179.5 feet.

Fish Passage Implementation Schedule (CRC Comments at pages 12-14)

CRC asserts that the fish passage implementation schedule is delayed.

Downstream Passage

Fish passage measures require time to obtain multi-agency approvals of 30%, 60%, 90% and 100% design drawings as required by the Agreement, to complete and secure multiple permits, and to construct the

¹⁴ AIP2022 does not exactly match the operating conditions in the Agreement; however, the differences are minor as discussed on Page 1-2 of the Supplemental Report. The Amended Flows and Fish Passage Agreement-in-Principle was filed with the Commission on October 31, 2022. Accession No. 20221031-5305.

facilities. Additionally, some fish passage measures will require detailed hydraulic models for purposes of maximizing the passage effectiveness to achieve agency performance goals outlined in the Agreement. All of these steps include ongoing multi-agency involvement and thus time for coordination, engagement, and agreement. FirstLight is required to consult with the Massachusetts Division of Fisheries and Wildlife (MDFW), National Marine Fisheries Service (NMFS), and United States Fish and Wildlife Service (USFWS) at each of the design intervals above, which takes planning and coordination.

In Mr. Zapel's affidavit he opines that it seems reasonable to expect that full implementation of the Cabot Downstream Fish Passage Facility might be possible within 3 to 3.5 years of license issuance, but that is only six months less than the 4 years in the Agreement. Mr. Zapel also states that the Station No. 1 rack could be implemented 3 years from license issuance. And relative to the barrier net, Mr. Zapel notes that it could be constructed within 4 to 4.5 years from license issuance. Note that Mr. Zapel provides absolute timelines for completing the fish passage structures, but that does not factor in when construction is completed relative to the period the fish passage facility is in use. For example, construction of the Spillway Lift could be completed in July of a given year, but it would not be operational until the next upstream fish passage season, which can add to the overall timeline. Thus, it is far from clear that the timelines proposed by Mr. Zapel would make any material difference in when the facilities would be operational and in use. In the Agreement, the years from license issuance are based on when the fish passage facility would be operational for the fish passage season.

Moreover, Mr. Zapel underestimates the extent to which the agency consultation requirements in the Agreement and duration of the permitting process directly impact the time to construct a fish passage facility. Mr. Zapel's experience is from a different part of the country, which may have different consultation and permitting processes. Based on our experience with completing the permitting process for several construction projects in Massachusetts in the last few years, it will take up to at least one year to complete the permitting process alone, as there are multiple state permits as well as other permitting requirements with other federal agencies. In addition, FirstLight is designing, permitting, and constructing two downstream facilities simultaneously for Cabot and Station No. 1, the Cabot trashrack structure and the Station No. 1 bar rack. Given the above, there is no reason to change the timeframes for constructing downstream passage in the Agreement as they are practical and grounded in years of Massachusetts-specific permitting experience. Also note that construction of the Cabot and Station No. 1 downstream passage structures will likely require having to dewater the power canal, thus no generation will occur. It is not in FirstLight's interest to delay the duration of construction.

Upstream Passage

The Agreement calls for constructing the Spillway Lift within 9 years of license issuance. Mr. Zapel opines that based on his previous fish passage facility design experience, a schedule for full implementation could be approximately 4-6.5 years, depending on the timeliness of agency reviews. He assumes that the Spillway Lift design would follow standard guidance derived from previous prototype configurations. Mr. Zapel also asserts that since the Plunge Pool would not be constructed until the Spillway Lift is constructed, full implementation could be completed in 6.5 to 8 years after license issuance.

