UNITED STATES OF AMERICA BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

FirstLight MA Hydro LLC Northfield Mountain LLC) Project Nos. 1889-085) 2485-071

RESPONSE OF FIRSTLIGHT MA HYDRO LLC AND NORTHFIELD MOUNTAIN LLC TO COMMENTS, RECOMMENDATIONS, AND PRELIMINARY TERMS AND CONDITIONS

July 8, 2024

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Abbreviation	Definition/Description
ALU	Aquatic Life Use
Amended FLA	Amended Final Applications for New License for Major Water Power Project— Existing Dam for the Turners Falls Hydroelectric Project and Northfield Mountain Pumped Storage Project, Project Nos. 1889-092 and 2485-079 (filed Dec. 4, 2020)
BSTEM	Bank Stability and Toe Erosion Model
CALM	Massachusetts Consolidated Assessment and Listing Methodology Criteria
cfs	Cubic feet per second
Coalition	Nolumbeka Project/Tribal Coalition. The Tribal Coalition consists of the Nolumbeka Project, the Chaubunagungammaug Band of Nipmuck Indians, and the Elnu Abenaki Tribe.
Commission	Federal Energy Regulatory Commission
Conte Lab	Silvio O. Conte Anadromous Fish Research Center
CRC	Connecticut River Conservancy
Dethier Review	Review of Erosion in the Turners Falls Impoundment by Dr. Evan Dethier (May 19, 2024)
DO	Dissolved oxygen
eDNA	Environmental DNA
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FFP Settlement Agreement	Flows and Fish Passage Settlement Agreement and Explanatory Statement, Project Nos. 1889-085 and 2485-071 (filed Mar. 31, 2023)
FFP Settlement Agreement Response	Response of FirstLight MA Hydro LLC and Northfield Mountain LLC to Comments on Flows and Fish Passage

GLOSSARY

Abbreviation	Definition/Description
	Settlement Agreement, Project No. 1889- 085 (filed June 12, 2023)
Final Amendments	Final Amendments to Final License Applications, Project Nos. 1889-085 and 2485-071 (filed Mar. 22, 2024)
FirstLight	FirstLight Hydro MA LLC and Northfield Mountain LLC
FLA	Final Application for New License for Major Water Power Project—Existing Dam for the Turners Falls Hydroelectric Project and Northfield Mountain Pumped Storage Project, Project Nos. 1889-085 and 2485-071 (filed Apr. 29, 2016)
FPA	Federal Power Act
FRCOG	Franklin Regional Council of Governments
GHG	Greenhouse gas
HPMPs	Historic Property Management Plans
Inter-Fluve Review	Technical Memorandum prepared by Inter- Fluve, Inc. (filed June 20, 2024)
Interior	U.S. Department of the Interior
MADEP	Massachusetts Department of Environmental Protection
MDCR	Massachusetts Department of Conservation and Recreation
MDFW	Massachusetts Division of Fisheries and Wildlife
MOA	Memorandum of Agreement
MOUIP	Memorandum of Understanding in Principle
NEANS	Northeast Aquatic Nuisance Species
NHESP	Massachusetts Natural Heritage and Endangered Species Program
NMFS	National Marine Fisheries Service
Northfield Mountain Project	Northfield Mountain Pumped Storage Project
NPS	National Park Service

Abbreviation	Definition/Description
NRC	National Response Center
PM&E	Protection, mitigation, and enhancement
Projects	Northfield Mountain Pumped Storage Project and Turners Falls Hydroelectric Project
REA Notices	February 22, 2024 Notices of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions
Recreation Settlement Agreement	Recreation Settlement Agreement and Explanatory Statement, Project Nos. 1889- 085 and 2485-071 (filed June 12, 2023)
Revised IAPSMP	Revised Invasive Aquatic Plant Species Management Plans
Study 3.1.2	Study 3.1.2, Northfield Mountain / Turners Falls Operations Impacts on Existing Erosion and Potential Bank Stability
ТСР	Traditional Cultural Property
TFI	Turners Falls Impoundment
Turners Falls Project	Turners Falls Hydroelectric Project
Turners Falls IPSMP Plan	Turners Falls Hydroelectric Project Invasive Plant Species Management Plan
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WUA	Weighted usable area

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FirstLight MA Hydro LLC)	Project Nos. 1889-085
Northfield Mountain LLC)	2485-071

RESPONSE OF FIRSTLIGHT MA HYDRO LLC AND NORTHFIELD MOUNTAIN LLC TO COMMENTS, RECOMMENDATIONS, AND PRELIMINARY TERMS AND CONDITIONS

Pursuant to Section 4.34(b) of the regulations of the Federal Energy Regulatory Commission ("Commission" or "FERC"),¹ and in accordance with the Commission's February 22, 2024 Notices of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions ("REA Notices"),² 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 the comments, recommendations, and preliminary terms and conditions filed in response to

¹ 18 C.F.R. § 4.34(b) (2023).

² On April 10, 2024, the Commission granted the requests of the Connecticut River Conservancy ("CRC") and the Franklin Regional Council of Governments ("FRCOG") for a 30-day extension of the deadline to file comments in response to the REA Notices, thereby also automatically extending the deadline for reply comments to July 8, 2024. *See* Notice Granting Extension of Time, Project No. 1889-085 et al. (issued Apr. 10, 2024); 18 C.F.R. § 4.34(b) (reply comments due 45 days after the comment deadline).

FERC's REA Notices on FirstLight's relicensing proposal for the Turners Falls Project and the Northfield Mountain Project (collectively, "Projects").³

I. OVERVIEW OF COMMENTS ON THE AMENDED FINAL LICENSE APPLICATIONS

In addition to numerous comments (and one motion to intervene⁴) of individuals, 38 entities timely filed comments and/or motions to intervene in response to FERC's REA Notice: Western Mass Rights of Nature;⁵ Town of Erving, Massachusetts;⁶ Great River Hydro, LLC;⁷ ISO New England Inc.;⁸ Massachusetts State legislators;⁹ Braintree Electric Light Department;¹⁰ the Town of Groveland, Massachusetts Municipal Light Department;¹¹ Merrimac Municipal Light Department;¹² Hingham Municipal Lighting

³ Final Application for New License for Major Water Power Project—Existing Dam for the Turners Falls Hydroelectric Project and Northfield Mountain Pumped Storage Project, Project Nos. 1889-085 and 2485-071 (filed Apr. 29, 2016) ("FLA"); Amended Final Applications for New License for Major Water Power Project—Existing Dam for the Turners Falls Hydroelectric Project and Northfield Mountain Pumped Storage Project, Project Nos. 1889-092 and 2485-079 (filed Dec. 4, 2020) ("Amended FLA"); Flows and Fish Passage Settlement Agreement and Explanatory Statement, Project Nos. 1889-085 and 2485-071 (filed Mar. 31, 2023) ("FFP Settlement Agreement"); Recreation Settlement Agreement and Explanatory Statement, Project Nos. 1889-085 and 2485-071 (filed June 12, 2023) ("Recreation Settlement Agreement"); Final Amendments to Final License Applications, Project Nos. 1889-085 and 2485-071 (filed Mar. 22, 2024) ("Final Amendments"). Collectively, the Amended FLA, the FFP Settlement Agreement, the Recreation Settlement Agreement, and the Final Amendments will be referred to throughout this Response as "FirstLight's relicensing proposal."

⁴ Motion to Intervene and Comments of Karl Meyer, Project No. 1889-000 et al. (filed May 22, 2024). *See also* Comments of Karl Meyer, Project No. 1889-000 (filed June 6, 2024). These comments were filed over two weeks late and were thus untimely.

⁵ Comments of Western Mass Rights of Nature, Project No. 1889-000 et al. (filed Mar. 22, 2024) ("Western Mass Rights of Nature Comments").

⁶ Motion to Intervene of Town of Erving, Massachusetts, Project No. 1889-085 et al. (filed Apr. 8, 2024).

⁷ Motion to Intervene of Great River Hydro, LLC, Project No. 1889-085 et al. (filed Apr. 10, 2024).

⁸ Comments of ISO New England Inc., Project No. 1889-000 et al. (filed Apr. 22, 2024) ("ISO-NE Comments").

⁹ Comments of Massachusetts General Court, Project No. 1889-085 et al. (filed May 2, 2024).

¹⁰ Comments of Braintree Electric Light Department, Project No. 1889-092 et al. (filed May 13, 2024).

¹¹ Comments of the Town of Groveland, Massachusetts Municipal Light Department, Project No. 1889-092 et al. (filed May 13, 2024).

¹² Comments of Merrimac Municipal Light Department, Project No. 1889-092 et al. (filed May 13, 2024).

Plant;¹³ Town of Wellesley, Massachusetts Municipal Light Plant;¹⁴ Town of Norwood, Massachusetts Municipal Light Department;¹⁵ Middleton Electric Light Department;¹⁶ Belmont Municipal Light Department;¹⁷ Town of Stowe Electric Department;¹⁸ American Whitewater, Appalachian Mountain Club, Zoar Outdoor, and Crab Apple Whitewater;¹⁹ League of Women Voters of Amherst, Massachusetts;²⁰ North Attleborough Electric Department;²¹ Energy New England, LLC.;²² Taunton Municipal Lighting Plant;²³ Rowley Municipal Lighting Plant;²⁴ the U.S. Department of the Interior ("Interior") on behalf of the National Park Service ("NPS"), U.S. Fish and Wildlife Service ("USFWS"), and U.S. Geological Survey ("USGS");²⁵ Massachusetts Business Roundtable;²⁶ Western Mass Economic Development Council;²⁷ the Gill Historical

¹³ Comments of Hingham Municipal Lighting Plant, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁴ Comments of the Town of Wellesley, Massachusetts Municipal Light Plant, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁵ Comments of the Town of Norwood, Massachusetts Municipal Light Plant, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁶ Comments of Middleton Electric Light Department, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁷ Comments of Belmont Municipal Light Department, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁸ Comments of Stowe Electric Department, Project No. 1889-092 et al. (filed May 13, 2024).

¹⁹ American Whitewater, Appalachian Mountain Club, Zoar Outdoor, and Crab Apple Whitewater Motion to Intervene and Comments, Project No. 1889-085 et al. (filed May 13, 2024).

²⁰ Comments of League of Women Voters of Amherst, Massachusetts, Project No. 1889-000 et al. (filed May 14, 2024).

²¹ Comments of North Attleborough Electric Department, Project No. 1889-092 et al. (filed May 15, 2024).

²² Comments of Energy New England, LLC, Project No. 1889-092 et al. (filed May 15, 2024).

²³ Comments of Taunton Municipal Lighting Plant, Project No. 1889-092 et al. (filed May 15, 2024).

²⁴ Comments of Rowley Municipal Lighting Plant, Project No. 1889-092 et al. (filed May 15, 2024).

²⁵ Comments, Recommendations, Terms and Conditions, and Prescriptions of the U.S. Department of the Interior, Project No. 1889-085 et al. (filed May 16, 2024) ("Interior Comments"); Notice of Intervention of the U.S. Department of the Interior, Project No. 2485-071 (filed May 21, 2024); Notice of Intervention of the U.S. Department of the Interior, Project No. 1889-085 (filed May 21, 2024); Notice of Intervention of the U.S. Department of the Interior, Project No. 1889-085 (filed May 22, 2024); Notice of Intervention of the U.S. Department of the Interior, Project No. 1889-085 et al. (filed May 22, 2024).

²⁶ Comments of Massachusetts Business Roundtable, Project No. 1889-092 et al. (filed May 17, 2024).

²⁷ Comments of Western Mass Economic Development Council, Project No. 1889-000 et al. (filed May 17, 2024).

Commission;²⁸ Massachusetts Division of Fisheries and Wildlife ("MDFW");²⁹ Montague Historical Commission;³⁰ National Marine Fisheries Service ("NMFS");³¹ International Brotherhood of Electrical Workers Local Union 455;³² Vermont Agency of Natural Resources;³³ American Rivers;³⁴ the Nolumbeka Project/Tribal Coalition ("Coalition");³⁵ FRCOG;³⁶ the Town of Gill, Massachusetts;³⁷ the Town of Montague, Massachusetts;³⁸ CRC;³⁹ University of Massachusetts Energy Policy and Rivers;⁴⁰

²⁸ Comments of the Historical Commission of the Town of Gill, Project No. 1889-085 et al. (filed May 20, 2024).

²⁹ Comments of Massachusetts Division of Fisheries and Wildlife, Project No. 1889-000 et al. (filed May 20, 2024) ("MDFW Comments"); (doc-less) Motion to Intervene of MA Division of Fisheries and Wildlife, Project No. 1889-000 et al. (filed May 21, 2024).

³⁰ Comments by the Montague Historical Commission, Project No. 1889-085 et al. (filed May 21, 2024).

³¹ Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Prescription for Fishways of the National Marine Fisheries Service, Project No. 1889-085 et al. (filed May 21, 2024) ("NMFS Comments").

³² Comments of International Brotherhood of Electrical Workers Local Union 455, Project No. 1889-092 et al. (filed May 21, 2024).

³³ Motion to Intervene of the Vermont Agency of Natural Resources, Project No. 1889-085 et al. (filed May 21, 2024).

³⁴ Comments and Recommendations of American Rivers, Project No. 1889-085 et al. (filed May 21, 2024).

³⁵ Motion to Intervene of the Nolumbeka Project Tribal Coalition, Project No. 1889-085 et al. (filed May 20, 2024); Comments and Recommendations of the Nolumbeka Project/Tribal Coalition, Project No. 1889-085 et al. (filed May 22, 2024) ("Coalition Comments").

³⁶ Motion to Intervene of the Franklin Regional Council of Governments, Project No. 1889-085 et al. (filed Apr. 17, 2024); Comments and Recommended Terms of the License Submitted for Consideration by the Franklin Regional Council of Governments, Project No. 1889-085 et al. (filed May 22, 2024) ("FRCOG Comments").

³⁷ Motion to Intervene of the Town of Gill, Massachusetts, Project No. 1889-085 et al. (filed May 14, 2024); Comments and Recommendations Submitted for Consideration by the Town of Gill, Project No. 1889-085 (filed May 22, 2024).

³⁸ Motion to Intervene and Declaration of Intention of Town of Montague, Massachusetts, Project No. 1889-085 et al. (filed Apr. 1, 2024); Comments of the Town of Montague, Massachusetts, Project No. 1889-085 et al. (filed May 22, 2024) ("Montague Comments").

³⁹ Comments of Connecticut River Conservancy, Project No. 1889-085 et al. (filed May 22, 2024) ("CRC Comments"). To the extent the CRC Comments rely on CRC's comments on the FFP Settlement Agreement (*see* CRC Comments at 6, 7, 11-14, 19, 35), FirstLight would remind FERC that those comments are subject to FirstLight's pending Motion to Strike. Response of FirstLight MA Hydro LLC and Northfield Mountain LLC to Comments on Flows and Fish Passage Settlement Agreement at 27-29, Project No. 1889-085 (filed June 12, 2023) ("FFP Settlement Agreement Response").

⁴⁰ Comments of University of Massachusetts Energy Policy and Rivers, Project No. 1889-085 (filed May 22, 2024).

Ashuelot River Local Advisory Committee;⁴¹ and Connecticut River Defenders.⁴²

In addition to the late-filed comments of Karl Meyer, five entities filed comments after the deadline in response to FERC's REA Notice: Reading Municipal Light Department;⁴³ the Massachusetts Congressional Delegation;⁴⁴ the Town of Northfield, Massachusetts and Northfield Historical Commission;⁴⁵ Northeast Clean Energy Council;⁴⁶ and Massachusetts Municipal Wholesale Electric Company.⁴⁷ FirstLight does not object to FERC's consideration of the late-filed comments.

NMFS submitted its preliminary prescriptions for fishways and reservation of authority⁴⁸ under Section 18 of the Federal Power Act ("FPA")⁴⁹ and recommendations under FPA Section 10(j).⁵⁰ NMFS is a signatory to the FFP Settlement Agreement.

⁴¹ Comments of Ashuelot River Local Advisory Committee, Project No. 1855-050 et al. (filed May 22, 2024).

⁴² Comments of Connecticut River Defenders, Project No. 2485-000 (filed May 22, 2024).

⁴³ Comments of Reading Municipal Light Department, Project No. 1889-000 et al. (filed May 23, 2024). These comments were filed one day late and were thus untimely.

⁴⁴ Comments of United States Senator Edward J. Markey, United States Senator Elizabeth Warren, and United States Congressman James P. McGovern, Project No. 1889-000 et al. (filed May 23, 2024). These comments were filed one day late and were thus untimely.

⁴⁵ Comments of Town of Northfield, Massachusetts and the Northfield Historical Commission, Project No. 1889-085 et al. (filed May 23, 2024). These comments were filed one day late and were thus untimely. However, the Town timely-filed an intervention. Motion to Intervene of Town of Northfield, Massachusetts, Project No. 1889-085 et al. (filed Apr. 8, 2024).

⁴⁶ Comments of Northeast Clean Energy Council, Project No. 1889-092 et al. (filed May 29, 2024). These comments were filed one week late and were thus untimely.

⁴⁷ Comments of Massachusetts Municipal Wholesale Electric Company, Project No. 1889-092 et al. (filed June 4, 2024). These comments were filed two weeks late and were thus untimely.

⁴⁸ NMFS Comments, Att. A; Errata Notice and Correction to the NMFS Preliminary Prescription for Fishways, Project Nos. 1889-085 and 2485-071 (filed June 7, 2024).

⁴⁹ 16 U.S.C. § 811.

⁵⁰ *Id.* § 803(j).

Interior submitted FPA Section 10(j) and Section 10(a)⁵¹ recommendations and its preliminary Section 18 fishway prescriptions and reservation of authority⁵² on behalf of USFWS. USFWS is a signatory to the FFP Settlement Agreement. Interior also submitted a reservation of authority under Section 4(e) of the FPA⁵³ in connection with the Silvio O. Conte Anadromous Fish Research Center ("Conte Lab") administered by USGS. The Interior Comments state that NPS supports both the FFP Settlement Agreement and the Recreation Settlement Agreement. NPS is a signatory to the Recreation Settlement Agreement.

The Section 18 fishway prescriptions and reservations of authority submitted by NMFS and Interior are consistent with the FFP Settlement Agreement.

Regarding Interior's Section 4(e) reservation for Conte Lab, Interior asserts that, although Conte Lab itself will no longer be within the Turners Falls Project boundary under FirstLight's proposed boundary change, which it supports, it has certain access rights to Conte Lab which give it a continued "interest in land" within the boundary and thus authority to mandate Section 4(e) conditions.⁵⁴ FirstLight disagrees that Section 4(e) applies to the Turners Falls Project.⁵⁵

On June 28, 2024, FirstLight filed for the Commission's information a Memorandum of Agreement ("MOA") between FirstLight and Interior resolving all outstanding issues regarding Conte Lab. Pursuant to the MOA, Interior agreed to submit

⁵¹ *Id.* § 803(j), (a).

⁵² Interior Comments, Att. E; U.S. Department of the Interior Errata Notice on behalf of U.S. Fish and Wildlife Service for the Preliminary Prescription for Fishways, Project Nos. 1889-085 and 2485-071 (filed June 10, 2024).

⁵³ 16 U.S.C. § 797(e).

⁵⁴ Interior Comments at 34-35.

⁵⁵ See U.S. Forest Serv. v. Cowpasture River Preservation Ass'n, 590 U.S. 604, 615 (2020) ("a right-ofway... grants only an easement across the land, not jurisdiction over the land itself.").

a modified reservation of authority consistent with the MOA, in consideration for FirstLight's agreement to make certain changes to an existing easement and water use agreement related to USGS use of the Conte Lab. Neither the MOA nor the amended agreements are intended to become conditions of the new Turners Falls Project license. Interior filed its modified reservation of authority on July 2, 2024.⁵⁶ The modified reservation of authority is intended to become a condition of the new Turners Falls Project license.

MDFW, also a signatory to the FFP Settlement Agreement, submitted recommendations pursuant to FPA Sections 10(j) and 10(a).

While most of the USFWS and MDFW recommendations are consistent with the FFP Settlement Agreement, they also recommend certain conditions not covered by the FFP Settlement Agreement. FirstLight will address those proposed conditions below.