A realistic schedule for constructing the Spillway Lift and Plunge Pool needs to consider a number of factors not addressed by Mr. Zapel: a) hydraulic modeling is needed in the design process to increase the likelihood of migratory fish finding the Spillway Lift entrance as well as negotiating the lift to meet agency fish passage performance goals, b) agency reviews of 30%, 60%, 90%, and 100% design drawings are required in the Agreement, c) at least one year will be needed to complete permitting, and d) the time of year for in-water work and construction of both the Plunge Pool and Spillway Lift will affect when they are actually put into use. Construction of the Spillway Lift and Plunge Pool will require having to dewater the work area from below Turners Falls Dam bascule gate 1 and downstream to the Spillway Lift entrance area via use of cofferdams or other means. The in-water work will ideally be timed with the low-flow season during the summer period, which is another factor to consider in the schedule. The timing of when the license is

issued will factor into when the construction work can occur during the low flow season. Finally, if construction of the Spillway Lift and Plunge Pool occurs just after the upstream or downstream fish passage seasons, this will add to the overall schedule.

Contrary to Mr. Zapel’s assumption, the proposed Spillway Lift is not necessarily a standard prototype, as it includes some relatively new untested features, like a palisades entrance, and is being constructed at the same time as the Plunge Pool. Both structures are integral to each other and the Plunge Pool outlet must be designed to ensure fish can find the entrance to the Spillway Lift. Flow will pass from the Plunge Pool through a palisade structure adjacent to the Spillway Lift entrance, which will be used for attraction flow to the Spillway Lift. Mr. Zapel’s own estimate is for full implementation in 6.5 to 8 years, thus 9 years is a reasonable estimate for having the Spillway Lift operational considering the modeling, design intervals and consultation with agencies, permitting, timing of when the license is issued and construction period. In addition to the 30, 60, 90 and 100% design reviews, the agency design criteria for upstream and downstream passage are occasionally modified, tending to lengthen both the consultation process and modifications needed to address the updated design criteria between the various design intervals.

Fish Passage Adaptive Management Measures and Effectiveness Testing Schedule (CRC Comments at pages 14-15)

Per the Agreement, FirstLight will complete construction of each fish passage facility, operate the facility for one season (shakedown year), and then conduct effectiveness testing as outlined in Table 5.

Table 5. Agreement Schedule for Operation/Shakedown and Initial Effectiveness Testing

Facility (Operational Period in Parenthesis)	Operational/ Shakedown Year after License Issuance	Initial Effectiveness Testing Study Years and Locations Testing	Locations testing
¹ Cabot Downstream Fish Passage Facility & Station No. 1 Bar Rack (4/4-11/15)	4	6-7	Cabot, Station No. 1- downstream testing
Barrier Net (6/1-11/15)	7	10-11	Barrier Net, Plunge Pool, Spillway Lift- upstream and downstream testing
Plunge Pool (4/4-11/15) Spillway Lift (4/4-7/15)	9	10-11	
¹ Per the Agreement, these times are from license issuance based on the time needed to complete construction. The actual first year of operation of these two facilities will depend on when the license is issued. If the license is issued in quarter 1 (Q1, Jan 1-Mar 31) then these two facilities will be operational no later than April 1 of Year 4 after license issuance; if it is issued in Q2 then these two facilities will be operational no later than August 1 of Year 4 after license issuance; and if it is issued after Q2 then these two facilities will be operational no later than April 1 of Year 5 after license issuance.			

CRC states the following on page 14 of its comments: *Depending on the quarter in which the final license is issued, the Applicant proposes to conduct a shakedown year for the Station No. 1 rack and Cabot Rack either in Year 4 or Year 5 after License issuance. For all other fish passage construction projects, the Applicant proposes to complete installation and the shakedown year within the same year or season; this should also be the case for the Station No. 1 rack and Cabot Rack.*

As the table above shows, FirstLight proposes to construct and implement shakedown of the Cabot and Station No. 1 downstream fish passage structures in the same year; however, that year could be Year 4 or 5, as noted in footnote 1 in the above table.

CRC states the following on page 14 of its comments: *Initial effectiveness studies to evaluate the Station No. 1 rack and Cabot Rack are proposed to happen in Years 6 and 7 with final reports by February 1 of Years 7 and 8 for adult shad, and juvenile shad and adult eel, respectively. The Applicant does not explain why reporting will take longer for juvenile shad and adult eels and CRC disagrees that downstream passage reporting would reasonably take between 1-2 full years.*

First, CRC incorrectly lists the dates when reports will be issued. Per the Agreement, FirstLight will provide reports by February 1 of Years 7 and 8 for adult shad, and by April 1 of Years 7 and 8, for juvenile shad and adult eel. Second, CRC's question reflects a lack of understanding of fish passage. The timing of upstream and downstream fish passage varies. Studies for juvenile shad and adult eels will occur over the downstream fish passage season, which per the Agreement (see Article A340. Fishway Operating Periods) and as included in the above table, extends from April 1 to November 15. Downstream fish passage effectiveness studies will be conducted during this period. It will take time after the downstream fish passage season concludes to conduct rigorous and robust statistical analyses of the data to monitor and track fish and evaluate the effectiveness of the downstream fish passage structures. Conducting the statistical analyses and developing a report by April 1 of the following year is a realistic and reasonable schedule.

CRC states the following on page 14 of its comments: *Additionally,, it is unclear why no AMM effectiveness testing is done in Year 9. Effectiveness testing could begin in the same year that the Round 1 AMMs are implemented; this applies to further rounds of effectiveness testing for AMMs in Years 12, 13 and 17.* It is assumed that CRC is referring to adaptive management measures (AMMs) associated with the Cabot and Station No. 1 downstream fish passage structures. CRC fails to recognize the various steps and necessary schedule between when the initial effectiveness testing is completed and having the AMM operational. In the case of the Cabot and Station No. 1 fish passage structures, those steps include a) the Year 7 initial effectiveness study results need to be summarized in a report by April 1 of Year 8 and provided to MDFW, NMFS, and USFWS, b) per the Agreement, the MDFW, NMFS, USFWS, and FirstLight are required to consult on the effectiveness testing results, evaluate the list of the AMMs, and identify what AMMs are most likely to improve passage efficiency (note that the list of downstream AMMs include installing equipment (Station No. 1 behavioral barrier) or modifications to the Cabot downstream fish passage structure) and c) implementation of the AMMs will require time for design, planning, potential permitting, and construction. Based on the above steps, it is unrealistic to implement AMMs by the start (April 4) of the next downstream fish passage season in Year 9. The same rationale discussed above also applies to the future rounds of effectiveness testing.

CRC states the following on page 14 of its comments: *For the Turners Falls Dam Plunge Pool, initial effectiveness testing is proposed in Year 10 – 11 and Round 1 AMM effectiveness testing is proposed in Years 14 and 15. Round 1 AMMs include modifying the bascule gate setting and resultant spill. Essentially, this includes increasing the minimum flow and the bascule gates from which flow is provided; this AMM can be implemented at any time without significant effort on the part of the Applicant, so it is unclear why this would not happen in Year 12 and 13.* FirstLight is not opposed to modifying the bascule gate setting and resultant spill in Years 12 and 13 based on consultation with MDFW, NMFS, and USFWS. However, FirstLight would conduct effectiveness testing associated with modifications to the bascule gate in Years 14-15 to align all downstream testing (Barrier Net, Plunge Pool, Station No. 1 and Cabot) in the same year. FirstLight sees no reason to conduct downstream fish passage effectiveness studies of the Plunge Pool in Years 12 and 13 in isolation, especially when the tagged fish would be released upstream of the dam and could also pass into the canal. Also consider that if AMMs are implemented at the downstream passage facilities at Station No. 1 and Cabot Station, they would likely be constructed in Year 12 or 13, and the power canal could potentially be dewatered to construct the AMMs meaning any effectiveness testing of

the bascule gates would not be representative of actual operating conditions as all flow would be passed at the dam.

CRC states the following on page 14 of its comments: *For upstream fish passage, Tier 2 AMMs are proposed to be implemented in Years 15 and 16 with a shakedown year in Year 17. For most of the proposed fish passage measures, the shakedown year takes place within the same year of construction or modification. The Applicant does not justify the need for an additional year to implement Tier 2 AMMs.*

CRC makes the same arguments relative to the timing of implementing and testing upstream fish passage AMMs as it does for downstream passage. The same rationale discussed above relative to downstream passage is applicable here as well.