Of the 43 comments and/or interventions by entities other than individuals, 19 offered unqualified support for FirstLight's relicensing proposal, for which FirstLight is highly appreciative. These included letters of support from ISO New England, municipal power agency customers of FirstLight, business interests, and labor union interests, all citing the importance of the Projects in promoting clean, reliable, low-cost energy and jobs.

Other commenters supported some aspects of FirstLight's relicensing proposal but objected to others and requested additional protection, mitigation and enhancement ("PM&E") measures be required in the new Projects' licenses. This Response will only address the requests for additional license conditions. FirstLight is not responding to

⁵⁶ U.S. Department of the Interior Submits Amendment to Reservation of 4(e) Authority re the Turners Falls Hydroelectric Project, Project No. 1889-085 (filed July 2, 2024).

every comment by every commenter but has focused on the major contested issues. FirstLight's silence as to any particular argument or factual assertion by a commenter should not be read as an admission to or agreement with such argument or assertion. Since CRC filed the most comprehensive comments, FirstLight's Response treats CRC's comments as proxy for other commenters who support one or more of CRC's positions on several of the issues.

II. LEGAL FRAMEWORK

Before addressing the specific PM&E measures and other conditions to which it objects, FirstLight believes it would be useful to lay out the legal framework by which the Commission and the courts evaluate proposed license conditions under Sections 4(e), 10(a), and 10(j) of the FPA.

A. Substantial Evidence Standard

Section 10(j) and 10(a) recommendations must be supported by substantial evidence in the record pursuant to Section 313(b) of the FPA.⁵⁷ The "substantial evidence" test is a threshold evidentiary standard requiring agencies or other entities to support their conditions and recommendations with a rational evidentiary basis to ensure that FERC's adoption of such recommendations is appropriately supported. If a Section 10(a) or 10(j) recommendation fails to meet the substantial evidence test, the Commission must reject it.⁵⁸

⁵⁷ 16 U.S.C. § 825*l*(b).

<sup>Henwood Assocs., 50 FERC ¶ 61,183 at pp. 61,548-49 (1990); see also Topsham Hydro Partners Ltd.
P'ship, 184 FERC ¶ 62,151 (2023) (rejecting several 10(j) recommendations as unsupported by substantial evidence); Gustavus Elec. Co., 110 FERC ¶ 61,334 at P 30 (citing U.S. Dep't of the Interior v. FERC, 952 F.2d 538, 544 (D.C. Cir. 1992), reh'g denied, 111 FERC ¶ 61,424, order on reconsideration, 111 FERC ¶ 61,424 (2005); FPL Energy Me. Hydro, LLC, 95 FERC ¶ 61,016 (2001)); Pub. Util. Dist. No. 1 of Pend Oreille Cnty., 112 FERC ¶ 61,055 at P 65 (2005) (rejecting recommendations for bald eagle perching where there was no evidence that the amount of perching at the project was limiting or more was</sup>

B. Nexus to Project Effect

Section 10(a) or 10(j) recommendations must have a nexus to (or address) a project effect.⁵⁹ Under this standard, the proponent must establish a nexus between the need for the measure and the resources affected by the project.⁶⁰ If the proponent cannot establish such a nexus, the Commission will reject the measure.⁶¹ For example, the Commission has rejected a recommendation to expand a project boundary to include additional lands within 100 feet on each side of the tributaries upstream of a project, finding that its proponent had failed to establish a nexus between the need for the measure and the resources affected by the project.⁶²

necessary); Grand River Dam Auth., 116 FERC ¶ 62,112 at P 29 (2006) (rejecting recommendation for offsite wetland restoration to mitigate for project impacts to wetlands along the shoreline, finding no information in the record on the quality of project shoreline habitat or quantifying project effects on habitat quality from reservoir drawdowns or shoreline use); S.D. Warren Co., 105 FERC ¶ 61,009 at PP 24-29 (2003) (rejecting USFWS recommendation to require a year-round minimum flow of 57 cubic feet per second ("cfs") in the bypassed reach to benefit the trout fishery during the winter, finding that there was insufficient evidence to indicate that the flow is necessary over the winter period to support a winter fishery that may develop in the reach), reh'g denied, 106 FERC ¶ 61,087 (2004).

⁵⁹ S.C. Pub. Serv. Auth., 182 FERC ¶ 61,025 at P 179 (2023) (declining to adopt Interior's recommended modified operating curve to maintain full pond levels in the winter months and NMFS's recommendation to increase the minimum flows downstream because there "is insufficient information in the record to determine whether there is a nexus to the project, or to assess the need for the measures."); *PacifiCorp Energy*, 158 FERC ¶ 62,006 at P 106 (2017) (finding "there is no nexus between the measure and project effects and thus no justification for requiring PacifiCorp to monitor fish passage conditions or fund and implement fish passage improvement measures at this non-project facility."); *Ala. Power Co.*, 153 FERC ¶ 61,298 at P 69 & n.61 (2015), *order on reh'g & clarification*, 157 FERC ¶ 61,100 (2016); *Ga. Power Co.*, 149 FERC ¶ 62,210 at P 59 (2014).

⁶⁰ Georgia Power Co., 149 FERC ¶ 62,210 at P 70.

⁶¹ See City of Kaukauna, 135 FERC ¶ 62,149 at PP 63-64 (rejecting recommendation that the licensee provide swale habitat for turtles to place their eggs, finding it did not relate to project effects, but rather to pre-project construction activities or natural conditions), *reh'g denied*, 137 FERC ¶ 61,072 (2011); *Duke Energy Carolinas, LLC*, 153 FERC ¶ 62,134 at PP 168-69 (2015) (rejecting recommendation that licensee map and protect all known populations of the endangered Schweinitz's sunflower on licensee-owned, nonproject land and implement a propagation and restoration plan for the species, finding that populations of the sunflower on lands not influenced by the project or otherwise needed for project purposes is beyond the scope of the license, and instituting a propagation plan does not address a project-specific effect), *order on reh'g & clarification*, 156 FERC ¶ 61,010 (2016), *pet. for rev. denied sub nom. Duke Energy Carolinas, LLC v. FERC*, 888 F.3d 923 (D.C. Cir. 2018).

⁶² Georgia Power Co., 149 FERC ¶ 62,210 at P 70.

C. Need for the Measure

The Commission will reject a Section 10(a) or 10(j) recommendation if it determines that the measure is not needed. For example, the Commission has rejected a recommendation for Geographic Information System mapping and development of a digital database for sensitive species, noxious weeds, and habitat restoration sites to assist in tracking mitigation progress and associated management activities at a project, finding that sufficient information already existed to assess project effects and these measures were not needed.⁶³ The Commission also has rejected a water quality monitoring program where it found no evidence of project-related water quality problems that would justify the need for such a program.⁶⁴

The Commission also will reject recommendations that are sufficiently addressed under the Commission's standard fish and wildlife reopener article, which is included in every license.⁶⁵ For example, the Commission has rejected a recommendation that after five years of flow monitoring at a project, the licensee be required to provide an unspecified minimum flow in the bypass reach if the agencies recommend such a flow, finding that inclusion of the Commission's standard fish and wildlife reopener article was sufficient.⁶⁶

⁶³ Pub. Util. Dist. No. 1 of Okanogan Cnty., 144 FERC ¶ 62,018 at P 95 (2013).

⁶⁴ *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).

⁶⁵ See, e.g., Form L-1 at Standard Article 15, 54 F.P.C. 1804 (1975), *available at* <u>https://www.ferc.gov/sites/default/files/2020-04/FormL-01.pdf</u>.

⁶⁶ *City of Petersburg*, 104 FERC ¶ 62,151 at PP 25-26 (2003).

D. Specificity of Section 10(a) and 10(j) Recommendations

Section 10(a) and 10(j) recommendations must contain specific measures to protect, mitigate damages to, or enhance the resource.⁶⁷ The recommendation cannot be too vague to determine what measures would be implemented. For example, the Commission has rejected a recommendation that a licensee "continue its support of aquatic restoration within the [basin]" and "identify suitable habitats (primarily tributaries) for species reintroductions" as too vague to implement.⁶⁸ In another instance, the Commission rejected a recommendation prohibiting unspecified project activities during the winter hibernation period of a sensitive bat species for these same reasons.⁶⁹

E. Consistency with Comprehensive Development Standard

Sections 10(a)(1) and 4(e) of the FPA require the Commission to balance all public interest considerations relative to the comprehensive development of the waterway when determining whether and, if so, under what conditions to issue a license. This is known as the comprehensive development or public interest standard.⁷⁰ If the Commission believes that a Section 10(a) or 10(j) recommendation is inconsistent with

⁶⁷ See, e.g., Pub. Util. Dist. No. 1 of Chelan Cnty., 107 FERC ¶ 61,280 at pp. 62,328-29 (rejecting a 10(j) recommendation as unduly vague), order on reh'g in part, 109 FERC ¶ 61,208 (2004); Georgia Power Co., 149 FERC ¶ 62,210 at P 59; Portland Gen. Elec., 148 FERC ¶ 62,142 at P 33 (2014) (noting that a condition requiring the licensee to establish a \$250,000 Resident Fish Mitigation Fund to provide funding for habitat mitigation and enhancements to benefit resident fish does not provide any specific measures to be implemented and is too vague); Coneross Power Corp., 178 FERC ¶ 62,063 at P 48 n.29 (2022) ("[r]ecommendations under section 10(j) must be specific measures." (citing Alabama Power Co., 153 FERC ¶ 61,298 at PP 70-71)).

⁶⁸ Alabama Power Co., 153 FERC ¶ 61,298 at P 69 & n.60.

⁶⁹ See, e.g., Pub. Util. Dist. No. 1 of Okanogan Cnty., 144 FERC ¶ 62,018 at P 84 (rejecting recommendation prohibiting unspecified project activities during the winter hibernation period to protect Townsend's big-eared bats as too vague).

⁷⁰ Erie Boulevard Hydropower, L.P., 176 FERC ¶ 62,036 at P 66 (2021); Ala. Power Co., 157 FERC ¶ 62,218 at P 81 (2016); City of Tacoma, 132 FERC ¶ 61,037 at P 300 (2010), reh'g denied, 135 FERC ¶ 61,037 (2011); Pub. Util. Dist. No. 1 of Pend Oreille Cnty., 117 FERC ¶ 61,205 at P 27 (2006); S. Cal. Edison Co., 115 FERC ¶ 62,187 at PP 98-101, reh'g granted in part, 117 FERC ¶ 61,067 (2006); Avista Corp., 93 FERC ¶ 61,116 at pp. 61,325-26 (2000).

the comprehensive development standard of Sections 4(e) and 10(a), it will reject the condition, unless it is also mandatory under Section 4(e) or Section 18.⁷¹ The Commission may reject a recommendation as inconsistent with the comprehensive development standard where the cost of the measure significantly outweighs its expected environmental benefit.⁷² In this regard, the courts have confirmed that Section 4(e)'s requirement that the Commission give "equal consideration" to environmental factors does not mean "equal treatment" and that FERC can reject environmental measures that would impose too onerous an economic burden on the licensee.⁷³

F. Commission Standards for Agency Section 10(j) Recommendations

Section 10(j)(1) of the FPA requires the Commission, when issuing a license, to

include PM&E measures for fish and wildlife resources affected by the project based on

the recommendations of state and federal fish and wildlife agencies. The Commission's

regulations define a "fish and wildlife recommendation" under Section 10(j) as:

any recommendation designed to protect, mitigate damages to, or enhance any wild member of the animal kingdom, including any migratory or nonmigratory mammal, fish, bird, amphibian, reptile, mollusk, crustacean, or other invertebrate, whether or not bred, hatched, or born in captivity, and

⁷¹ See, e.g., Alabama Power Co., 153 FERC ¶ 61,298 at P 67 (rejecting recommendation that the licensee increase the total shoreline buffer width to at least 100 feet, finding it inconsistent with the comprehensive planning standard; rejecting recommendation for minimum flows to enhance long-term habitat conditions for rainbow trout, finding that they were not high enough to bring temperatures within the tolerance ranges for trout 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 (rejecting recommendation to seasonally lower reservoir to improve rainbow and brown trout spawning, finding that the \$3,000,000 per year cost would have only a minor effect on habitat conditions with very little benefit to trout); *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).

⁷² See, e.g., Pub. Util. Dist. No. 1 of Pend Oreille Cnty., 112 FERC ¶ 61,055 at P 64 (rejecting Interior recommendation that the licensee fund and mitigate project-related wildlife habitat losses anticipated to occur during the term of the new license, at a cost of \$108,000 annually, based on the high cost of the measure); Pac. Gas & Elec. Co., 120 FERC ¶ 62,001 at PP 55-57 (rejecting Interior recommendation for water quality monitoring plan based, in part, on high cost of the measure).

⁷³ *California v. FERC*, 966 F.2d 1541, 1550 (9th Cir. 1992); see also U.S. Dep't of Interior v FERC, 952 F.2d 538, 545-56 (DC Cir 1992).

includes any egg or offspring thereof, related breeding, or spawning grounds, and habitat. $^{74}\,$

The agency must specifically identify and explain the recommendation, the relevant resource goals and objectives, and the evidentiary or legal basis for the recommendation.⁷⁵

If the Commission believes that a Section 10(j) recommendation is inconsistent with the purpose and requirements of Part I of the FPA or other applicable law, and the Commission cannot resolve the inconsistency with the agency, it may modify or reject the recommendation.⁷⁶ A Section 10(j) recommendation must meet the substantial evidence test and cannot act as a veto on FERC's ultimate decision.⁷⁷

The Commission may consider recommendations that fall outside the scope of Section 10(j) recommendations under the broader public-interest standard of Section 10(a) but is not required to seek agreement with the agencies pursuant to Section 10(j)(2). Recommendations that fall outside the scope of Section 10(j) include, for example: requests for studies that could have been conducted prior to licensing; recommendations for recreation facilities; funding requests; or requests that an agency be consulted in the development of plans.⁷⁸ The Commission has recently held that an agency recommendation to develop a plan to minimize delay to upstream migratory fish due to

⁷⁴ 18 C.F.R. § 4.30(b)(9)(ii).

⁷⁵ *Id.* § 4.34(e)(2).

⁷⁶ Before rejecting a Section 10(j) condition, the Commission and the agencies must first attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agencies. If the agencies cannot resolve the inconsistency, the Commission may reject the recommendation, but must explain how the recommendation is inconsistent with Part I of the FPA or other applicable law, and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources. 16 U.S.C. § 803(j)(2).

⁷⁷ Nat'l Wildlife Fed'n v. FERC, 912 F.2d 1471, 1480-81 (D.C. Cir. 1990).

⁷⁸ Merimil Ltd. P'Ship, 110 FERC ¶ 61,240 at P 28 n.30 (2005).

false attraction from project discharges if such delay is found to occur in the future is outside the scope of Section 10(j), stating: "There is no reserved authority under section 10(j) for future, uncertain actions that may never occur."⁷⁹

III. RESPONSE TO RECOMMENDATIONS

A. Canal Drawdown Plan

Three commenters provided recommendations with respect to FirstLight's annual maintenance drawdown of the Turners Falls Canal. USFWS recommended that FirstLight file a Turners Falls Canal Drawdown Aquatic Organism Protection Plan with FERC within nine months of license issuance describing measures to be implemented to minimize impacts to aquatic organisms during the annual canal drawdown.⁸⁰ The Plan would be developed in consultation with the USFWS and MDFW and include the following:

- (1) Implement protection measures in Study $3.3.18^{81}$
 - (a) Conduct the annual drawdowns no earlier than mid-September.
 - (b) Use the 2014 drawdown rate until the team identifies a permanent drawdown rate.
 - (c) Install cones in the canal to identify large machinery paths.
- (2) Create a Canal Drawdown Team
 - (a) The team shall consist of staff from FirstLight, USFWS, MDFW, and CRC.
 - (b) The team shall meet quarterly to develop additional protection measures to be included in the Plan.

⁷⁹ *Turners Falls Hydro, LLC*, 174 FERC ¶ 62,130 at P 41 & n.32 (2021).

⁸⁰ Interior Comments at 30 (Section 10(j) Recommendation 10 for the Turners Falls Project).

⁸¹ Updated Study Reports, Study 3.3.18 - Impacts of the Turners Falls Canal Drawdown on Fish Migration and Aquatic Organisms, Project Nos. 1889-000 and 2485-000 (filed Sept. 14, 2015).

- (c) The Plan shall be submitted to FERC once finalized and then FirstLight shall implement the Plan once approved.
- (d) The team shall be disbanded upon FERC's approval of the Plan.
- (3) Continue to allow public access during the drawdowns for scientific and educational activities (such as CRC fish rescue effort) and maintain communication with the USFWS's Connecticut River Coordinator.

MDFW recommends an essentially identical plan to be filed with FERC within one year of license issuance.⁸²

CRC also recommends that FirstLight create a Canal Drawdown Team to develop a Canal Drawdown Protection Plan.⁸³ CRC states that the plan should address the drawdown rate, connectedness of remaining pools, minimization of "no water conditions in areas of the canal where the substrate does not allow for burrowing," and the frequency of drawdown events.⁸⁴ CRC further recommends FERC requiring FirstLight to financially support aquatic organism rescue efforts and make results of surveys publicly available.⁸⁵

FirstLight does not object to a license requirement to develop a Canal Drawdown Protection Plan in consultation with USFWS and MDFW. This will formalize a process of consultation and coordination that FirstLight has been engaged in for some time on the annual canal drawdowns. Specifically, the Aquatic Organism Protection Plan would be developed by a newly formed Canal Drawdown Team consisting of FirstLight, USFWS, MDFW, and CRC. The team would meet quarterly to identify protection measures that could be implemented during the annual drawdowns. FirstLight would provide a draft

⁸² MDFW Comments at 10 (MassWildlife 4 – Article MW2).

⁸³ CRC Comments at 39-40.

⁸⁴ *Id.* at 39.

⁸⁵ *Id.* at 40.

Plan to USFWS and MDFW for their comments and file a final Plan with FERC for its approval within one year of license issuance.⁸⁶ Upon FERC approval of the Plan, the Canal Drawdown Team would be disbanded and FirstLight would implement the protection measures identified in the Plan during subsequent drawdown events.

However, FirstLight does not agree that the license condition itself should require specific protection measures such as timing of the drawdowns, drawdown rates, or public access. Details of the plan should be developed by the Canal Drawdown Team based on experience, FirstLight operational requirements, and other relevant factors.⁸⁷ FirstLight also disagrees that the license should require FirstLight to provide financial support for volunteer rescue efforts as the measure is vague and CRC has not shown it is necessary. Volunteer rescue efforts also can create public safety issues and cannot be fully controlled by FirstLight.

⁸⁶ Considering the numerous post-license measures FirstLight will be required to implement under its relicensing proposal, FirstLight believes one year rather than nine months is a more appropriate timeframe for filing of a final plan with FERC.

⁸⁷ CRC in its comments also critiqued FirstLight's Study 3.3.18 as understating the effects of the canal drawdowns on aquatic organisms. CRC Comments at 41-42. Given that FirstLight is agreeing to a Canal Drawdown Aquatic Organism Protection Plan, CRC's comments are arguably moot. However, FirstLight would point out that CRC incorrectly extrapolates results of the quadrat sampling from the 2014 Study Report to imply a larger hypothetical impact to mussels, mudpuppies, and sea lamprey without any explanation of its methods or assumptions and without any consideration of uncertainty. Extrapolation of the fish survey and quadrat data to the entire area of the canal is inappropriate as the sampling sites were deliberately chosen in areas (pools) with higher organism presence to achieve a better estimate of total count and diversity. All extrapolations carry inherent uncertainties and potential errors, particularly when the initial data is non-representative. Further, the sample data showed that the organisms demonstrate a preference for specific habitat types. These habitat types are unevenly distributed throughout the canal, further complicating any attempt to generalize the findings to the entire area. The lack of stranded fish spread evenly throughout the canal also negates the validity of CRC's extrapolation. This study finding shows that free-swimming fish travel within the water line and only become stranded if their pool no longer has an exit and dries out. The same density of fish sampled in the pools cannot be expected in other areas of the canal.