Barrier Net (CRC Comments at pages 18-20)

FirstLight conducted a study entitled *Evaluate Upstream and Downstream Passage of Adult Shad* (Study 3.3.2)¹⁵. The results from Study 3.3.2 and comparison of annual fish counts have demonstrated a high proportion of adult shad successfully migrate between Turners Falls and Vernon Dams indicating a low risk of adult shad entrainment due to the Northfield Mountain Project pumping operations. Layzer (1978)¹⁶ examined the behavior of tagged adult American Shad, with emphasis on Northfield Mountain in 1975 and 1976. He noted that adult shad had a strong preference for deeper sections of the river and did not report any entrainment. Layzer (1978) reported adult shad milling in the tailrace area but found the same behavior in other portions of TFI and concluded it to be normal behavior largely unrelated to Northfield Mountain Project operations. Fish that were frequently found near the tailrace during the day were later found about three kilometers (km) upriver. Use of pool habitats near the tailrace may serve as a resting or staging area rather than as an effect of Northfield Mountain Project operations. Per the study findings, adult shad migrate through deeper sections of the river, most on the opposite side of the river from the Northfield Mountain Project intake/tailrace limiting exposure to the intake/tailrace area. Additionally, adult shad swimming speeds exceed velocities experienced near the tailrace/intake area during pumping operations. Prolonged swim speeds of 7.2 body lengths/s (Castro-Santos 2005)¹⁷, greater than 2.2 meters per second (m/s) (7.2 feet per second, ft/s), (Weaver 1965¹⁸, Haro et al. 2004)¹⁹, and approximately 7 ft/s (Bell 1991)²⁰ and burst speeds of approximately 14.5 ft/s (Bell 1991) and 13 ft/s (Beamish 1978)²¹ were reported. FirstLight conducted Study 3.3.9 entitled *Two-Dimensional Modeling of the Northfield Mountain Pumped Storage Project Intake/Tailrace Channel and Connecticut River Upstream and Downstream of the*

¹⁵ FirstLight (2016). *Evaluate Upstream and Downstream Passage of Adult Shad*. Study No. 3.3.2. Addendum 1 (2017).

¹⁶ Layzer, J.B. 1978. Northfield Mountain Pumped Storage Hydroelectric Project anadromous fish study: Part I. behavior of ultrasonic tagged adult American Shad, *Alosa sapidissima*, in the Connecticut River with particular reference to the Northfield Mountain Pumped Storage Hydroelectric Project and the Vernon Dam 1973-1976. Report to Northeast Utilities Service Company, Berlin, CT.

¹⁷ Castro-Santos, T. 2005. Optimal swim speeds for traversing velocity barriers: an analysis of volitional high-speed swimming behavior of migratory fishes. *The Journal of Experimental Biology* 208:421-432.

¹⁸ Weaver, C.R. 1965. Observations on the swimming ability of adult American Shad (*Alosa sapidissima*). *Transactions of the American Fisheries Society* 94:382-385.

¹⁹ Haro, A., T. Castro-Santos, J. Noreika, and M. Odeh. 2004. Swimming performance of upstream migrant fishes in open-channel flow: a new approach to predicting passage through velocity barriers. *Canadian Journal of Fisheries and Aquatic Science* 61:1590-1601.

²⁰ Bell, M.C. 1991. Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers, North Pacific Division, Portland, Oregon.

²¹ Beamish, F.W.H. 1978. Swimming capacity. In: Hoar, W.S. and D.J. Randall, eds. *Fish Physiology*, Volume 7, Locomotion. Academic Press, NY. 576 pp.