B. Summer/Fall Minimum Bypass Flows

CRC and other commenters disagree with Proposed License Article A110's requirement for FirstLight to release a minimum flow of 500 cfs from the Turners Falls Dam into the approximately one-mile bypass reach of the Connecticut River known as Reach 1 during the period July 1 to November 15 each year.⁸⁸ FirstLight previously addressed comments regarding the alleged insufficiency of this flow level in detail in its FFP Settlement Agreement Response.⁸⁹

1. <u>Aquatic Habitat</u>

Reach 1 is a subsegment of River Segment MA34-03 that was studied as part of FirstLight's instream flow study completed as part of the licensing process. Reach 1 is complex and includes three sub-reaches including (a) the plunge pool below the dam, (b) the Right Channel, ⁹⁰ Center Channel, and Left Channel which flow around Peskeomskut Island, and (c) the reach from where the three channels converge to Station No. 1. As agreed upon in the study planning process, habitat in the plunge pool, Center Channel and Left Channel were not quantified in the habitat study. The Right Channel is approximately 80-feet-wide and represents an approximately 0.1 mile of Reach 1. From the three-channel convergence to Station No. 1, the river is approximately 400+ feet-wide and represents an approximately 400+ feet-wide and represents an approximately 0.5 miles of Reach 1. Other reaches that comprise River Segment MA34-03 include Reach 2 and Reach 3, which were also evaluated as part of the instream flow study (*see* Table 1 below).

⁸⁸ See CRC Comments at 7-21.

⁸⁹ FFP Settlement Agreement Response at 4-9 and Attachment A, Technical Responses to Comments on FirstLight's Flows and Fish Passage Settlement Agreement at 1-6 (June 2023) ("FirstLight's Technical Response").

⁹⁰ The "Right" Channel assumes one is looking in a downstream direction.

Reach	Subsegment of River Segment MA34-03	Subsegment Length
Reach 1	Turners Falls Dam to Station No. 1	1.0 mi
Reach 2	Station No. 1 to Rock Dam/Rawson Island	1.0 mi
Reach 3 ⁹¹	Rock Dam/Rawson Island to Montague Gage ⁹²	1.75 mi

Table 1:	Habitat	Reach	Descri	ntion	and	Lengths
1 4010 10	TTHEFT	I tout the	Deserr	P C I O I I		Longens

CRC states that the FFP Settlement Agreement's flow rate is primarily based on the presence of Tradescant's Aster and Tussock Hairgrass (state listed threatened or endangered plants) within the bypass reach, that it is unclear whether they are designated as Aquatic Life Use ("ALU") by the Clean Water Act, and that little is known about these two plant species and locations. The ALU is a determination to be made by the Massachusetts Department of Environmental Protection ("MADEP") in the Section 401 certification process relative to the overall uses of River Segment MA34-03, which is 3.7 miles long and extends from Turners Falls Dam to the Deerfield River confluence. By signing the FFP Settlement Agreement, MDFW agrees that 500 cfs is protective of fish, macroinvertebrates, and state listed plants. CRC opines that if beneficial impacts to fish species of higher flows must be obtained at the expense of state-listed rare plants, "the plants must give way."⁹³ But MDFW, on behalf of the Massachusetts Natural Heritage and Endangered Species Program ("NHESP"), has determined that the plants must not give way and must be protected.

⁹¹ Note that Reach 3 of the instream flow study includes both a subsegment downstream of Cabot Station as well as a subsegment that is upstream of Cabot Station but influenced by both Cabot Station operations and Deerfield River flows. We focused our analysis on Reaches 1 and 2 as habitat in those reaches is influenced primarily by the amount of bypass flow.

⁹² Reach 3 technically ends at the Montague USGS gage, which is only 0.17 miles downstream of the Deerfield River confluence.

⁹³ CRC Comments at 10.

CRC contends that FirstLight's proposed minimum flows would only allow for 10% of the maximum available habitat for macroinvertebrates and less than 27% for several fish species. Additionally, CRC points to the need to evaluate certain fluvial species (providing examples of Longnose Dace and Tessellated Darter) in this reach. Table 2 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 at Transects 10 and 11.

Table 2. 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
FFP Settlement Agreement

	Right Channel	Reach 1 (Transects 10 and 11), High Backwater
Fluvial Specialist	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%
¹ The closest flow modeled to 50	00 cfs was 562 cfs. The percenta	ges above are based on 562 cfs.

CRC goes on to state that 500 cfs would not sustain "crucial" aquatic habitats that are vital for fluvial specialist species given its "unique" high-gradient riffle run habitat.

However, CRC also states that their comments have intentionally focused on pool-run habitats in Reach 1 given the "habitat's particular suitability for fluvial fish species."⁹⁴ Not only are these statements contradictory, but they incorrectly assume that fluvial fish species require the specific habitats that CRC is attempting to define. By definition, a fluvial specialist species is one that requires lotic (flowing) habitats for at least a portion of their life cycle. The needs of fluvial specialist species can vary substantially in terms of their microhabitat (e.g., depth, velocity, substrate) and seasonal habitat use of flowing habitats. To use an example fluvial specialist commonly cited by CRC, the Tessellated Darter's preferred habitat outside of the breeding season is slower habitats with sand and/or mud substrate. These types of habitats are prevalent in the Connecticut River, but not in Reach 1. As such, Reach 1 habitat would not be expected to naturally support a high abundance of Tessellated Darter, nor would Reach 1 be considered a crucial aquatic habitat for this fluvial specialist species given that there are many other areas with more suitable habitat for this species to occupy, which would explain this species' prevalence in the Connecticut River drainage in Massachusetts.

CRC's claim that the high gradient riffle-run habitats in Reach 1 are unique in Massachusetts is unsupported by any meaningful data, and it should be noted that this river reach contains no habitat designated as "critical" for any listed species. Further, though this river reach is higher gradient than the surrounding impounded habitats, the mapped mesohabitats in Reach 1 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

⁹⁴ *Id.* at 13.

gradient, except for the riffle around Peskeomskut Island. As such, broadly defining the reach as high gradient is inaccurate.

CRC contends that, because only one fluvial specialist species was captured in the reach, then the segment is not in ALU attainment under *Massachusetts Consolidated Assessment and Listing Methodology Criteria* ("CALM") guidelines for moderate to high gradient streams. As explained above, the primary habitats within the reach are actually lower gradient than CRC portrays. Therefore, the applicability of the CALM criteria for moderate to high gradient streams in this river reach is questionable. However, even if these criteria were appropriate to apply to Reach 1 (which is only a subreach of River Segment MA34-03), FirstLight's study documented two fluvial specialist/dependent species (Tessellated Darter and White Sucker) within Reach 1 which would be in attainment of the Massachusetts CALM criteria for ALU for moderate to high gradient streams.

CRC states that, while FirstLight's proposal of 500 cfs downstream of Turners Falls Dam would provide 10% of the maximum available habitat for macroinvertebrates in Reach 1, CRC's proposal of 1,400 cfs would provide 36.1% of maximum weighted usable area ("WUA") in Reach 1. It is important to note that, though WUA is often a useful metric for evaluating habitat given flow, greater WUA does not necessarily equate to better habitat quality and may not result in higher populations of macroinvertebrates if there are other limiting factors (e.g., scour from high flows).

Finally, CRC contends that the 500 cfs minimum flow does not comply with Massachusetts water quality standards. This is incorrect. 314 CMR 4.03(3)(b) of the Massachusetts water quality standards states:

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In waters where flows are regulated by dams or similar structures, the lowest flow condition at which aquatic life criteria must be applied is the flow equaled or exceeded 99% of the time on a yearly basis, *or another equivalent flow agreed upon by the Department and the federal, state or private entity controlling the flow*.

(Emphasis added). In this case, the 500 cfs minimum flow represents an equivalent flow determined by MDFW in the FFP Settlement Agreement to reflect the appropriate balancing of aquatic resources and rare plants.

2. <u>Recreational Boating</u>

CRC further comments that a 500 cfs minimum flow in Reach 1 is inadequate for recreational boating, and that portaging is not an acceptable alternative.⁹⁵ As FirstLight previously explained in its FFP Settlement Agreement Response,⁹⁶ FirstLight agreed in the Recreation Settlement Agreement 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.⁹⁷ These new river access points will mitigate for navigability constraints in the upper bypass reach during the low flow period.

CRC cites the Boating Navigability Study conducted by FirstLight in 2021 in which boaters paddled the reach from Turners Falls Dam, around Peskeomskut Island, and downstream to Rock Dam. FirstLight developed the boating study plan in consultation with the Massachusetts Department of Conservation and Recreation ("MDCR"), CRC, and other stakeholders. Note that in the study plan it states: "For the

⁹⁵ CRC Comments at 15-17.

⁹⁶ FFP Settlement Agreement Response at 6.

⁹⁷ Recreation Settlement Agreement, App. E, Recreation Management Plan, Section 6.1.5.

purpose of this study, a 'navigable' reach was defined as one through which boaters can paddle recreational watercraft without having to portage around obstacles, even if minor bumping and/or scraping occurs."⁹⁸ CRC is correct that the flow nearest to 500 cfs was a flow of 545 cfs released at the Bascule Gates, which was designated as Flow No. 3 in the study.

Each participant in the study ranked the boating experience at each flow based on the following scale: -2 = totally unacceptable; -1 = unacceptable; 0=neutral; 1 = acceptable; and 2 = totally acceptable. Of the 10 boaters who evaluated the 545 cfs flow, two found the flow to be totally acceptable, two found it acceptable; three rated it neutral, and two found it unacceptable. Of the two that found it unacceptable, one provided no comment and the other provided the following comment: "Not great, but far better than the AM runs. Still not appropriate for beginners, the rapid lines are scratchy and hard to follow. At this level, first rapid is a real class II."⁹⁹ As the above individual ratings and commentary show, averaging scores, as CRC cites in their comments, can be misleading. In fact, the majority of participants were either neutral about the flow or found it acceptable, and at least one of the participants who rated the flow as unacceptable for navigability did not actually find it unnavigable, but rather that the level of difficulty may not be appropriate for beginners. In addition, based on the definition of "navigable," the reach was navigable for all participants at 545 cfs.

CRC argues two access points are not the same as "*uninhibited navigation down the river channel*."¹⁰⁰ This ignores that Turners Falls Dam already inhibits through

⁹⁸ CRC Comments, Ex. A - Turners Falls Boating Navigability Study Report at 1.

⁹⁹ *Id.* at A-4.

¹⁰⁰ CRC Comments at 16.

navigation and that boaters putting in below Turners Falls Dam will be hauling canoes and gear, likely from the parking lot at the Great Falls Discovery Center. The total distance from this parking lot to the upstream access point is 1,280 feet while the total distance to the downstream access point is 1,510 feet. The difference in hauling distance of 280 feet is unlikely to be a significant impediment for individuals seeking to access the lower put in.

In addition, the MDCR supports the two access points at Turners Falls Dam as part of the Recreation Settlement Agreement and does not stand in opposition to the flows at Turners Falls Dam included in the FFP Settlement Agreement. Similarly, the Appalachian Mountain Club, American Whitewater, Zoar Outdoor, and Crab Apple Whitewater also support the two access points as well as the flows at Turners Falls Dam as signatories to both the FFP Settlement Agreement and Recreation Settlement Agreement.

Finally, the Commission has explained that its policy on recreational development at licensed projects does not require "that all recreational demand must be satisfied," and that "[n]either section 10(a)(1) nor our regulations require us to evaluate every possible recreational use within a project boundary."¹⁰¹ Taken as a whole, the recreational boating measures provided in the FFP Settlement Agreement and Recreation Settlement Agreement represent a substantial improvement over the current condition.

3. <u>Aesthetics</u>

Relative to aesthetics, CRC contends that the flow of 500 cfs "fails to uphold the natural aesthetic value of the river because it will not provide enough water to fully cover

¹⁰¹ *Duke Energy Progress, Inc.*, 153 FERC ¶ 61,056 at PP 109, 116 (2015) (citations omitted).

the riverbed."¹⁰² CRC offers in evidence two pictures out of 10 included in Appendix D of the Boating Navigability Study showing the area around Peskeomskut Island under a flow of 545 cfs. At best, the two pictures tell an incomplete story, and at worst they are intentionally misleading. We have included below all ten pictures which we believe tell a complete story of the aesthetic value of a spillage flow approximating 500 cfs (545 cfs).



Photo 3-01: Peskeomskut Island – Center Channel – Upstream View – Boaters, 1, 2

¹⁰² CRC Comments at 19.



Photo 3-02: Peskeomskut Island – Center Channel – Downstream View – Boaters, 1, 2



Photo 3-03: Peskeomskut Island – Center (foreground) + Right (background) Channels – Boater 6



Photo 3-04: Peskeomskut Island – Center (foreground) + Right (background) Channels – Boaters 4, 9



Photo 3-05: Peskeomskut Island – Left Channel – North View



Photo 3-06: Put-In #2 – Access Trail – Upstream View



Photo 3-07: Put-In #2 – Access Trail – Downstream View



Photo 3-08: View from Put-In #2 Upstream toward Peskeomskut – Center Channel – Boaters 1, 2



Photo 3-09: View from Put-In #2 Upstream toward Peskeomskut – Center Channel – Boaters 1, 2



Photo 3-10: View from Put-In #2 Upstream toward Peskeomskut – Right Channel – Boater 6

C. Riverbank Erosion in the Turners Falls Impoundment

CRC, FRCOG, and other commenters reiterate their previous position that

Northfield Mountain Project operations cause bank erosion in the Turners Falls Impoundment ("TFI") and offer a consultant report in support of their position.¹⁰³ The comments provided by these groups employ the same points that have previously been made throughout the licensing proceeding, which have been exhaustively rebutted and responded to by FirstLight on multiple occasions.¹⁰⁴

The Dethier Review is a new report provided by CRC and FRCOG, which presents a generic, qualitative summary of erosion processes in reservoirs, provides a

¹⁰⁴ See Response to Stakeholder Requests for Study Modifications and/or New Studies Based on the Study Report and Meeting Summary, Project Nos. 1889-000 and 2485-000 (filed Jan. 17, 2017); Response to Comments on Various Study Report Addendums, Project Nos. 1889-000 and 2485-000 (filed Dec. 21, 2018). See also 401 Water Quality Certificate Application, App. E – Supplemental Turners Falls Impoundment Erosion Summary Report & Erosion Proposal (April 2024), App. A, Project Nos. 2485-079 and 1889-092 (filed Apr. 22, 2024).

¹⁰³ See CRC Comments at 22-25; FRCOG Comments at 2-26 and Attachment C, Review of Erosion in the Turners Falls Impoundment by Dr. Evan Dethier (May 19, 2024) ("Dethier Review").
high-level review of a select subset of past erosion evaluations conducted in the TFI, discusses evidence of erosion in the TFI, and presents a "peer review" of FirstLight reports and the use of the Bank Stability and Toe Erosion Model ("BSTEM"). The Dethier Review makes several misstatements and incorrect assumptions about model inputs, operation, and approach, including calibration at all sites. FirstLight has provided a detailed response to the Dethier Review in Attachment A.

Additionally on June 20, 2024, MADEP filed with the Commission a Technical Memorandum prepared by Inter-Fluve, Inc. which included its review of the BSTEM modeling and reporting conducted by FirstLight during this licensing proceeding ("Inter-Fluve Review"). FirstLight has provided a detailed response to the Inter-Fluve Review in Attachment B.

Neither the Dethier Review nor the Inter-Fluve Review adds meaningfully to the body of knowledge on riverbank erosion in the TFI. Neither report casts any serious doubt on the use of BSTEM to understand erosion processes within the TFI or FirstLight's conclusions on causes of erosion and degree of nexus to the Northfield Mountain Project.

FirstLight has studied and addressed the issue of Project operations as it pertains to bank erosion exhaustively in the record of this proceeding via state-of-the-science methods developed through extensive consultation by a team of nationally recognized experts.¹⁰⁵ FirstLight was methodical along each step of developing, conducting, and reporting on Study 3.1.2 – *Northfield Mountain / Turners Falls Operations Impacts on*

¹⁰⁵ See Supplemental Turners Falls Impoundment Erosion Summary Report & Erosion Proposal, *supra* note 104.

Existing Erosion and Potential Bank Stability ("Study 3.1.2"), seeking and receiving input from MADEP and other stakeholders throughout the process.

Prior to conducting any field work, FirstLight sent the resumes of all individuals involved in the erosion related studies to MADEP. FirstLight provided stakeholders including MADEP with three rounds of study plans, a Transect Selection Report, a three volume Erosion Causation Report, and Supplemental BSTEM Analyses.¹⁰⁶ FirstLight met separately with MADEP, and as part of a larger stakeholder group, to ensure that it was collecting the desired information needed to address the causes of erosion. Throughout the study planning period, MADEP did not express any issues with the proposed team, data collection, the proposed methodology, or that BSTEM would play a pivotal role in assessing bank erosion. MADEP's own comments on Study 3.1.2 did not raise concerns with BSTEM or the extensive site-specific data that would be collected along the TFI banks. In fact, on December 14, 2016, MADEP issued the following comments relative to Study 3.1.2:

With respect to the Erosion Causation Report relative to the Northfield Mountain/Turners Falls Operations Impacts on Existing Erosion and Potential Bank Stability (the "Study"), it appears that the Study is rooted in the B-Stem Model that is the industry standard. The Study includes a substantial number of data input points, which would be expected to lead to the generation of valuable data when the model is run. Further, the data incorporated into the B-Stem Model includes the information that MassDEP sought.¹⁰⁷

Further, although BSTEM played a pivotal role in the erosion evaluations that

were conducted, it was one part of a larger approach. As part of Study 3.1.2, FirstLight

¹⁰⁶ Id

¹⁰⁷ See Letter from Brian D. Harrington, Massachusetts Department of Environmental Protection, to Kimberley D. Bose, Federal Energy Regulatory Commission, Project Nos. 1889-000 and 2485-000 (filed Dec. 14, 2016).

conducted extensive field data collection and robust data analyses utilizing a combination of qualitative and quantitative assessments as well as computer modeling. This "threelevel approach" provided a comprehensive, holistic assessment of erosion processes throughout the TFI to ensure a proper understanding of the physical processes governing bank erosion. This approach allowed for cumulatively supportive, scientifically justifiable results to be obtained where each subsequent level of analysis built upon the understanding developed by the previous level. The work conducted for Study 3.1.2 and the other erosion and sediment transport related studies¹⁰⁸ represent the most comprehensive evaluation of these resources that has ever been done in the TFI.

Both CRC and FRCOG attempt to discredit the validity of the BSTEM model by characterizing it as "FirstLight's model" or as a model created by FirstLight to determine the causes of erosion. BSTEM is not "FirstLight's model." BSTEM was developed by the U.S. Department of Agriculture ("USDA") Agricultural Research Service National Sedimentation Laboratory in 1998 by Dr. Andrew Simon and his team. Dr. Simon was also the lead for Study 3.1.2. Since its creation, BSTEM has been improved and enhanced significantly to improve functionality and applicability. BSTEM has been extensively peer reviewed, used in numerous peer-reviewed articles and reports representing studies from all over the world, and included in other United States and European models. The version of BSTEM used for this proceeding (i.e., BSTEM-Dynamic) is a USDA model, not a proprietary FirstLight model as CRC and FRCOG imply and provides far more functionality than the publicly available versions of BSTEM. In his 2016 review of

¹⁰⁸ See Study 3.1.1 – 2013 Full River Reconnaissance, Project Nos. 1889-000 and 2485-000 (filed Sept. 16, 2014); Study 3.1.3 – Northfield Mountain Project Sediment Management Plan, Project Nos. 1889-000 and 2485-000 (filed Oct. 14, 2016).

BSTEM's application for this proceeding, Dr. Eddy Langendoen (the USDA scientist quoted in the Dethier Review) noted that:

...I can vouch that BSTEM is capable of evaluating the four potential primary causes of erosion listed above. Moreover, its bank erosion algorithms are indeed the state-of-the-science for computer modeling and over the past five years have been incorporated into widely-used river morphodynamics computer models such as HEC-RAS v5 (U.S. Army Corps of Engineers), SRH-2D (U.S. Bureau of Reclamation), RVR Meander (University of Illinois), and TELEMAC (consortium of British/French/German government agencies); and have been accepted as such by the International community. . . . The study performed by the project team was exhaustive and detailed with respect to identifying and evaluating the potential causes of erosion.¹⁰⁹

FRCOG challenges FirstLight's use of BSTEM to evaluate the potential impact of

proposed Project operations under the FFP Settlement Agreement on bank erosion.

FirstLight's March 2024 erosion evaluation analyzing the FFP Settlement Agreement¹¹⁰

relied on a HEC-ResSim Operations Model and HEC-RAS Hydraulic Model to

determine the hydrologic and hydraulic input parameters for BSTEM. Use of such

models to determine the potential impact of proposed operating conditions is common

practice and widely accepted in FERC licensing proceedings.

FRCOG also contends it is not possible to compare the results of Study 3.1.2 with the results of the March 2024 erosion evaluation. The results of Study 3.1.2 and the 2024 erosion evaluation were never intended to be directly comparable as they were designed to answer two fundamentally different questions. The goal of the 2024 erosion evaluation was to determine the incremental impact, if any, of *proposed* Project operations on bank erosion, whereas Study 3.1.2 was designed to evaluate *existing* conditions. To evaluate

¹⁰⁹ See National Marine Fisheries Service Comments on FirstLight's Relicensing Studies, Att. A, App. 2 at 1, Project Nos. 1889-000 and 2485-000 (filed Dec. 15, 2016).

¹¹⁰ See Final Amendments, Supplemental BSTEM Modeling Report Reflecting Operating Conditions in the Flows and Fish Passage Settlement Agreement.

proposed operating conditions, the baseline scenario and proposed operating scenario must be directly comparable. Given this, both the baseline and proposed operating scenario were based on modeled inputs for the 2024 evaluation. Conducting the 2024 evaluation in this manner allowed for a direct comparison of baseline and proposed operating results.

Finally, CRC and FRCOG cite previous U.S. Army Corps of Engineers ("USACE") reports evaluating erosion in the TFI. FirstLight disagrees with their characterization of the results of those studies. Section 6.1.4.2 of the April 2017 Study 3.1.2 report provides a detailed comparison of the 1979 USACE evaluation and Study 3.1.2.¹¹¹ In summary, several significant differences between the two studies are observed when comparing the methodologies. First, the USACE study focused on a much longer and broader reach of the Connecticut River, with only one detailed study site in the TFI as opposed to 25 for Study 3.1.2. Secondly, the USACE study was based on a very limited dataset whereas Study 3.1.2 was based on robust data which had been collected over the course of a 15-year period or longer. Lastly, the 1979 USACE study was limited by the technology of its time especially when compared against the tools utilized by FirstLight for this proceeding.

Regarding the 1991 USACE report, the report's primary objective was to conduct a reconnaissance study of the erosion areas in the TFI. Although the 1991 USACE report notes that erosion continues and that pool fluctuations are a cause of erosion, it did not conclude that the cause of erosion was due to Project operations. Following the 1991

¹¹¹ See Relicensing Study 3.1.2 Northfield Mountain / Turners Falls Operations Impacts on Existing Erosion and Potential Bank Instability Study Report at 6-61, Project Nos. 1889-000 and 2485-000 (filed Apr. 3, 2017).

USACE report, Northeast Utilities (FirstLight's predecessor) sent the USACE a followup letter with questions. In its December 26, 1991 response to Northeast Utilities, the

It appears that Pages 31 and 32 of the July 1991 report have been misinterpreted by the Franklin County Commissioners and others. Our

USACE clarified its findings:

report does not say that "daily and weekly fluctuations of the Turners Falls Pool are the most important factor contributing to accelerated erosion.". It does indicate that tractive shear stress on the erodible (non-cohesive) river bank soils or river velocity during spring runoff periods and floods is the most important erosive factor (major force). Table 16 of our report indicates that, if shear stress or velocity is assigned an erosion variable of 1.0, pool fluctuations would have only 18% of the erosion causing effect of shear stress.¹¹²

Although the methodologies between the USACE and FirstLight studies had some fundamental differences, the main conclusion of each study was consistent – high flows and the shear stress associated with those flows are the primary cause of bank erosion in the study area. The erosion evaluations conducted for this proceeding were able to build upon the previous evaluations conducted by the USACE and evaluate erosion processes in a scientifically rigorous manner at a far greater level of detail than was previously possible.

D. Turners Falls Impoundment Levels and Recreation

CRC and other commenters argue that the proposed TFI level restrictions under the FFP Settlement Agreement will interfere with recreational boater access.¹¹³ FirstLight addressed this issue in its FFP Settlement Agreement Response.¹¹⁴

¹¹² See Letter from U.S. Army Corps of Engineers to Northeast Utilities (Dec. 26, 1991).

¹¹³ CRC Comments at 25-27.

¹¹⁴ FirstLight Settlement Agreement Response at 14-15; FirstLight's Technical Response at 9.

CRC comments that TFI water levels will impact the Pauchaug Brook Boat Launch, which is owned, operated, and maintained by MDFW, and access to Barton Cove via the State Boat Ramp, which is owned, operated, and maintained by MDCR.

FirstLight evaluated TFI water levels at these locations using its operations and hydraulic models. The operations model was used to simulate the operating conditions in the FFP Settlement Agreement, including expanded Upper Reservoir Project operations, as summarized in its March 2024 report filed¹¹⁵ with FERC entitled *Supplemental BSTEM Modeling Report Reflecting Operating Conditions in the Flows and Fish Passage Settlement Agreement*. FirstLight then used the operations model outputs, namely the water level at the Turners Falls Dam, inflows from Vernon and local tributaries, and Northfield Mountain pump and generation flows, as input to its calibrated hydraulic model. The hydraulic model was then run to predict the hourly TFI water elevations at different locations under proposed operations, including Barton Cove and near the Pauchaug Brook Boat Launch, for the period 2000-2014.

Study 3.6.6, entitled *Assessment of Effects of Project Operation on Recreation and Land Use*, was conducted to evaluate the impact of Project operations on recreation and land use, and specifically the impacts of TFI water levels on the ability to launch emergency boats at the Pauchaug Brook and State Boat Launches. The estimated end of the Pauchaug Brook Boat Launch ramp at the time of the study was at elevation 178 feet and it was assumed that a minimum of three (3) feet of water was needed to launch the town of Northfield's Rescue boat, thus the water level would need to be approximately 181 feet. The TFI water level near the Pauchaug Brook Boat Launch, under baseline

¹¹⁵ Final Amendments, *supra* note 3.

conditions which was evaluated in Study 3.6.6, are at or above elevation 181 feet 96%, 90%, 82%, 80%, 81%, and 88% of the time in May, June, July, August, September, and October, respectively for the period 2000-2015.

In contrast, the TFI water level near the Pauchaug Boat Launch, under the FFP Settlement Agreement operating conditions, would be at or above elevation 181 feet 88%, 94%, 94%, 89%, 85%, and 95% of the time in May, June, July, August, September, and October, respectively for the period 2000-2014. Under the FFP Settlement Agreement, with the exception of May, the water levels are at or above elevation 181 feet a greater percentage of the time under the FFP Settlement Agreement compared to baseline conditions.

It should be noted that should a rescue boat need to be launched, FirstLight has always worked closely with its host communities to adjust flows and water levels, as needed, in emergency conditions.

In the case of Barton Cove, Study 3.6.6 noted that boaters use a couple of channels to move in and out of Barton Cove, with the primary channel being well-marked with buoys leading boaters from the main river channel into Barton Cove. The report further noted that those familiar with the primary channel report that the channel remains usable by nearly all watercraft, including FirstLight's River Cruise Boat at all TFI elevations greater than 179 feet. The TFI water level in Barton Cove, under baseline conditions which was evaluated in Study 3.6.6, are at or above elevation 179 feet 98% of the time between May and October, respectively for the period 2000-2014. Similarly, the TFI water level in Barton Cove, under the FFP Settlement Agreement, are at or above elevation 179 feet 96%, 98%, 96%, 96%, 96%, and 92% of the time in May, June, July,

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August, September, and October, respectively for the period 2000-2015. In summary, under the FFP Settlement Agreement, the water levels will be maintained above elevation 179 feet a very high percentage of the time.

CRC states that "New license requirements should ensure that the impoundment be held at the same baseline river height that has been in place under current operations."¹¹⁶ The TFI water levels under the FFP Settlement Agreement will be virtually the same as baseline conditions in Barton Cove, and slightly higher at the Pauchaug Brook Boat Launch, which will only serve to improve the ability to launch boats.

Note that MDFW was a signatory to the FFP Settlement Agreement which included the TFI water level operating range. In addition, MDCR signed the Recreation Settlement Agreement agreeing not to oppose the FFP Settlement Agreement.

E. Fish Passage Improvements

American Rivers and other commenters question the timing and efficacy of the fish passage improvements in the FFP Settlement Agreement.¹¹⁷ FirstLight addressed these issues in its FFP Settlement Agreement Response.¹¹⁸

As proposed in the FFP Settlement Agreement the timing of fish passage and initial effectiveness testing at Turners Falls and Northfield Mountain would be as follows:

¹¹⁶ CRC Comments at 27.

¹¹⁷ *Id.* at 27-33.

¹¹⁸ FFP Settlement Agreement Response at 15-17; FirstLight's Technical Response at 9-11.

Facility	Operational/Shakedown Date	Initial Effectiveness Study Years and Locations to be Tested
Cabot Rack and	Year 4 after license	Years 6-7, the Cabot Downstream Fish Passage Structure and Station No. 1 Rack will be tested.
Downstream	issuance ¹	
Conveyance		
Station No. 1 Bar Rack	Year 4 after license issuance ¹	
Turners Falls Dam	Year 9 (by April 1 st) after	Years 10-11, the Turners Falls Plunge Pool and Spillway Lift will be tested.
Plunge Pool	license issuance	
Spillway Lift	Year 9 (by April 1 st) after license issuance	
Rehabilitate Gatehouse	Year 9 (by April 1 st) after	Not Applicable
Trapping Facility	license issuance	
(Sampling Facility)		
Retire Cabot Ladder	No later than Year 11	Not Applicable
and Portions of	after license issuance	
Gatehouse Ladder	(tied to within 2 years	
	after the Spillway Lift	
	becomes operational).	
Permanent Eel Passage	Year 13 after license	Year 14, the internal efficiency
Structure(s)	issuance	of the permanent eel passage
		structure(s) will be tested.
Barrier Net	No later than June 1 of	Years 10-11, the Barrier net will
	Year 7 after license	be tested.
	issuance.	
¹ Relative to the Cabot Intake Protection and Downstream Passage Conveyance and the Station No. 1 Bar		
Rack, the times cited are from license issuance based on the time needed to complete construction. 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 O2 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.		

American Rivers appears to build on CRC's May 25, 2023, comments and an

accompanying affidavit provided by Mr. Edwin Zapel. FirstLight responded to these

comments in its June 12, 2023 filing and the accompanying Technical Response.

FirstLight's June 12 filing summarizes the Technical Response, as follows:

FirstLight's Technical Response 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 design, 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.¹¹⁹

Neither American Rivers nor any of the other commenters provide a detailed basis

for rebutting FirstLight's Technical Response from June 12, 2023. Absent such a

detailed response, the objections lack substantial evidence.

The USFWS, in its Preliminary Prescription for Fishways, specifically addressed

timing and sequencing of fish passage improvements in terms of its management

priorities and testing requirements. In summary:

- The priority for the American shad program on the Connecticut River is to improve downstream passage efficiency, particularly for adult American shad who may return as repeat spawners in subsequent years;
- Given this priority, the signatories to the FFP Settlement Agreement scheduled the downstream passage facilities at Cabot Station and Station No. 1 be completed first in Year 4 or Year 5 after license issuance (depending on which quarter of the year the license is actually issued) with testing in Years 6 and 7 after license issuance. If adaptive management measures are required then they would be implemented in Years 8 and/or 9. It is important to have the downstream passage facilities at Station No. 1 and Cabot Station in place and operating to performance standards before, potentially, introducing more fish via upstream passage.
- In addition, the initial construction of the downstream passage facilities will require a canal shutdown meaning that all flow will be spilled at Turners Falls Dam inundating the area where the plunge pool and entrance facilities for the new lift are to be constructed.
- The construction of the new lift at Turners Falls Dam and associated plunge pool in Year 9 accomplishes the above USFWS goals.
- The construction of the Northfield Mountain Project barrier net in Year 7 will also accomplish the goal of improved downstream passage being in place before the new lift facilitates the introduction of higher numbers of spawning shad upstream of Turners Falls Dam. This timing will also work with the downstream passage of adult American eels based upon temporary eel passage facilities being installed

¹¹⁹ FFP Settlement Agreement Response at 16.

in Year 1 after license issuance and estimated majority to out-migrating adult years of 7-20 years.¹²⁰

Regarding the effectiveness of the Northfield Mountain Project barrier net, as the USFWS notes on page 33 of their Preliminary Prescription, barrier net technology has been employed at a variety of facilities as was noted in the feasibility study conducted for the Ludington Pumped Storage Project (FERC No. 2680). This feasibility study¹²¹ provided a comprehensive review of barrier net installations throughout the country and found that all such installations met their specified entrainment reduction standards.

In addition, because the barrier net would not prevent entrainment of shad eggs and juvenile eel, the FFP Settlement Agreement includes provision for an off-license agreement in the amount of \$1,296,281 as compensatory mitigation for those unavoidable impacts.¹²² American Rivers fails to acknowledge FirstLight's agreement to provide compensatory mitigation.

F. Threatened, Endangered, and Sensitive Species Protection

CRC states that FirstLight's relicensing proposal is inadequate to protect threatened, endangered, and sensitive species.¹²³ CRC notes that burbot and longnose sucker, both species of concern in Massachusetts, are not protected under the flow provisions in the FFP Settlement Agreement. In the Connecticut River Watershed Council's (now CRC) March 1, 2013, study request letter submitted at the onset of study scoping, it never requested that these two species be evaluated. FirstLight developed three rounds of study plans for the instream flow study, including a list of target species

¹²⁰ Interior Comments at 31-33.

¹²¹ See Initial Study Report for the Ludington Pumped Storage Project, Project No. 2680-108 (filed Dec. 2, 2015).

¹²² FFP Settlement Agreement, Explanatory Statement at 27.

¹²³ CRC Comments at 37-39.

and life stages. Between the various rounds of study plans, new target species and life stages were added; however, CRC never requested to assess these species. Additionally, in CRC's December 15, 2016 comments on the instream flow study report, it offered no comments on the report. FirstLight and FERC conducted a very rigorous scoping process and no federal or state agency or stakeholder requested these two species be assessed.

Moreover, there is a general lack of structural habitat for these two species in the bypass reach. Specifically, burbot are generally found in deep lakes and cool streams offering shelter. They can also be found in weedy areas of streams and large rivers. The bypass reach generally lacks this type of structural habitat. Longnose Sucker are reported to frequent tributaries such as the Deerfield and Westfield Rivers having steeper topography with boulder strewn channels. In summary, the habitat for these species is not generally available in the bypass reach. Since these two species were not assessed in the instream flow study, it is unclear how CRC can state that a higher minimum flow below the Turners Falls Dam is needed to support these species.

While CRC discusses Shortnose Sturgeon, Cobblestone Tiger Beetle, and Puritan Tiger Beetle in its comment letter, it offers no rationale as to why the operating conditions in the FFP Settlement Agreement fail to support these species.

CRC states that higher flows are needed below the Turners Falls Dam to protect the federally endangered Shortnose Sturgeon, and the state endangered Cobblestone Tiger Beetle and state/federally endangered Puritan Tiger Beetle. Regarding Shortnose Sturgeon, FirstLight consulted directly with NMFS on the flow regime and on the Shortnose Sturgeon Biological Assessment and agreed to the flow regime in the FFP Settlement Agreement to support this species in the bypass reach.

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Regarding Cobblestone Tiger Beetle, the FFP Settlement Agreement includes specific provisions to reduce potential impacts to Cobblestone Tiger Beetle habitat located just below Cabot Station. Specifically, the FFP Settlement Agreement requires FirstLight maintain a stabilized flow regime below Cabot Station in the spring, summer and fall when Cobblestone Tiger Beetles could be present. In addition, as part of the FFP Settlement Agreement, there is an off-license agreement in which FirstLight will fund \$980,000 to support conservation and management activities to provide a long-term net benefit to Cobblestone Tiger Beetles.

Regarding Puritan Tiger Beetle, FirstLight consulted directly with the USFWS and NHESP on the operational changes necessary to support this species, which again led to the stabilized flow regime below Cabot Station.

While CRC supports FirstLight's Bald Eagle Protection Plan, it states that *"FirstLight's proposed low flows make it more likely that invasive aquatic species will thrive" and identify hydrilla, an invasive aquatic plant, as likely to infest the segment of the Connecticut River in the vicinity of the Projects.*¹²⁴ CRC states that hydrilla is known to host cyanobacterial neurotoxin that is deadly to bald eagles. CRC further states that in addition to increased minimum flows, it recommends that increased awareness and monitoring for hydrilla should be included in the Bald Eagle Protection Plan.¹²⁵

In FirstLight's March 22, 2024 filing with FERC it included a revised Invasive Aquatic Plant Species Management Plans ("Revised IAPSMP") for the Projects. In it, FirstLight proposes to monitor for invasive aquatic plants in the TFI and bypass at

¹²⁴ CRC Comments at 39.

¹²⁵ Id.

various times throughout the license term. However, as explained in FirstLight's response to comments on the invasive aquatic plant management plans, discussed later, there are various pathways for invasive aquatic plants to become established in the Project area which are outside of FirstLight's control. CRC concludes that a higher minimum flow is needed below the Turners Falls Dam to prevent the establishment of hydrilla, the infestation of aquatic invasive species (cyanobacteria) and the potential impact on bald eagles in less than a 1-mile segment of the Connecticut River. Hydrilla is rarely found in swiftly flowing waters¹²⁶ and the upper bypass reach is comprised of primarily of bedrock making it difficult for hydrilla to become established. CRC's rationale that a minimum flow higher than that in the FFP Settlement Agreement below the Turners Falls Dam is necessary to prevent the establishment of hydrilla, the infestation of aquatic invasive species, and the up-take by Bald Eagles, is unsupported by the evidence.

Western Mass Rights of Nature alleges that the Northfield Mountain Project threatens the existence of Shortnose Sturgeon above the Turners Falls Dam.¹²⁷ Their letter questions FirstLight's November 2018 study report, *Environmental DNA Sampling for Shortnose Sturgeon*.¹²⁸ The Western Mass Rights of Nature comments are not supported by substantial evidence in the record.

In response to an anecdotal siting of a shortnose sturgeon in the TFI, FirstLight conducted an environmental DNA ("eDNA") study to determine the presence or absence

¹²⁶ MDCR, Hydrilla: An Invasive Aquatic Plant (Jan. 2022), *available at* <u>https://www.mass.gov/doc/hydrilla-1/download</u>.

¹²⁷ Western Mass Rights of Nature Comments at 10.

¹²⁸ *Id.* at 11.

of a Shortnose Sturgeon population in the TFI. The eDNA testing provides a measure of species presence, density, and distribution without having to collect the fish, and is a scientifically accepted method for detecting rare or endangered organisms. FirstLight worked with Genidaqs, the Genetics Lab of Cramer Fish Sciences, which had experience in the Sacramento River detecting the presence of rare green sturgeon using the same sampling methods deployed in the TFI.

Following the Genidaqs field collection procedures, FirstLight's consultant collected water samples at defined intervals throughout the TFI. Genidaqs then tested the samples for Shortnose Sturgeon DNA. All 150 original samples tested negative for Shortnose Sturgeon DNA. Genidaqs also tested 30 random samples for smallmouth bass DNA to ensure the technique was working since smallmouth bass are abundant in the TFI. Twenty-seven of those samples tested positive for smallmouth bass, confirming the test's validity.

After reviewing the results testing negative for Shortnose Sturgeon, FirstLight opted to collect a second round of samples. Water samples were taken downstream of Turners Falls Dam where a population of Shortnose Sturgeon are known to reside as a "positive control" test. Additional samples were collected just downstream of Vernon Dam where the Shortnose Sturgeon was reportedly caught.¹²⁹ Some of the water samples collected downstream of Turners Falls Dam tested positive for Shortnose Sturgeon, as expected. None of the additional samples collected below Vernon Dam tested positive for Shortnose Sturgeon. Thus, the testing did not corroborate the previous reported catch of a Shortnose Sturgeon in this location. It is possible a single Shortnose Sturgeon was

¹²⁹ Environmental DNA Sampling for Shortnose Sturgeon, Project Nos. 1889-000 and 2485-000 (filed Nov. 8, 2018).

present and was within the test's 5% probability of detection error. It is also possible the

previously reported Shortnose Sturgeon is no longer present in the TFI. In any case,

based on FirstLight's eDNA testing, the likelihood of a Shortnose Sturgeon population

being present in the TFI is extremely low.