*Intake/Tailrace*²². As part of this study, velocities in the Connecticut River in the vicinity of the Northfield Mountain Project tailrace/intake were modeled for several scenarios using the River 2D model. In scenarios comprising the highest risk of entrainment (e.g., low (95% exceedance)) river flow, and low level of the TFI during pumping operations at 7,600 cfs (2 pumps), the magnitude range of predicted velocities was 0 – 3 ft./s. During pumping operations of 15,200 cfs (4 pumps), the range was 0 – 5 ft/s. Maximum field measured velocities within the tailrace at a transect approximately 25 ft. in front of the intake rack were approximately 4.5 ft/s during both pumping scenarios

Study 3.3.2, conducted in 2015, again demonstrated that migrating shad within the TFI (fish that migrated successfully through the Gatehouse ladder or were released into the TFI) faced little migratory disruption due to Northfield Mountain Project operations. During the study, 145 dual tagged adult shad were released into the TFI. Of those fish, 100 were recaptured above the Northfield Mountain Project tailrace/intake. No tagged fish were detected in the Northfield Mountain Project Upper Reservoir. Entrainment did not occur at the Northfield Mountain Project intake during upstream or downstream adult shad migrations.

Thus, there is no reason to have the barrier net in place in the spring when adult shad are migrating upstream. Additionally, high spring flows would pose practical difficulties to maintaining the barrier net, both for logistical reasons and safety of FirstLight personnel.

CRC asserts that the barrier net may not work and that adaptive management measures should include pumping restrictions and new, undeveloped technologies. Mr. Zapel's own affidavit discusses his experience with “*similar very large barrier exclusion nets*”. Further, CRC acknowledges that even larger barrier nets than Northfield have been in use at other hydroelectric projects for decades. CRC's assertion that the barrier net may not work is simply unsubstantiated opinion and not based on expert testimony.

When developing conceptual level layout and cost estimates for the barrier net, FirstLight consulted Pacific Netting, which has designed and deployed several full depth fish guidance barrier nets with good results. These include the longest full exclusion barrier net in the world which has been deployed at Consumers Energy Ludington Pump Storage Facility in Michigan seasonally since 2002. Fish guidance nets for salmon smolts migrating downstream at Tacoma Power's Cushman Dam, and at both of Puget Sound Energy's Upper and Lower Baker Lakes have been successfully deployed. Full exclusion barrier nets have also been successfully deployed for years at Ameren UE's Bagnell Dam on the Lake of the Ozarks, Missouri. Given the use of well-tested barrier net systems, and with proper time to further model and design the barrier net, there is no reason to believe it will not be effective.

Northfield Mountain Entrainment

CRC is concerned about the loss of fish eggs and larvae to Northfield Mountain pumping operations. The entrainment of shad eggs and larvae from Northfield Mountain Project operations has an insignificant effect on the Connecticut River shad population. FirstLight conducted a study entitled: *Ichthyoplankton Entrainment Assessment at the Northfield Mountain Project* (Study 3.3.20)²³. The field work was conducted in 2015. FirstLight repeated the same study²⁴ (field work in 2016). As noted in these reports, based on the entrainment estimates and published survival fractions, the number of equivalent juvenile and adult shad lost to entrainment as eggs and larvae at the Northfield Mountain Project was estimated to be 696 juveniles or 94 adults in 2015 and 2,093 juveniles or 578 adults in 2016. To put these numbers into perspective, the equivalent adults lost to entrainment in 2015 and 2016 at the Northfield Mountain Project

²² FirstLight (2015). Two-Dimensional Modeling of the Northfield Mountain Pumped Storage Project Intake/Tailrace Channel and Connecticut River Upstream and Downstream of the Intake/Tailrace. Study No. 3.3.9.

²³ FirstLight (2016a). Ichthyoplankton Entrainment Assessment at the Northfield Mountain Project. 2015 Field Work. Study No. 3.3.20.

²⁴ FirstLight (2016b). Ichthyoplankton Entrainment Assessment at the Northfield Mountain Project. 2016 Field Work. Study No. 3.3.20.

ranged from 0.1% to 1.1% of the Turners Falls gatehouse passage. Though entrainment of shad eggs and larvae occurs, the effects of entrainment on the Connecticut River shad population are minimal.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Federal Energy Regulatory Commission in these proceedings.

Dated at Washington, DC this 12th day of June, 2023.

/s/ Melear Tauch
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