NMFS indicated in their May 21, 2024, comment letter the following

Turners Falls is considered to be the historic upstream boundary of Shortnose sturgeon in the Connecticut River; however, there have been anecdotal sightings of sturgeon upstream of the dam and in the summer of 2017 an angler reported a catch of a Shortnose sturgeon upstream of the Turners Falls Dam. This information suggests that occasional Shortnose sturgeon are present upstream of the dam; however, we have no information on how Shortnose sturgeon accessed this reach or how many sturgeon may be present in this area. At this time there is no information to indicate that there is spawning occurring upstream of the Turners Falls Dam. Targeted sampling by the USGS Conte Lab and environmental DNA (eDNA) studies upstream of the Turners Falls Dam have not resulted in the detection of any Shortnose Sturgeon between Turners Falls and Bellows Falls.¹³⁰

Therefore, best available science fails to support speculation that there is a

population of Shortnose Sturgeon in the TFI requiring protection.

G. Prior Authorization for Actions Affecting State-Listed Species

MDFW recommends that FERC include in the Project licenses a requirement that

no action can proceed affecting a state-listed species without a permit from MDFW.¹³¹

FirstLight does not agree with this recommendation as it would put MDFW in the

position of being able to block FirstLight's implementation of new Project license

requirements based on need for a state permit.¹³²

¹³⁰ NMFS Comments at 20.

¹³¹ MDFW Comments at 11 (Recommendation 7 – Article MW3).

¹³² See California v. FERC, 495 U.S. 490 (1990).

H. Invasive Plant Species

USFWS and MDFW both submitted Section 10(j) recommendations that

FirstLight be required to comply with an Invasive Plant Species Management Plan.¹³³

USFWS and MDFW provided comments on the Turners Falls and Northfield Mountain

Invasive Plant Species Management Plans that were filed with the Amended FLA.

USFWS and MDFW made the same comments to these plans.

The plans have the following main components:

- Add to FirstLight's Amended FLA proposed plan for the Northfield Mountain Project a provision that where FirstLight has engaged in ground disturbing activities, if invasive species are outcompeting desirable vegetation FirstLight will treat the infestations.
- For the Turners Falls Project, FirstLight must take active control measures for existing infestations of aquatic invasive plants, in particular water chestnut.
- For the Turners Falls Project, the first full summer after license issuance (Year 1), conduct an updated baseline invasive aquatic plant survey of the TFI and bypass reach.
- For the Turners Falls Project, starting the year after conducting the baseline survey, FirstLight must conduct annual early detection surveys of the TFI and bypass reach over the license term. For any new invasive species detected, FirstLight is required to notify the agencies immediately, consult the agencies on appropriate rapid response approaches and implement the rapid response measures identified by the agencies.
- For the Turners Falls Project, FirstLight must conduct cyclical monitoring of the TFI shoreline on a five-year rotating basis to assess the success of control measures and guide where future control measures should occur. The agencies segmented the TFI into three reaches, thus surveys would be initiated in Years 6, 7, and 8 and would continue over the license term.

In summary, the agency proposed plan would have FirstLight conduct a baseline

survey, prepare a draft report, meet with the agencies to discuss areas needing control

¹³³ Interior Comments at 16-20, 30 (USFWS Section 10(j) Recommendation 11), and App. C; MDFW Comments at 4-7, 11 (Section 10(j) Recommendation MassWildlife 5), and App. C.

measures, and file a final report with FERC. The early detection protocol would entail focused annual surveys in areas of highly aggressive invasive aquatic plants with FirstLight responsible for implementing rapid response measures for any invasive species. In addition, FirstLight would conduct cyclical monitoring on a five-year rotating basis of the TFI shoreline divided into three sections. FirstLight would be solely responsible for implementing control measures.

CRC supports the agency plans with the following additional requirements:

- The plan should include a requirement that the monitoring methodology be consistent with monitoring at the Holyoke Project, FERC Project No. 2004, and the upstream Great River Hydro projects.
- In addition to the agencies, FirstLight should be required to consult with the Northeast Aquatic Nuisance Species ("NEANS") Panel.
- The early detection and rapid response protocol should be implemented in collaboration with the NEANS Panel.
- FirstLight should conduct a comprehensive baseline survey every four years.
- Educational materials and signs should be coordinated with the MDCR.¹³⁴

On March 22, 2024, FirstLight filed its Final Amendments to its relicensing

applications. The Final Amendments included the Revised IAPSMP for the Projects.

Neither the agencies nor CRC acknowledges FirstLight's revised plans. FirstLight's

revised plan for the Turners Falls Project¹³⁵ includes:

- For the Turners Falls Project, the first full summer after licensing issuance (Year 1), conduct an updated baseline invasive aquatic plant survey of the TFI and bypass reach.
- For the Turners Falls Project, conduct annual invasive aquatic plant surveys of the TFI up to the French King Gorge as the bypass reach and TFI above the French King Gorge have limited aquatic invasive plants.

¹³⁴ CRC Comments at 33-34.

¹³⁵ Final Amendments, Invasive Plant Species Management Plan ("Turners Falls IPSMP Plan").

• For the Turners Falls Project, repeat the same procedures as the baseline invasive aquatic plant survey of the TFI and bypass reach every 5 years.

FirstLight's plan also provides for appropriate control measures if needed:

After reviewing the annual reports, if the USFWS and NHESP demonstrate that aquatic invasive plant species are significantly affecting fish and wildlife populations in the TFI or bypass reach and that control measures are needed, the Licensee will consult with USFWS and NHESP to undertake reasonable measures, as determined by FERC and the Massachusetts Department of Environmental Protection, to control aquatic invasive plant species in the TFI and bypass reach, commensurate with the Licensee's level of responsibility.¹³⁶

FRCOG acknowledges FirstLight's revised plan for the Turners Falls Project, but

asserts it is inadequate on several grounds and offers a number of recommendations for additional requirements. Among other things, FRCOG objects to the provision in the plan

that would require the agencies to demonstrate that control measures are needed.¹³⁷

Court and Commission precedent supports this provision. In *Rhinelander Paper Co. v. FERC* ("*Rhinelander Paper*"),¹³⁸ the court distinguished between an obligation to monitor invasive plant species and an obligation to control invasive plants. The court pointed out that in *Northern States Power Co. of Wisconsin*,¹³⁹ FERC had rejected a Section 10(j) recommendation that the licensee be required to cooperate with USFWS and the state fish and wildlife agency in implementing a plan to control purple loosestrife due to lack of substantial evidence that such a plan was needed. Instead, FERC required the licensee to monitor for the presence of the invasive species, deferring actual control

¹³⁶ Turners Falls IPSMP, Section 3.4.

¹³⁷ FRCOG Comments at 27-29.

¹³⁸ 405 F.3d 1 (D.C. Cir. 2005).

¹³⁹ 78 FERC ¶ 62,087 at pp. 64,247-48 (1997), order on reh'g on other grounds sub nom. Fraser Papers, Inc., 83 FERC ¶ 61,129, reh'g granted in part, 84 FERC ¶ 61,036 (1998), pet. dismissed by Wisconsin v. FERC, 192 F.3d 642 (7th Cir. 1999).

measures.¹⁴⁰ In *Rhinelander Paper* as well, FERC had imposed only a monitoring requirement, subject to FERC's reserved right to impose control measures at a later date if the invasive plant species should become a problem.

In *PCA Hydro, Inc.*,¹⁴¹ the licensee objected to a license article requiring an invasive plant monitoring plan on the grounds that it subjected it to completely openended obligations and left it with no opportunity to contest the need for eradication measures. FERC replied that the primary purpose of the article was to require monitoring to prevent invasive species from colonizing and disrupting the environment. However, to address the licensee's concerns, FERC agreed to modify the license article to include the following language:

If at any time during the term of the license, *the Wisconsin DNR and FWS demonstrate invasive species are significantly affecting fish and wildlife populations at the project and that control measures are needed, and the Commission agrees with those determinations,* the Commission reserves authority to require the licensee to cooperate with the Wisconsin DNR and FWS to undertake *reasonable* measures to control or eliminate the invasive species in [the] project area.¹⁴²

Importantly, FERC placed the burden on the fish and wildlife agencies to show, to

FERC's satisfaction, that invasive plants are significantly affecting fish and wildlife populations before control measures are triggered. Further, FERC stipulated that any control measures must be "reasonable," giving the licensee the ability to challenge measures proposed by the agencies that the licensee considers unreasonable. FERC has included virtually identical or similar language in other licenses, including the Holyoke

¹⁴⁰ *Rhinelander Paper*, 405 F.3d at 7-8.

¹⁴¹ 111 FERC ¶ 61,191 at PP 18-22 (2005).

¹⁴² *Id.* at p. 61,928 (revised Article 407) (emphases added).

Project license.¹⁴³ Thus, FERC has recognized that the mere presence of invasive species within a project boundary does not automatically trigger the need for control measures.

Further, in *Appalachian Power Co.*, FERC acknowledged that there are multiple causes for the presence of invasive species in a lake and stated that the licensee should not bear the costs and responsibilities alone. Accordingly, FERC approved the licensee's proposed aquatic vegetation management plan, which provided that the licensee would coordinate with other stakeholders to address invasive aquatic vegetation in a comprehensive manner, over the objection of an intervenor who argued the licensee should bear the full cost and responsibility.¹⁴⁴

The key differences between FirstLight and the USFWS/MDFW invasive aquatic plant management plans include:

- After the baseline survey, which FirstLight and the agencies agree upon, FirstLight proposes to conduct targeted annual surveys of the TFI from the Turners Falls Dam to the French King Gorge as this reach has considerably more invasive aquatic plants. Alternatively, the agencies are seeking to conduct annual surveys of the entire TFI. Both proposals include developing a report, meeting with the agencies and filing the report, along with the consultation record with FERC.
- FirstLight proposes to conduct the same baseline survey every five years, whereas the agencies are seeking to conduct cyclical surveys in three reaches of the TFI every five years.

While the agencies are requesting considerably more monitoring than FirstLight

believes is necessary, the key difference between the FirstLight and agency proposals is

who takes on the responsibility and cost for any invasive aquatic plant treatment. The

¹⁴³ E.g., Appalachian Power Co., 132 FERC ¶ 61,236 at p. 62,334 (2010) (revised Article 409); Mosinee Paper Corp., 111 FERC ¶ 61,438 at p. 62,834 (2005) (revised Article 408); Holyoke Water Power Co., 88 FERC ¶ 61,186 at p. 61,635 (Article 417), order on reh'g, 89 FERC ¶ 61,027 (1999).

¹⁴⁴ Appalachian Power Co., 132 FERC ¶ 61,236 at P 59. FERC also rejected the intervenor's proposal that the licensee be required to do a full lake survey every year instead of every five years as provided by the licensee's plan. *Id.* at PP 58-59.

original source of invasive aquatic plants in Barton Cove and elsewhere in the TFI is unknown; however, it was likely introduced from boats, motors, trailers, and fishing gear. There is also a continual seed supply being transported into the TFI from the Connecticut River and tributaries to the TFI. In addition to the continual influx of seed sources, there are boat launches which are sources of invasive aquatic plants. There is a boat launch in Gill, Massachusetts owned and managed by the MDCR that, to FirstLight's knowledge, is not staffed by personnel, commonly referred to as weed watchers, to inspect boats/trailers being launched or taken out of the water for invasive aquatic plants. The boat launch is located in Barton Cove, which has the most widespread invasive aquatic plants. Similarly, the MDFW-owned Pauchaug Brook Boat Launch is also not staffed with weed watchers. If these boat launch sites were monitored it would help prevent the introduction of new and existing invasive aquatic plants. While the agencies would place the responsibility for implementing any aquatic invasive plant treatments solely on FirstLight, there are other contributing causes to invasive aquatic plants over which FirstLight has no control.

Finally, CRC requests that in addition to consulting the agencies, FirstLight should consult the NEANS panel on survey protocols and include educational materials and signage in coordination with the MDCR. The USFWS and NHESP have professional invasive aquatic plant specialists to provide input on the studies and findings; consulting the NEANS panel adds an unnecessary level of consultation. Regarding signage, FirstLight agrees that signage should be installed and maintained by the State at the Pauchaug Brook and Gill Boat Launches to educate boaters on invasive aquatic plants.

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I. Light Pollution

CRC states that the Projects cause light pollution and recommends that FirstLight be required to create a plan for DarkSky Approved lighting schemes.¹⁴⁵

CRC's assertion that the Projects cause light pollution has not been substantiated by study, nor has the group previously raised the issue during relicensing proceedings. FirstLight developed a proposed study plan, an updated proposed study plan and a revised study plan for the water quality study. No stakeholder, including the CRC, raised concern relative to light pollution at the Projects in study requests or comments on the study plans.

CRC indicates that FirstLight installed two "bright lights" at Turners Falls Dam in the past approximately five years. This statement is incorrect. Project lighting is required for dam safety, public safety, and security. FirstLight has not installed additional lighting at the Project. However, FirstLight has replaced all exterior lighting with LEDs for energy efficiency. During this process, some previously non-functional bulbs were restored to operation, which may have given the appearance of new lighting. During this period, a local resident contacted FirstLight regarding the effects of the Project lighting; FirstLight installed a barrier to reduce the impact to the resident to the resident's satisfaction.

J. Greenhouse Gas Emissions

CRC claims the Projects are a source of greenhouse gas ("GHG") emissions and recommends that FirstLight be required to report the net GHG impact from Northfield

¹⁴⁵ CRC Comments at 43-45.

Mountain Project pumped storage operations on an annual basis, and to estimate and report the GHG emissions from its two reservoirs.¹⁴⁶

FirstLight believes the reporting of greenhouse gas emissions on an annual basis, based on an estimated ISO New England Inc. fuel mix, provides no valuable information to the FERC license process, has no regulatory requirement for reporting, no framework or repository for such reports and would double count emissions already being reported by fossil fuel-fired generators. As fossil fuel-fired generation makes up a portion of the power generated at any given time, GHG emissions from those sources are already reported under the U.S. Environmental Protection Agency's ("EPA") Greenhouse Gas Emissions reporting program as well as, for facilities in Massachusetts, under MADEP's Global Warming Solutions Act requirements. Both the EPA and the MADEP programs require the emitters to report, not the end user of the energy. Moreover, the portion of the grid powered by renewable energy increases each year as the state works to achieve its net zero climate mandates, and therefore any GHG emissions associated with the pumping will decrease over time.

CRC notes that the creation of reservoirs can introduce new GHG emissions and requests that FirstLight be required to estimate and report on the GHG emissions of the Project reservoirs using the G-res tool. The G-res tool was developed to estimate the GHG footprint resulting from the conversion of a river to a reservoir.¹⁴⁷ The Turners Falls Project has been operating for more than 40 years under its existing license and the Northfield Mountain Project has been operating for more than 52 years under its existing

¹⁴⁶ *Id.* at 45-48.

¹⁴⁷ Y.T. Prairie et al., The GHG Reservoir Tool (G-res) Technical documentation v2.1 (2019), *available at* <u>https://assets-global.website-files.com/5fbd20be8373042612c54646/5fbd20be8373042051c55394_g-res_tool_user_guide_v2.1.pdf</u>.

license. As the baseline condition for this relicensing proceeding includes two longestablished reservoirs, estimating the GHG footprint of the reservoirs relative to the preconstruction condition would not inform the relicensing proceedings. Furthermore, the Gres tool is not designed to assess GHG emissions of "cascading systems," defined as a system in which a reservoir receives water from one or multiple reservoirs upstream,¹⁴⁸ which is the case for the TFI. Finally, it is well established that GHG emissions from reservoirs are highest immediately following creation but decline to a steady level approximately 20 years after creation.¹⁴⁹ As noted above, the Project reservoirs were established over 40 years ago. As such, estimating and reporting on GHG emissions of the reservoirs would provide no valuable information to FERC license implementation.

K. Water Quality

CRC asserts that the Projects have various negative water quality impacts and recommends a number of license conditions related to water quality.¹⁵⁰ CRC also asserts that there are gaps in the water quality study regarding dissolved oxygen ("DO") and temperature and raises the following issues: (a) the sampling depth for Site 7 in the TFI was installed deeper than the other sampling sites, (b) the sampling depths of Sites 5 and 7 would not have measured surface water temperature warming as a possible effect of the Projects, and (c) in locations where water quality meters could not be placed in the bypass there may be violations of the water quality standards for temperature.

In its March 1, 2013, study request letter, MADEP stated that:

Water temperature and DO measurements should be collected from a minimum of six locations: upstream in the impoundment (Route 10 bridge),

¹⁴⁸ *Id.* at 9.

¹⁴⁹ EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022, EPA 430-R-24-004 (2024), https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.

¹⁵⁰ CRC Comments at 49-55.

at a deep location within the impoundment, in the forebay near the intake, in the bypass reach, in the canal near Cabot Station and downstream of the confluence of the Cabot Station discharge and the bypass reach but upstream of the confluence with the Deerfield River.¹⁵¹

FirstLight's Water Quality Study Plan included seven water quality sampling stations in the TFI (including two above the Route 10 Bridge), two in the bypass, one in the canal, and one below the Deerfield River confluence as requested by MADEP. The deep location in the TFI was at Site 7. MADEP also stated that "A proposed water quality sampling plan is to be submitted to MADEP for approval prior to sampling."¹⁵² As requested, FirstLight developed a Water Quality Monitoring Study Field Sampling Plan and provided it to MADEP, CRC, and numerous other state and federal agencies and stakeholders for review and comment. In FirstLight's September 16, 2014, Initial Study Report filing with FERC, it addressed comments received on the Water Quality Monitoring Study Field Sampling Plan and filed the plan, which included Appendix A outlining MADEP's Water Quality Sampling Standard Operating Procedures. The Water Quality Monitoring Study Field Sampling Plan was subsequently finalized and approved by FERC.

Relative to the water quality monitoring sites in the TFI, FirstLight developed a proposed study plan, an updated proposed study plan and a revised study plan for the water quality study. Consistent among all three study plans was that the water quality meters in the TFI would be deployed at 25% of the depth of the sampling location as this was considered representative of water quality conditions. No stakeholder, including CRC and MADEP, ever raised concern relative to the depth of the water quality meters in

¹⁵¹ Study Requests of Massachusetts Department of Environmental Protection at 8, Project Nos. 1889-000 and 2485-000 (filed Mar. 1, 2013).

¹⁵² *Id*.

the TFI. Additionally, in its comments on the Updated Proposed Study Plan and Revised Study Plan, CRC never raised concern of the sampling depths in the TFI or the sampling locations in the bypass reach. CRC did raise the issue of sampling depths in its comments on the Water Quality Sampling Plan, but these comments were addressed and, as noted above, the study plan was approved by FERC. The water depth at Sites 5 and 7 were 40 and 50 feet, respectively; thus the water quality meters were rightly positioned at depths of 10 and 12 feet, respectively.

In addition to the continuous water quality monitoring in the TFI, vertical profiles of DO and temperature were obtained in 1 meter increments at three locations in the TFI, including Site 7 (Site 5 did not include vertical profiles), on a bi-weekly basis from April¹⁵³ to November. At Site 7, of the total of 13 bi-weekly vertical profiles, the maximum temperature differential between 1 m below the water surface to the bottom of the water column was less than 0.3 °C throughout the season except one sampling event in May. Given that the TFI waters were well mixed and had no thermal stratification, the continuous water quality monitor at Site 7 set at 25% of the water depths is representative of the water temperature near the surface. CRC's argument that water temperatures at the surface will be higher is not supported by the facts.

Relative to the bypass reach, CRC notes that certain sections of the bypass reach did not include water quality monitors because they are in areas that may dry up in the summer and may violate water quality standards. Like the rationale above, stakeholders including CRC, reviewed three rounds of study plans and there were no issues raised

¹⁵³ One of the three profiles could not be obtained until May due to safety issues and its proximity to the Turners Falls Dam.

relative to the location of the two continuous monitoring water quality sampling locations in the bypass reach—upstream of Station No. 1 and near Rawson Island.

The water quality monitoring study demonstrated that DO and temperature water quality standards for Class B waters were attained under baseline conditions. In the case of the bypass, with the considerable increase in bypass flows under the FFP Settlement Agreement, it is reasonable to conclude that water quality conditions will only improve.

CRC claims that "the Projects have in the past and likely will in the future cause oil, trash, and debris spills into the Connecticut River."¹⁵⁴ Oil spills were detected at Turners Falls Dam in 2022 and 2023. On February 23, 2022, at approximately 10:30 AM, yellow staining was observed on the ice accumulated around pistons 7 and 8 below Bascule Gate #4 of the Turners Falls Dam. It was determined that an unknown volume of hydraulic oil was released from a bascule gate actuator system, causing a sheen on the surface water of the Connecticut River in a small cove below the gate. FirstLight notified MADEP of the release at 12:20 PM and the National Response Center ("NRC") was notified at 4:11 PM. Immediate response actions included application of absorbent and containment materials to remove the hydraulic fluid sheen from the surface water and repairs to pistons 7 and 8. FirstLight filed a Permanent Solution with No Conditions Statement with MADEP in December 2022 documenting actions taken and concluding that the surface water had been returned to pre-release conditions and necessary repairs had been made to the dam actuator system.

On March 9, 2023, at approximately 10:00 AM, a member of the public observed an oil sheen on the surface water of the Connecticut River below Bascule Gates #1, #2,

¹⁵⁴ CRC Comments at 51-54.

and #3. The source of the sheen was identified as a hydraulic fluid leak at Pistons 3 and 5 (which operate Bascule Gates #2 and #3). FirstLight was notified of the sheen at 2:28 PM and subsequently confirmed the presence of the sheen to MADEP at 3:30 PM and the NRC at 3:44 PM. Immediate response actions included monitoring of the release area for recurrence of the sheen and repair of minor leaks identified from two pistons that control Bascule Gates #2 and #3. As of December 2023, FirstLight has repaired chrome pitting identified on several pistons and replaced packing and cylinder head O-rings on six of the eight pistons, including Pistons 3 and 5. Pistons 7 and 8 were injected with packing filler as a precaution. The packing and cylinder head O-rings on these pistons were replaced in 2022. There was no observed chrome pitting Pistons 7 and 8 and there was no observed oil leakage at these Pistons either. New absorbents have been placed in all piston pits, and new absorbent socks have been placed around each cylinder of Pistons 1 through 8 to prevent any future release from escaping. FirstLight filed a Permanent Solution with No Conditions Statement with MADEP in January 2024 documenting actions taken and concluding that the surface water had been returned to pre-release conditions and necessary repairs had been made.

As noted above, the 2022 and 2023 release incidents were caused by separate but related issues. The eight hydraulic cylinders controlling the bascule gates are experiencing hydraulic fluid leakage due to the age of the equipment and wear of the chrome surfacing of the piston rods. Although initial repairs were conducted in 2022 and 2023, FirstLight has begun a phased process of fully replacing each hydraulic cylinder to deliver a long-term solution for the system. The project is currently in the engineering phase, and the replacement of the cylinders on one gate with two new cylinders is

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expected to occur in 2025. The removed cylinders will be refurbished and installed in the next gate, and this process will be repeated for the remaining two gates. Timing of repairs to the final three gates will be estimated upon completion of repairs to the first gate. This full replacement of the aging cylinders should prevent future releases to the Connecticut River and represent upgrades that support the enduring value of the clean energy project.

Relative to trash and debris "spills," FirstLight first points out that the majority of debris accumulating behind the Turners Falls boat barrier is woody debris that has entered the river naturally during storms. As noted in CRC's comments,¹⁵⁵ the debris accumulation behind the boat barrier upstream of Turners Falls Dam in 2023 was substantial due to heavy rainstorms and flood events. FirstLight at the time was engaged in efforts to make interim repairs to the bascule gate hydraulic cylinders (discussed above) and determined that removal of the debris would create unnecessary delays and employee safety concerns during the repair effort. FirstLight communicated with MADEP in August of 2023 regarding FirstLight's management of debris at the Turners Falls Dam boat barrier in a typical year and the complications specific to 2023 due to bascule gate repairs.

As noted in the CALM Guidance Manual for the 2022 Reporting Cycle cited by CRC, "a waterbody will not be assessed as impaired for the occasional presence of litter or debris, but rather for persistent and/or other more serious indicators of aesthetic degradation."¹⁵⁶ The debris load experienced in 2023 was atypical, and debris loading at the Turners Falls Dam boat barrier has not previously been raised as an issue during

¹⁵⁵ See id. at 52-53.

¹⁵⁶ MADEP, Massachusetts Consolidated Assessment and Listing Methodology (CALM) Guidance Manual for the 2022 Reporting Cycle at 59 (Oct. 2022), *available at* <u>https://www.mass.gov/doc/2022-</u> consolidated-assessment-and-listing-methodology-guidance/download#page=63&zoom=100,143,72.

relicensing proceedings. The presence or absence of boat barriers does not affect the amount of debris in the river, and except in extreme cases FirstLight does not remove debris behind the boat barrier as it poses a safety risk.

Relative to sediment deposition in Barton Cove, FirstLight noted in its Amended FLA that ". . . although deposition may still occur on a year-to-year basis, a balance of sediment inflow and outflow likely occurs over a long period of time (i.e., years to decades)."¹⁵⁷ CRC notes that this conclusion is predicated on the results of cross-section surveys of four transects in Barton Cove from 1999-2015.¹⁵⁸ CRC notes it is unclear where the information was sourced to develop Figure 3.3.1.2.3-1 in the Amended FLA.¹⁵⁹ Using annual cross-section surveys at BC-1, BC-2, BC-3, and BC-5 (there is no BC-4 cross-section) within Barton Cove from 1999-2015, FirstLight computed for each year the net gain of approximately 4,400 square feet of sediment, which is equivalent to approximately 275 square feet/year. To put this into perspective, Barton Cove is approximately 241 acres or 10,517,660 square feet, thus a net deposition of 275 square feet over this area would be negligible.

L. Removal and Replacement of Mills and Bridges in Former Industrial Area

The Town of Montague in its comments requests FirstLight and FERC's "cooperation with ongoing efforts to remove or replace" blighted mills and bridges within the Village of Turners Falls that are approaching the end of their useful lives, and that FERC impose in the new Turners Falls Project license "a commitment to those entities"

¹⁵⁷ Amended FLA, Ex. E at E-72.

¹⁵⁸ CRC Comments at 55.

¹⁵⁹ *Id.*

continued cooperation with needed projects, including a commitment to remove barriers to such projects wherever possible."¹⁶⁰

It is not entirely clear what the Town of Montague is seeking here from FERC. The former industrial area in the Village of Turners Falls is not within the Project boundary and is not a Project effect, though several bridges and utilities cross the power canal. From conversations with the Town of Montague Town Administrator, FirstLight understands that the Town's use of the term "barriers" in its comments was meant to refer to procedures, versus physical barriers, for FERC approvals that may be required for the removal or replacement of structures, such as bridges, that span the canal and may be part of the Town's future redevelopment projects in this area.

FirstLight is aware that the Town intends to redevelop this area and has previously entered into an agreement (August 9, 2021) outlining the obligations of each party concerning the demolition and replacement of the Strathmore Bridge, and the granting of easements to the Town to construct at the Town's expense other bridges or improvements on FirstLight's property in this area. In that agreement, FirstLight "covenants that it will exercise good faith and shall use its best efforts to obtain FERC approval for the identified projects." FirstLight is not aware of any other projects that the Town intends to complete on FirstLight's property in this area; therefore, FirstLight believes that its existing agreement with the Town sufficiently ensures cooperation between the parties and support from FirstLight for executing the Town's planned projects. FirstLight does not believe cooperation or support for unidentified but potential future projects needs to be imposed as a license article.

¹⁶⁰ Montague Comments at 2.

M. Tribal and Cultural Resource Issues

The Coalition¹⁶¹ filed comments asserting that the Projects negatively affect sensitive cultural resources in various ways and listing 21 "concerns and recommendations" regarding the Projects. FirstLight has previously responded to the issues raised by the Coalition in its FFP Settlement Agreement Response and its Recreation Settlement Agreement Response.¹⁶²

The Coalition also provides an incomplete and mischaracterized account of the timing and history of communications and settlement discussions between it and FirstLight. As FirstLight has previously stated, FirstLight will not negotiate in public with the Coalition, honoring the ground rules we reached years ago with stakeholders to the settlement process. FirstLight indicated its willingness to make certain commitments to the Coalition when both parties signed a Memorandum of Understanding in Principle ("MOUIP") which FirstLight filed with FERC.¹⁶³ FirstLight remains supportive of the MOUIP and continues to work toward a settlement agreement based on the commitments in the MOUIP. From the Coalition's comments, the scope of their issues and concerns is much broader than the MOUIP. Nonetheless, FirstLight has continued to respond in a timely manner to the Coalition.

¹⁶² FFP Settlement Agreement Response at 8-9; Recreation Settlement Agreement Response at 11-13.

¹⁶¹ The Tribal Coalition consists of the Nolumbeka Project, the Chaubunagungammaug Band of Nipmuck Indians, and the Elnu Abenaki Tribe. The Nolumbeka Project is non-profit corporation. The Elnu Abenaki Tribe is a recognized by the State of Vermont. Only the Chaubunagungammaug Band of Nipmuck Indians is a Massachusetts-recognized Tribe. There are no federally recognized Tribes in the Coalition, nor did any federally recognized Tribe file comments in response to FERC's REA Notice.

¹⁶³ Memorandum of Understanding in Principle (MOUIP) to Develop a Relicensing Settlement Agreement, Project No. 1889-092 (filed Mar. 24, 2023).

The Coalition also continues to state that Tribes were not consulted as part of the FERC-approved Traditional Cultural Property ("TCP") Study 3.7.3 that FirstLight conducted and submitted to FERC.¹⁶⁴ The Tribes and the Nolumbeka Project were consulted but declined to participate in the TCP study. Therefore, FirstLight had no choice but to conduct the study without Tribal interviews.¹⁶⁵ The Coalition's request that FirstLight be required to conduct a new TCP study a decade later, with the Coalition's participation, and that the results of the study (which the Coalition appears to have predetermined)¹⁶⁶ should dictate virtually every aspect of how the Projects will operate under the new licenses including the creation of a new off-river lower reservoir for the Northfield Mountain Project and conversion of pumped storage operations to a closed-loop system,¹⁶⁷ comes too late and would unreasonably delay and disrupt the Project relicensings.

Finally, under separate cover, FirstLight is filing today revised Historic Property Management Plans ("HPMPs") for the Projects. The revised HPMPs include additional management measures for identification and treatment of archaeological resources threatened by eroding streambanks. They also include additional provisions for consultation with applicable Native American Tribes, which is intended to include staterecognized Tribes, when planning and carrying out ground-disturbing activities.

¹⁶⁴ See Determination on Requests for Study Modifications and New Studies, Project Nos. 2485-071 and 1889-085 (issued June 29, 2016); Study 3.7.3 - Traditional Cultural Properties Study Report (March 2015), Project Nos. 1889-000 and 2485-000 (filed Sept. 14, 2015) ("TCP Study Report").

¹⁶⁵ TCP Study Report, Section 1.1.2.

¹⁶⁶ Given the scope of the Coalition's objections to the Projects, and that the Coalition's Comments tie restoration of the Connecticut River to a condition that would essentially preclude Project operations in order to adequately protect cultural resources in their view, FirstLight questions whether the Coalition would be able to give fair and accurate testimony as to any TCPs within the Project boundaries.

¹⁶⁷ Coalition Comments at 28-33.

N. Dam Decommissioning Fund

CRC and other commenters continue to surmise 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.¹⁶⁸

As FirstLight pointed out in its previous response to this comment,¹⁶⁹ 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.¹⁷⁰

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 and other commenters' speculations, may or

may not happen during the next license term.

Moreover, CRC fails to acknowledge that the Commission has previously rejected

any kind of general requirement for licensees to establish decommissioning funds.¹⁷¹

¹⁶⁸ See CRC Comments at 56-64.

¹⁶⁹ FFP Settlement Agreement Response at 22-23.

¹⁷⁰ E.g., Little Falls Hydroelectric Assocs., LP, 187 FERC ¶ 62,057 (2024); Watson Assocs., L.P., 187 FERC ¶ 62,056 (2024); Green Mountain Power Corp., 186 FERC ¶ 62,163 (2024); Walden Hydro, LLC, 185 FERC ¶ 62,097 (2023); Brookfield White Pine Hydro, LLC, 185 FERC ¶ 62,074 (2023); Wash. Elec. Coop., Inc., 184 FERC ¶ 62,059 (2023); Aspinook Hydro, LLC, 184 FERC ¶ 62,023, order addressing arguments raised on reh'g, 185 FERC ¶ 61,127 (2023); Cocheco 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).

¹⁷¹ Project Decommissioning at Relicensing; Policy Statement, 60 Fed. Reg. 339, 346 (Jan. 4, 1995) ("Decommissioning Policy Statement").
In its Decommissioning Policy Statement, the Commission identified "several impediments" to requiring a financially sound licensee to tie up substantial amounts of capital in a decommissioning fund that may never be needed. FERC concluded that considering these "practical problems" associated with a pre-retirement funding program, it would not act to impose such a program on all licensees. Only where "there are factors suggesting that the life of a project may end within the next 30 years" or where there are indications that the licensee would be "unable to meet likely levels of expenditure without some form of advance planning" would FERC consider such a requirement in an individual case.¹⁷² FirstLight is financially sound, and its projects are well-maintained, modernized, and nowhere near the end of their useful lives. FERC will have reserved authority in the licenses to impose reasonable financial assurance requirements if it ever deems such requirements to be necessary.

CRC points out that the Commission issued a Notice of Inquiry in 2021 regarding financial assurances in hydroelectric licensing and states that a number of commenters supported including decommissioning costs in licenses.¹⁷³ However, many commenters opposed including decommissioning costs in licenses, citing numerous practical difficulties and onerous financial burdens.¹⁷⁴ The Commission has taken no further action on this issue, other than the new standard license article discussed above. The

¹⁷² *Id*.

¹⁷³ CRC Comments at 57-58.

¹⁷⁴ See Post-Technical Conference Comments of the National Hydropower Association and Edison Electric Institute at 9-10, Docket No. RM21-9-000 (filed June 13, 2022); Post-Technical Conference Comments of the Public Power Licensee Group at 12-13, Docket No. RM21-9-000 (filed June 13, 2022); Post-Technical Conference Comments of the Bay State Hydropower Association at 3, Docket No. RM21-9-000 (filed June 13, 2022); Comments of Natel Energy on the Technical Conference on Financial Assurance Measures for Hydroelectric Projects at 2, Docket No. RM21-9-000 (filed June 24, 2022).

Commission should reject the recommendation to include a decommissioning fund requirement in FirstLight's new Project licenses.

O. License Term

As with the FFP Settlement Agreement and Recreation Settlement Agreement, CRC and other commenters continue to oppose 50-year new license terms for the Projects. FirstLight thoroughly answered this objection in its earlier response.¹⁷⁵

CRC asserts that "technology is rapidly advancing and a shorter license term allows society to continue advancing quickly with cleaner and more reliable energy sources" and "will allow for future changes and adaptability with relation to changing climate."¹⁷⁶ However, none of these factors is a consideration under FERC's license term policy.¹⁷⁷ Moreover, the ISO New England submitted a comment letter urging the Commission "to ensure the Projects' continued operation, which will assist in maintaining reliability and meeting the region's current *and future* energy goals."¹⁷⁸

CRC also questions FirstLight's calculations of costs and revenues under the new Project licenses, citing *Duke Energy Carolinas, LLC* ("*Duke Energy Carolinas*")¹⁷⁹ for the proposition that licensee's cost estimates under a new license for purposes of determining the appropriate license term are not always reliable and are not determinative.¹⁸⁰ CRC offers no basis for questioning FirstLight's cost estimates. FirstLight has committed to major capital investments in fish passage and recreation

¹⁷⁵ FFP Settlement Agreement Response at 23-27.

¹⁷⁶ CRC Comments at 66.

¹⁷⁷ Policy Statement on Establishing License Terms for Hydroelectric Projects, 82 Fed. Reg. 49,501 (Oct. 26, 2017), 161 FERC ¶ 61,078 (2017).

¹⁷⁸ ISO-NE Comments at 1 (emphasis added).

¹⁷⁹ 156 FERC ¶ 61,010 at PP 14-15 (2016).

¹⁸⁰ CRC Comments at 61-64, 68.

improvements, as well as increased minimum flows and operating restrictions which will result in lost revenue, which FirstLight has estimated at a total cost of over \$350 million over 50 years.¹⁸¹ If the price of power were to go up, as CRC speculates, then the lost power costs would be even higher. Clearly, this level of investment in environmental improvements merits 50-year licenses under the Commission's license term policy.

Further, *Duke Energy Carolinas* was decided before Congress amended the FPA in 2018, as FirstLight has explained in previous filings, to require FERC in setting new license terms to consider 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."¹⁸² As documented in the Amended FLA Exhibit Ds, FirstLight and its predecessors have spent tens of millions of dollars on modernization work at both Projects over the years.¹⁸³ 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.¹⁸⁴

¹⁸¹ See Response to Additional Information Requests Relative to Recreation Settlement Agreement at 2, Project Nos. 2485-000 and 1889-092 (filed Dec. 11, 2023); Response to FERC Additional Information Requests at 6, 11, Project Nos. 2485-071 and 1889-085 (filed May 11, 2023).

¹⁸² 16 U.S.C. § 823g(b)(2)(A).

¹⁸³ Amended FLA, Ex. D at D-2.

¹⁸⁴ CRC makes the completely unsupported argument that FirstLight has somehow waived its right to submit additional information on its investments in the Projects by not submitting the information previously. CRC Comments at 66 n.215. Since FirstLight is continually making investments in the Projects it would make no sense for FirstLight to rely solely on information submitted with the 2020 Amended FLAs. In addition, FirstLight cannot be sure of the cost of PM&E measures under the new licenses until closer to receiving them, at a minimum when FERC issues its Draft Environmental Impact Statement setting forth Commission staff's recommended relicensing alternative. Finally, Section 36 of the FPA gives FirstLight an unqualified right to a determination by FERC as to whether its past or future investments in the Projects should be considered in setting the license term. 16 U.S.C. § 823g(c).

CRC continues to claim, incorrectly, that the FFP Settlement Agreement and Recreation Settlement Agreement do not constitute a "comprehensive" settlement such that the Commission will defer to the wishes of the settlement parties on license term.¹⁸⁵ In fact, FERC has issued 50-year terms where partial settlement agreements covered a wide range of relicensing issues, as do the two settlement agreements in this case.¹⁸⁶ In addition to minimum stream flows, flow stabilization, and fish passage, the settlements here include protective measures for bald eagles and bats, as well as off-license mitigation funding for ichthyoplankton and Cobblestone Tiger Beetles. The reality is a universal, uncontested settlement among all participants in a major relicensing case such as this is difficult to achieve despite best efforts of the licensee and other stakeholders.

Lastly, under both the FFP Settlement Agreement and the Recreation Settlement Agreement, failure to issue 50-year license terms for the Projects is a ground for termination of the settlements.¹⁸⁷ FirstLight's agreement to make substantial investments in fish and wildlife and recreational improvements at the Projects was predicated on a license term of 50 years; a lesser license term would compel FirstLight to reevaluate those commitments.

¹⁸⁵ CRC Comments at 66-67.

¹⁸⁶ N.Y. State Elec. & Gas Corp., 174 FERC ¶ 62,174 at PP 7, 114 (2021) (deferring to the 50-year license term request in a settlement agreement between four parties addressing "project operation, minimum flows, fish passage and protection, bat and bald eagle protection, and invasive species management"); *Power Auth. of the State of N.Y.*, 167 FERC ¶ 62,075 at PP 6, 101 (deferring to the 50-year license term request in a settlement agreement between four parties addressing "water management, ecological enhancement, land management, recreation, and cultural resources"), order granting clarification on other grounds, 167 FERC ¶ 62,161 (2019).

¹⁸⁷ FFP Settlement Agreement, Sections 1.3.6, 6.1, 6.5; Recreation Settlement Agreement, Sections 1.3.6, 6.1, 6.5.

IV. CONCLUSION

FirstLight respectfully requests that the Commission reject the additional license conditions proposed by agencies and other commenters that are inconsistent with FirstLight's relicensing proposal including the FFP Settlement Agreement and the Recreation Settlement Agreement, or are otherwise inconsistent with the Commission's policy, precedent, and other applicable law. FirstLight does agree, however, to the canal drawdown plan recommended by USFWS under Section 10(j) if modified as set forth above.

Respectfully submitted,

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Counsel for FirstLight MA Hydro LLC and Northfield Mountain LLC

Dated: July 8, 2024

ATTACHMENT A

Response to Review of Erosion in the Turners Falls Impoundment

Response to *Review of Erosion in the Turners Falls Impoundment*

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



Prepared by:





JULY 2024

1.0 Introduction

On May 22, 2024, the Connecticut River Conservancy ("CRC") and the Franklin Regional Council of Governments ("FRCOG") separately filed comments and recommendations for the Turners Falls Hydroelectric Project (FERC No. 1889) ("Turners Falls Project") and the Northfield Mountain Pumped Storage Project (FERC No. 2485) ("Northfield Mountain Project"), collectively "the Projects," with the Federal Energy Regulatory Commission ("FERC" or the "Commission"). The comment letters contained points that have previously been made throughout the FERC licensing proceeding for the Projects, which have been rebutted and responded to by FirstLight on multiple occasions.¹ Included with the comment letters was a new report entitled *Review of Erosion in the Turners Falls Impoundment* (May 19, 2024) prepared by Dr. Evan Dethier ("Dethier Review" or "the Review").

2.0 Response

The Dethier Review presents a generic, qualitative summary of erosion processes in reservoirs, provides a high-level review of a subset of past erosion evaluations conducted in the Turners Falls Impoundment ("TFI"), and presents a "peer review" of FirstLight reports and the use of the Bank Stability and Toe Erosion Model ("BSTEM") (Section 3 of the Review).

The Dethier Review is not a peer review. The process by which the author conducted the Review is unclear and appears to have not included the full body of available scientific information nor does it recognize the extensive consultation that occurred in developing the study plans between FirstLight, CRC, FRCOG, the Massachusetts Department of Environmental Protection ("MassDEP"), and other stakeholders. In addition, although Dr. Dethier's CV is included with the Review, the extent of his expertise as it pertains specifically to BSTEM, which is the primary focal point of the "peer review," is unclear.

The enclosed response to the Dethier Review presents global comments pertaining to Sections 1 and 2 of the Review as well as detailed responses to specific comments made regarding the use of BSTEM (<u>Table 1</u>). As detailed in the subsequent sections, the author arrives at numerous conclusions throughout the Review based on generalizations and comparisons with dissimilar reservoirs that are devoid of scientific evidence and ignore the existing body of TFI-specific literature developed by FirstLight and others. In addition, the author makes numerous unsubstantiated assumptions and assertions regarding BSTEM throughout the Review and mischaracterizes the work completed by FirstLight during the licensing proceeding.

¹ See Response to Stakeholder Requests for Study Modifications and/or New Studies Based on the Study Report and Meeting Summary, Project Nos. 1889-000 and 2485-000 (filed Jan. 17, 2017); Response to Comments on Various Study Report Addendums, Project Nos. 1889-000 and 2485-000 (filed Dec. 21, 2018). See also 401 Water Quality Certificate Application, App. E – Supplemental Turners Falls Impoundment Erosion Summary Report & Erosion Proposal (April 2024), App. A, Project Nos. 2485-079 and 1889-092 (filed Apr. 22, 2024).

2.1 Erosion on Reservoir Shorelines (Section 1.2)

Section 1.2 presents a general, non-site specific discussion of erosion processes in reservoirs, which attempts to draw comparisons to erosion processes that occur in the TFI. At various points throughout the Review the author includes photos and discussion pertaining to bank erosion in reservoirs in Quebec, Manitoba, Iceland, and Poland as a means of comparison to the TFI. The reservoirs cited by the author have vastly different characteristics than the TFI, yet the author speculates that "*similar and/or identical processes are at work in the TFI*" because the photographs of the comparison reservoirs look like photographs from the TFI. Such assumptions are not based on any scientific evidence, ignore the existing body of TFI-specific scientific literature, and contradict the author's own language in Section 1.2. As noted by the author:

"...the Turners Falls Impoundment is a narrow, riverine reservoir, especially in its upper reaches. Thus, it is somewhat different from many of the reservoirs that have been studied for erosion, which tend to be broader." Pg. 10

The author also notes that:

"...many processes contribute to erosion in a reservoir, and rarely can erosion be distilled to a single cause. Which of the above processes is dominant in a given reservoir depends on the make-up, orientation, and slope of the reservoir banks, slope and vegetation, dam operations, the prevailing hydrology and climatology, and reservoir activity. The primary cause of erosion may vary within a reservoir due to variations in current, exposure, or bank material." Pg. 8

When evaluating the causes of erosion in a specific reservoir or impoundment, a site-specific evaluation based on qualitative, quantitative, and computer modeling methods would provide the most comprehensive results. This is the methodology that was employed by FirstLight when conducting Study No. 3.1.2 Northfield Mountain / Turners Falls Operations Impacts on Existing Erosion and Potential Bank Instability ("Study No. 3.1.2") and the subsequent supplemental analyses.

2.2 Past Studies of Erosion in the Turners Falls Impoundment (Section 1.3)

Section 1.3 of the Review discusses previous erosion studies of the TFI, focusing largely on the 1979 and 1991 U.S. Army Corps of Engineers ("USACE") evaluations, the 2007 Field Geology Services ("FGS") report, and the 2016 Princeton Hydro review of Study No. 3.1.2, among others. The discussion presented in Section 1.3 omits several key findings of these past evaluations or how these evaluations informed Study No. 3.1.2.

Although both the 1979 and 1991 USACE reports did identify water level fluctuations as a potential cause of erosion in the TFI, both USACE studies (as well as Study No. 3.1.2) reached the same conclusion – high flows and the shear stress associated with those flows are the primary cause of bank erosion in the TFI. Following the issuance of the 1991 USACE report, Northeast Utilities (previous Licensee) sent the USACE a follow-up letter with questions. In its December 26, 1991 response to Northeast Utilities, the USACE clarified its findings:

"It appears that Pages 31 and 32 of the July 1991 report have been misinterpreted by the Franklin County Commissioners and others. Our report does not say that "daily and weekly fluctuations of the Turners Falls Pool are the most important factor contributing to accelerated erosion.". It does indicate that tractive shear stress on the erodible (non-cohesive) river bank soils or river velocity during spring runoff periods and floods is the most important erosive factor (major force). Table 16 of our report indicates that, if shear stress or velocity is assigned an erosion variable of 1.0, pool fluctuations would have only 18% of the erosion causing effect of shear stress."

Furthermore, recommendations included in FGS (2007) were incorporated into the study design for Study No. 3.1.1 2013 Full River Reconnaissance Study (Study No. 3.1.1) and Study No. 3.1.2 as is detailed in their respective study plans. This was thoroughly discussed during the study scoping process, which involved extensive consultation with MassDEP, FRCOG, CRC, and other stakeholders.

Throughout the Review the author repeatedly asserts that FirstLight claimed "that erosion cannot be attributed to Project operations" or that FirstLight is employing a "pattern of denial, rejecting even the possibility that Project operations are meaningfully contributing to erosion in the TFI." The author further asserts that FirstLight "selectively interprets or overinterprets results that downplay erosion in the TFI in general, and erosion attributable to Project operations specifically." Such statements are factually incorrect and ignore the extensive record developed for this proceeding.

During Study No. 3.1.2, FirstLight clearly identified "*water level fluctuations due to hydropower operations*" as one of four potential primary causes of erosion that warrant further evaluation along with hydraulic shear stress due to flowing water, boat waves, land management practices and anthropogenic influences on the riparian zone, and ice (in no particular order) (Section 3 of the April 2017 Study No. 3.1.2 Report, Volume II). Furthermore, at a high level, the results of Study No. 3.1.2 are consistent with past erosion evaluations conducted by others, all of which found that high flows are the primary cause of erosion in the TFI with Project operations being a contributing cause. However, FirstLight was able to take the erosion evaluation one step further than past efforts that were limited by the technology of their time or their qualitative study scope and identify the dominant and contributing causes of erosion at 25 detailed study sites via state-of-the-science methods developed in consultation with MassDEP and other stakeholders. Instead of "*rejecting even the possibility that Project operations are meaningfully contributing to erosion in the TFI*", as the author asserts, FirstLight has identified where Project operations are a contributing cause of erosion in the TFI and created maps showing the locations.

Study No. 3.1.2 was a robust evaluation based on qualitative and quantitative assessments as well as computer modeling. This "three-level approach" provided a comprehensive, holistic assessment of erosion processes throughout the TFI to ensure a proper understanding of the physical processes governing bank erosion. This approach allowed for cumulatively supportive, scientifically justifiable results to be obtained where each subsequent level of analysis built upon the understanding developed by the previous level. The work conducted for Study No. 3.1.2 and the

other erosion and sediment transport related studies² built upon the previous erosion evaluations conducted by the USACE and others and evaluated erosion processes in a scientifically rigorous manner at a far greater level of detail than was previously possible. Study No. 3.1.2 utilized extensive field collected data to quantify the erosion resistance of the bank materials and survey data spanning over 15 years as well as state-of-the-science tools including HEC-RAS, HEC-ResSim, River2D, and BSTEM. This represents the most comprehensive and thoroughly vetted evaluation of erosion processes in the TFI that has ever been conducted.

Regarding BSTEM, the author repeatedly attempts to discredit the appropriateness of BSTEM as a tool to identify the causes of erosion throughout the TFI noting that BSTEM is a "*proprietary software*" that is "*highly uncertain, particularly absent site-specific calibration and testing*." The author also states that:

"The parameterization of BSTEM, and thus its results, has been similarly critiqued by an independent scientist for the US Department of Agriculture and several peerreviewed scientific papers, summarized by Klavon (2017). Each of these independent experts find serious problems with the methods and results produced by BSTEM, which calls into question any interpretations by FirstLight."

BSTEM was developed by the United States Department of Agriculture Agricultural Research Service ("USDA-ARS") National Sedimentation Laboratory in 1998 by Dr. Andrew Simon and his team. Dr. Simon is also the lead for Study No. 3.1.2. Since its creation, BSTEM has been improved and enhanced significantly to improve functionality and applicability. BSTEM has been extensively peer reviewed, used in numerous peer-reviewed articles and reports representing studies from all over the world, and included in other United States and European models. The version of BSTEM used for this proceeding (i.e., BSTEM-Dynamic) is a USDA model, not a proprietary FirstLight model, and provides more functionality than the publicly available versions of BSTEM, including the version included in HEC-RAS.

Furthermore, the author fails to mention in his review that Klavon et al. (2017) refers to BSTEM as a "*robust model*" and that in the USDA review cited by the author, the reviewer (Dr. Eddy Langendoen) notes that:

"...I can vouch that BSTEM is capable of evaluating the four potential primary causes of erosion listed above. Moreover, its bank erosion algorithms are indeed the state-of-the-science for computer modeling and over the past five years have been incorporated into widely-used river morphodynamics computer models such as HEC-RAS v5 (U.S. Army Corps of Engineers), SRH-2D (U.S. Bureau of Reclamation), RVR Meander (University of Illinois), and TELEMAC (consortium of British/French/German government agencies); and have been accepted as such by the International community...The study performed by the project team was exhaustive and detailed with respect to identifying and evaluating the potential causes of erosion."

² Study No. 3.1.1 and Study No. 3.1.3 Northfield Mountain Sediment Management Plan.

MassDEP's own comments on Study No. 3.1.2 did not raise concerns with BSTEM or the extensive site-specific data that would be collected along the TFI banks. In fact, on December 14, 2016, MassDEP issued the following comments relative to Study No. 3.1.2:

"With respect to the Erosion Causation Report relative to the Northfield Mountain/Turners Falls Operations Impacts on Existing Erosion and Potential Bank Stability (the "Study"), it appears that the Study is rooted in the B-Stem Model that is the industry standard. The Study includes a substantial number of data input points, which would be expected to lead to the generation of valuable data when the model is run. Further, the data incorporated into the B-Stem Model includes the information that MassDEP sought."

Finally, in the Review the author asserts that BSTEM is "*highly uncertain, particularly absent site-specific calibration and testing*" implying that BSTEM was not calibrated to site-specific data. This is factually incorrect. As discussed in Section 4.1 of the April 2017 Study No. 3.1.2 final report (Volume II), BSTEM was calibrated using field collected data at existing, permanent transect locations spanning the geographic extent of the TFI. Such transects were previously established in areas where erosion had been known to occur dating back to the 1990's and were surveyed annually.

Throughout Section 3, and other areas of the Review, the author makes numerous other unsubstantiated assumptions and assertions regarding BSTEM. Such comments are addressed in Table 1.

2.3 Evidence of Erosion in the Turners Falls Impoundment (Section 2)

Section 2 of the Review presents a generic, qualitative hypothesis of erosion processes that may occur in the TFI. The discussion is devoid of any site-specific field collected data, quantitative analyses, or computer modeling yet claims that "the evidence, summarized both here and in past studies, consistently points toward FirstLight operations contributing to anomalously high erosion rates throughout the impoundment." The discussion presented in Section 2 ignores the extensive body of information gathered during the studies conducted for the licensing proceeding, which represent the most comprehensive and scientifically rigorous evaluations conducted in the TFI to date.

Discussion presented throughout Section 2 is largely based on the premise that water level fluctuations occur at the toe of the upper bank and up the face of the upper bank. As discussed in Section 5.1.3 of the April 2017 Study No. 3.1.2 Final Report (Volume II), TFI riverbanks are typically characterized by a lower and upper bank. The lower bank is typically a flat, beach-like feature that is submerged or experiences daily water level fluctuations during low to moderate flows as a result of hydropower peaking operations. Depending on its location in the TFI, the lower bank may or may not be vegetated. As one moves away from the normal edge-of-water, the lower bank transitions to an upper bank; the toe of the upper bank is clearly identifiable on most crosssection plots. The upper bank is typically steep, has some degree of vegetation, and is usually above the water surface except during high flows. Figure 5.1.3-8 from the April 2017 report provides an example of this.

The distinction between the lower and upper bank is important given that BSTEM results, and the results of the supplemental analyses, found that forces acting at the water surface and along the submerged banks typically do not cause erosion at lower flows and minimal erosion at moderate flows when the water surface rests on the lower bank (i.e., below the toe of the upper bank). It is not until the water surface rises and rests on the upper bank during high flows events that bank erosion potentially commences; even then the flow threshold to initiate erosion was found to be greater than 37,000 cfs³ at the majority of the detailed study sites. Although peaking hydropower operations can result in water level fluctuations over the course of a day, during low to moderate flow periods the water surface typically rests and fluctuates on the lower bank.

The information presented in Section 2, and throughout the Review, characterizes water level fluctuations in the TFI as occurring at the toe of the upper bank or along the face of the upper bank during normal Project operations, ignoring the fact that water level fluctuations associated with hydropower operations actually occur on the flat, beach-like lower bank.

For example, Figure 6 of the Review claims to show a "diagram showing mechanisms for erosion in the Turners Falls Impoundment, specifically illustrating how water level fluctuations could contribute to or cause erosion of steep banks;" however, the diagram illustrates a water level fluctuation pattern where the water level is fluctuating from the upper bank to the toe of the bank. Such a fluctuation pattern generally does not exist in the TFI during normal Project operations under low to moderate flow conditions. Figure 9 from the Review illustrates this point. The figure shows a beach-like lower bank, the toe of an upper bank, and then a steep upper bank. The water surface shown in the figure rests well below the toe of the upper bank and water level fluctuations due to hydropower operations would then occur on the flat beach-like lower bank shown in the photo.

The results of Study No. 3.1.2 and the subsequent analyses that have since occurred are consistent with past evaluations conducted by others, all of which found that high flows are the primary cause of erosion in the TFI with Project operations being a contributing cause. FirstLight was able to take the erosion evaluation one step further than past efforts that were limited by the technology of their time or their qualitative study scope and identify the dominant and contributing causes of erosion at 25 detailed study sites via state-of-the-science methods developed in consultation with MassDEP and other stakeholders.

³ 37,000 cfs is the approximate combination of peaking flows from the Vernon Hydroelectric Project and the Northfield Mountain Project.

Comment Location	Dethier Review Comment	FirstLight Response
Executive Summary – Page 5	Despite high-resolution cross sections available to the model, only a simple parameterization is used (as far as can be understood from the summary). Average slopes for upper and lower banks are used, potentially diminishing estimates of erosion except during floods.	The geometry used for bank modeling aptly re- measured directly in the field by crews climbin cross-sections were also used in BSTEM when survey resolution and error was conducted for
Executive Summary – Page 5	Groundwater saturation is integral to the model, but almost no data was collected to inform its parameterization.	Groundwater fluctuations were accounted for uvalues based on the texture of the bank sedime the modeling period.
Executive Summary – Page 5	Root cohesion data was only collected for large trees. There is no information on grasses and smaller vegetation that does much of the work of bank stability and velocity reduction. Cohesion does not vary through the model run, despite likely lower cohesion during late winter and spring, when soils are saturated and vegetation has not taken root for the season.	Data collection was conducted on established varying diameters and to map root architecture relations that are used regardless of specimen a numbers, diameters, and depth according to the no root reinforcement because of: (1) generally roots leading to low root-area-ratios compared account for saturation and its effect on cohesio roughness and applied effective stress was repr
Section 1.3 – Page 17	There are large uncertainties in its inputs and many "dial settings" that allow the model to be adjusted to achieve a range of results.	The only literature values that were used in the for the different layers. Such values were deriv Soil texture was determined from laboratory an
Section 2.1.1 – Page 18	Vegetation likely cannot colonize because of repeated inundation by fluctuating water in the impoundment during the growing season.	Even in natural rivers, riparian (woody) vegeta hydro-period is not excessive.
Section 2.4 – Page 33	In their rebuttal to the Princeton Hydro memo, FirstLight states that "BSTEM results found that the vast majority of all erosion (i.e., hydraulic and geotechnical erosion) occurs at flows greater than 30,000 cfs; this includes both minor particle by particle erosion at the toe of the bank and large mass wasting events." Yet its reports do not sufficiently measure or model erosion during this critical period: snowmelt in the winter and spring.	The assertion that Study No. 3.1.2 did not suffand spring is not true. BSTEM was run on an h seasons.
Section 2.5 – Page 40	The challenge of attributing erosion to flood flows alone was highlighted by Field (2007), who analyzed annual erosion at monumented cross sections in the TFI, relative to flood magnitudes for those years. They found that peak annual discharge did not have a direct relationship with measured erosion	Conclusions regarding high flows based on BS erosion during a single event, but by determini above thresholds of discharge. It is magnitude generally coincide with high-erosion rates. In a difficult because the "recession" or retreat may which is why the amount of erosion is a superi
Section 3.1 – Page 44	The BSTEM Model has substantial uncertainties and lack of transparency in its application to TFI.	The author's claims of a lack of transparency a licensing proceeding as it pertains to Study No the approach, data used, input parameters, etc.

Table 1. Response to Comments Pertaining to BSTEM

epresented the geometry of the bank and was ing up and down bank slopes. The high resolution n deemed appropriate. In addition, an analysis of the "high resolution" surveys.

using default saturated hydraulic conductivity ents. Such values were updated every time step over

woody species to test the tensile strength of roots of e. This provides tensile strength vs. diameter age. These results are then integrated with root he relative age of the trees. Grasses provide almost ly shallow root networks, (2) the small-diameter of d to woody species, and (3) the RipRoot model does on due to roots. The role of grasses on hydraulic presented in BSTEM.

e model were for saturated hydraulic conductivity ved from scientific literature based on soil texture. nalysis of field samples taken in the TFI.

ation only establishes above levels of where the

ficiently measure or model erosion during the winter hourly timestep over a 15-year period for all

STEM modeling were not made by calculating ing amounts of erosion that occurred for all flows and duration of the moderate and high flows that addition, using bank-recession as a metric is y not occur at the bank top or top of the slope, ior metric here.

are not true and ignore the substantial record for this b. 3.1.1 and 3.1.2. FirstLight has provided details of

Comment Location	Dethier Review Comment	FirstLight Response
Section 3.2 – Page 45	"Rough surveys" are not sufficient for parameterizing this sensitive model, and no explanation is given for why detailed measurements were not used instead. Such rough surveys would underestimate the effect of locally high slopes. In particular, steep and overhanging slopes that are common in the reservoir are likely not captured in this approach, nor are locally high slopes that may be the nexus of knickpoint erosion (See Section 2.3).	Tape and Brunton surveys conducted in the fiel and angles of slopes that were to be modeled. T banks to obtain this information because it was been carried out by surveyors who did not know model. Detailed cross-section surveys were util ensure a complete, accurate dataset was develop techniques employed.
Section 3.2 – Page 45	The BSTEM model similarly does not appear to have a way of predicting progressive bank failure by undercutting or rotational failure that may occur when buttressing fails. This is a potentially serious oversight that would shift erosion attribution toward flood flows and away from failure of steep banks during periods of saturation.	This comment is not accurate. Predicting progr BSTEM does. Although BSTEM does not hand which are known to be more critical in these sit
Section 3.3 – Page 45	Sediment transport at bank toes is a complex, highly uncertain process. This uncertainty, and its ramifications for the use of BSTEM, is described in the USACE manual for BSTEM use: "Also, it should be noted that most of these transport functions were derived for one-dimensional alluvial transport at the cross section scale. BSTEM applies these transport functions to bank scour at the node scale. This makes transport functions, already uncertain in their intended setting, loose process analogies in toe scour. <i>The transport functions often over predict scour substantially</i> and results should be interpreted carefully." (Emphasis added)	The version of BSTEM incorporated into HEC decision was made by the USACE to make init the details that are included in the dynamic vers BSTEM is not a sediment-transport model and upstream boundary, HEC-RAS utilizes its trans sediment eroded via BSTEM. Thus, erosion by water scour condition, which in regard to predi- approach. That said, every site in Study No. 3.1 the modeling period.
Section 3.3 – Page 46	They provide no satisfactory explanation for its suitability to the TFI, parameterization, or variability along the diverse reaches along the TFI, never mind vertically on the banks. The shear stress parameterization has been independently assessed as problematic. Klavon et al. (2017) states: "BSTEM users should be aware that the τ distribution methods used in BSTEM may be limited in being able to represent actual field conditions." (p. 197)	BSTEM is a physically-based model that relies control bank erosion processes. The model was testing at every site along the reach. These data varied by layer (vertically) where appropriate. I which instead used measured field values. First measuring actual field conditions.
Section 3.3 – Page 46	Numerous other sites require a 100-year flood event or greater to cause sediment transport. This is not a physically plausible condition and yet another key failure of the BSTEM model that is not acknowledged.	The table referenced by the author represents an stress, whereas BSTEM calculates a shear stress will be some shear-stress values greater than th values greater than critical, there will be erosion table are medians based on all tests at each site, used to represent the entire bank. Critical shear

Id allowed for direct measurements of the length The field teams hiked and crawled up and down the s more reliable than the general survey that had w the application of their work as it relates to the lized to cross-check the tape and Brunton data to oped. Steep slopes can, and are, captured using the

ressive bank failure by undercutting is exactly what dle rotational failures, it does handle planar failures tuations and would occur first.

2-RAS is a simplified version of the model. This tial integration easier. It does not include many of rsion, which was used for Study No. 3.1.2. Because does not consider the sediment concentration of an sport functions to determine the fate of bank ABSTEM represents something similar to a clearicting erosion, would be a more conservative 1.2 was calibrated based on measured erosion over

s on data on the driving and resisting forces that s parameterized from measurements of in situ field a are provided in the report. These values were also Default parameters were not used from the model, tLight "represented actual field conditions" by

in average boundary (vertically averaged) shear ss at every node along the bank face. Thus, there he average, and some that are less. Where there are on. The critical shear stress values shown in the c. The median values shown in this table were not r stress was varied by layer where appropriate.

Comment Location	Dethier Review Comment	FirstLight Response
Section 3.4 – Page 48	 Some key deficiencies suggest widespread oversimplification and lack of rigor: Only a single, uniform value of cohesion was established for the bank top. Only 9 cross sections had vegetation-derived cohesion for the bank face. As with the bank top, only a single cohesion value was established, not accounting for the variations in root structure through the face. No vegetation-derived cohesion was input for the bank toe, despite vegetation existing at the toe (see above: BSTEM Toe Transport Uncertainty). Root cohesion data was only collected for large trees. There is no consideration of grass and smaller vegetation that does much of the work of bank stability and velocity reduction. 	Regarding the first two bullets, cohesion values reinforcement varies with depth from the bank RipRoot.
		Regarding the third bullet, vegetation derived c woody-riparian vegetation at the bank toe.
		Finally, regarding the last bullet, the comment is Reinforcement due to roots is calculated based roots over a range of diameters and root archite is then determined as a function of age; (2) root on the B-value for the species (rate of decrease not contribute to bank cohesion (root reinforcer shallow rooting structure. Their main role is to
Section 3.4 – Page 48	Cohesion varies with changes in vegetation through the seasons and as vegetation is destroyed or regrows. This is potentially a consequential oversight that could rebalance the attribution of erosion in FirstLight's analysis. No effort was made to address the uncertainty that stems from these omissions.	The comment is not a correct assertion as the re (grasses), which have little to no effect on root case with perennial woody vegetation.
Section 3.5 – Page 48	"Dynamic" groundwater estimates are based solely on literature values, rather than observations.	Groundwater was modeled via BSTEM's near- impact that groundwater movement has on bank time step. Values of saturated hydraulic conduct values and the texture of the sampled bank sedi
Section 3.5 – Page 49	This over-reliance on literature values and absence of calibration to local values is characteristic of the FirstLight approach in applying BSTEM.	The only literature values used were for saturate the texture of the sampled bank sediments. As a based on the change in geometry over the mode
Section 3.7 – Page 49	The processes invoked in wave erosion – by boat waves and wind/current waves – are accentuated and/or facilitated by water level fluctuations.	The efficacy of boat waves to cause erosion is a narrow range, contrary to the author's commen- site with a sub-model of boat-generated waves Because of the narrow riverine-like shape of the lake-type reservoirs with greater fetch lengths.
Section 3.8 – Page 51	However, seepage is often difficult to identify in the field, or distinguish from other erosional landforms, particularly after some time has passed. Seepage may lead to other failure modes that would also obscure it as a root cause. Absent more timely, detailed observations, it is difficult to rule out the role of seepage, which thus may be far more relevant than is being implied.	Field data collection efforts associated with Stu entire TFI by boat and by foot (in accessible are occurred at 25 detailed study sites spanning the found that indicates seepage would be consider

were applied appropriately given that root top and cohesion due to roots varies with depth in

cohesion was not input because there was no

is not valid for the following reasons: (1) on the measured tensile strength of individual ecture of specimens of different ages. The network t reinforcement varies (decreases) with depth based in root numbers with depth); and (3) Grasses do ment) in any meaningful way because of their provide hydraulic roughness.

eviewer is referring to herbaceous vegetation reinforcement and slope stability. This is not the

-bank groundwater sub-model, which analyzes the ik stability. Groundwater levels can vary with each ctivity for each bank layer were based on literature iments.

ted hydraulic conductivity, which were based on discussed previously, BSTEM was calibrated el period.

enhanced by water levels that remain within a at. That said, boat waves were simulated for each that was based on data collected in the TFI. at TFI, wind waves are not as effective as in larger

dy No. 3.1.1 and 3.1.2 included surveying the eas). In addition, detailed field data collection longitudinal extent of the TFI. Little evidence was ed a potential primary cause of erosion in the TFI.

Comment Location	Dethier Review Comment	FirstLight Response
Section 3.10 – Page 51	Practitioners using BSTEM have found its results to be uneven and uncertain. They describe how BSTEM requires extensive calibration, often produces to erroneous or spatially inconsistent results, and is generally best suited to the Central United States, where it was developed.	Any model requires extensive calibration to hav BSTEM. As part of Study No. 3.1.2, FirstLight collected at permanent transects located through extends as far back as the 1990's in some instar has been thoroughly peer reviewed (Simon et al Hanson, G.J. and Simon, A. (2002); Simon, A. Simon, A. (2005); Collison et al. (2005); Simor Simon et al. (2009); Pollen-Bankhead, N. and S al. (2017); Casagli et al. (1997); Simon, A. and Langendoen et al. (2000); Simon, A. and Collis al. (2003); Pollen et al. (2004); Pollen, N. and S (2005); Simon et al. (2007); Pollen at al. (2007) Bankhead, N. and Simon, A. (2008)), and is rec- erosion modeling.
Section 3.10 – Page 51	Instead of relying solely on a flawed model, FirstLight should account for the direct observational evidence that its consultants have collected in the impoundment.	To refer to BSTEM as a "flawed model" is not The author says that BSTEM is not a robust mo the Review (Klavon et al., 2017) states that it <i>is</i> the author cites throughout the Review (Dr. Lar capable of evaluating the four primary causes o that is not mentioned by the author. Furthermor but instead employed a "three level approach" t as well as computer modeling. This approach al justifiable results to be obtained where each sub understanding developed by the previous level. relied on the direct observational evidence note
Section 4 – Page 52	The results of BSTEM should not be treated as scientific fact and should not be a substitute for better monitoring, which could much more reliably identify the causes of erosion.	The author provides no justification or explanat would elucidate causes of erosion along the entr see evidence of erosion, that does not mean that only way to determine the causes of erosion is t incorporates qualitative and quantitative analyse which is the methodology employed in Study N

ve confidence in its results, this is not unique to t calibrated BSTEM based on annual survey data shout the TFI. The survey data for these sites nces. BSTEM has been used throughout the world, al. (2000); Hanson, G.J. and Simon, A. (2001); and Collsion, A.J.C. (2002); Pollen, N. and n et al. (2006); Langendoen and Simon (2008); Simon, A. (2010); Simon et al. (2011); Klavon et l Curini, A. (1998); Simon et al. (2002); Simon et Simon, A. (2005); Simon, A. and Pollen, N. (2008); cognized as the state-of-the-science for bank

a justified by anything in the scientific literature. odel, yet the very reference that he uses throughout is a robust model. In addition, the USDA reviewer ingendoen) noted in his review that BSTEM is of erosion evaluated as part of Study No. 3.1.2, yet re, Study No. 3.1.2 did not rely solely on BSTEM that relied on qualitative and quantitative analyses allowed for cumulatively supportive, scientifically bsequent level of analysis built upon the . Various elements of the "three level approach" ed in the comment.

tion for how monitoring over 40 miles of riverbank tire length. Although an observer may be able to at the observer is able to identify the cause. The to conduct a comprehensive assessment that ses as well as deterministic computer modeling, No. 3.1.2.

ATTACHMENT B

Response to Technical Memorandum Review of the BSTEM Modeling and Reporting

Response to *Technical Memorandum Review of the BSTEM Modeling and Reporting*

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





Prepared by:





JULY 2024

1.0 Introduction

On June 20, 2024, the Massachusetts Department of Environmental Protection ("MassDEP") filed a report with the Federal Energy Regulatory Commission ("FERC" or "Commission") entitled *Technical Memorandum Review of BSTEM Modeling and Reporting Northfield Mountain Pumped Storage Project (No. 2485) and Turners Falls Hydroelectric Project (No. 1889)* (May 2024) prepared by Inter-Fluve, Inc. ("Inter-Fluve Review" or "the Review"). The purpose of the Review was to evaluate the modeling conducted for Study No. 3.1.2 Northfield Mountain / Turners Falls Operations Impacts on Existing Erosion and Potential Bank Instability ("Study No. 3.1.2") and the May 2023 supplemental BSTEM Modeling report, which evaluated the potential impact of the 2022 Agreement in Principle ("AIP") on bank erosion in the Turners Falls Impoundment ("TFI").

2.0 Response

In response to the Review, FirstLight offers the following global comments as well as specific responses to detailed comments (<u>Table 1</u>).

2.1 Peer Review

Section 1.1 of the Review notes that "[t]his memorandum summarizes the findings of a **peer review**, conducted by Inter-Fluve, at the request of the Massachusetts Department of Environmental Protection (MassDEP), of selected technical documents..." (emphases added). The technical memorandum provided by Inter-Fluve is not a comprehensive peer review.

The process by which this review was conducted is unclear as MassDEP has provided no details or additional information as it pertains to Inter-Fluve's efforts. A comprehensive peer review allows the reviewer(s) and author(s) an opportunity to ask and answer clarifying questions, provides access to the underlying data from the initial analysis, as well as additional information where necessary—a common practice in data-rich scientific peer review processes. FirstLight conducted outreach to MassDEP and Inter-Fluve on numerous occasions and was available to provide the underlying data as well as answer questions or to contribute additional information that would inform Inter-Fluve's report. Such requests were repeatedly rejected by MassDEP. As a result, the Inter-Fluve Review appears to have been conducted absent the full body of relevant scientific information and contains inaccurate findings and erroneous recommendations. FirstLight remains available to meet with MassDEP and Inter-Fluve to discuss the Review and FirstLight's enclosed comments.

Inter-Fluve appears to have not reviewed the full body of relevant scientific information gathered during the licensing proceeding. Of note, based on the report, it appears that Inter-Fluve did not review:

• Documentation associated with Study No. 3.1.3 Northfield Mountain Sediment Management Plan ("Study No. 3.1.3"), including the final report. Study No. 3.1.3 contained extensive field collected data, analyses, and modeling related to sediment transport in the TFI, Northfield Mountain tailrace/intake, and Northfield Mountain upper reservoir.

- The Supplemental BSTEM Modeling Report Reflecting Operating Conditions in the Flows and Fish Passage Settlement Agreement ("2024 Supplemental Analysis") prepared by Gomez and Sullivan Engineers, D.P.C. and Stantec in March 2024. This report supersedes the 2023 Supplemental Analysis that Inter-Fluve reviewed (as acknowledged by Inter-Fluve in Section 2.4). Given that Inter-Fluve acknowledges that the 2023 Supplemental Analysis it reviewed had been superseded, it is unclear why the Review did not include the most up-to-date information.
- The Supplemental Turners Falls Impoundment Erosion Summary Report & Erosion Proposal ("2024 Summary Report") prepared by Gomez and Sullivan Engineers, D.P.C. in April 2024. The 2024 Summary Report provides a summary of all relevant information gathered during the licensing proceeding, a detailed consultation record, and FirstLight's proposal for erosion mitigation.
- FirstLight's Clean Water Act Section 401 Water Quality Certification ("401 WQC") Application submitted to MassDEP on April 22, 2024, which included extensive discussion pertaining to how potential water quality impairments would be addressed.

By not reviewing the full body of relevant scientific information, which is publicly available on the FERC website, Inter-Fluve's review is incomplete and flawed.

2.2 Project Timeline

Section 1.1 of the Review includes three bullets detailing the project timeline that Inter-Fluve notes are "relevant to the contents of this memorandum." The first bullet presents a very high-level summary of the licensing process. It should be noted that the summary included in the Review does not include the extensive consultation and outreach efforts that FirstLight went through during study scoping and development, study execution, and study reporting. The erosion related studies and supplemental analyses that have been conducted represent consultation efforts that have occurred over the last 11 years with MassDEP, other agencies, and various other stakeholders. FirstLight was methodical along each step of developing, conducting, and reporting on Study No. 3.1.2, seeking and receiving input from MassDEP and other stakeholders throughout the process. Prior to conducting any field work, FirstLight sent the resumes of all individuals involved in the erosion related studies to MassDEP. FirstLight provided stakeholders including MassDEP with three rounds of study plans, a Transect Selection Report, a three volume Erosion Causation Report, and Supplemental BSTEM Analyses. FirstLight met separately with MassDEP, and as part of a larger stakeholder group, to ensure that it was collecting the desired information needed to address the causes of erosion. Throughout the study planning period, MassDEP did not express any concerns with the proposed team, data collection, the proposed methodology, or that BSTEM would play a pivotal role in assessing bank erosion. MassDEP's own comments on Study No. 3.1.2 did not raise concerns with BSTEM or the extensive site-specific data that would be collected along the TFI banks. In fact, on December 14, 2016, MassDEP issued the following comments relative to Study No. 3.1.2:

"With respect to the Erosion Causation Report relative to the Northfield Mountain/Turners Falls Operations Impacts on Existing Erosion and Potential Bank Stability (the "Study"), it appears that the Study is rooted in the B-Stem Model that is the industry standard. The Study includes a substantial number of data input points, which would be expected to lead to the generation of valuable data when the model is run. Further, the data incorporated into the B-Stem Model includes the information that MassDEP sought."

Appendix A of the 2024 Summary Report provides a detailed consultation record with respect to erosion related studies conducted during the licensing proceeding.

In addition, and as discussed in the previous section, the project timeline included in Section 1.1 is not complete as it does not include all relevant information gathered during the licensing proceeding nor does it include the 2024 Supplemental Analysis.

2.3 Environmental Baseline

Section 3.1 of the Review presents Inter-Fluve's findings from its review of Study No. 3.1.2, while Section 3.2 presents the findings from its review of the 2023 Supplemental Analysis. FirstLight's response to specific findings discussed in Section 3 are included in <u>Table 1</u>.

Many of Inter-Fluve's findings discussed in Section 3.1 are related to how FirstLight evaluated the potential effect of existing Project operations on bank erosion throughout the TFI. The first full bullet on Page 7 of the Review notes that:

"[i]f the impact of Northfield Mountain operations is to be determined through the comparison of model results for the Baseline condition and the Scenario 1 condition, then the BSTEM input data for Scenario 1 should be modified."

Inter-Fluve goes on to note that:

"[t]he BSTEM input data would need to be modified to reflect a bank profile and bank vegetation condition that would occur in the absence of the daily water level fluctuations caused by Northfield Mountain operations."

FERC has long held that the environmental baseline for a licensing proceeding is existing conditions, and that evaluation of pre-project conditions is not warranted. Contrary to what is required in a FERC licensing proceeding, Inter-Fluve's suggestion to modify the bank profile and bank vegetation input data would require examining the TFI in a pre-Project condition (i.e., before the Northfield Mountain Project began operation). The methodology used for Study No. 3.1.2 was the culmination of extensive consultation with MassDEP and other stakeholders and was approved by FERC in its Study Plan Determination.

Inter-Fluve also notes "[t]he analysis of riverbank stability and erosion in Study 3.1.1...and causes of erosion in Study 3.1.2...should explore how the interpretation of the results changes if stabilized or bedrock/resistant banks are removed from the statistical analyses of the results." The existing condition of the TFI reflects a broad range of bank characteristics and erosion conditions, with portions of the TFI having been previously stabilized and other portions not. To omit previously stabilized sites or bedrock/resistant sites would not be representative of existing conditions.

Regardless of this, the results of Study No. 3.1.2, and the supplemental analyses since conducted, identified site-specific bank erosion rates and causes of erosion at 25 detailed study sites located throughout the TFI. The detailed study sites represented a range of bank characteristics and erosion conditions, including both previously stabilized and un-stabilized banks.

2.4 Inter-Fluve Recommendations

Section 4 presents Inter-Fluve's summary, considerations, and recommendations based on its review of Study No. 3.1.2 and the 2023 Supplemental Analysis. FirstLight's response to specific findings discussed in Section 4 are included in <u>Table 1</u>.

Section 4.3 presents Inter-Fluve's recommendations, which include having FirstLight "develop a Monitoring Plan to field-verify the assumptions and conclusions drawn in FirstLight's studies" and for FirstLight to develop an Adaptive Management and/or Mitigation Plan to "provide a pathway and process for responding to impairments resulting from Project operations if/as they emerge during the licensing period." Although contrary to the contents of a typical peer review, the inclusion of the proposed mitigation measures in the Review follows a similar approach as was proposed by FirstLight in its 401 WQC Application (i.e., periodic monitoring program and bank stabilization, if needed).

Inter-Fluve notes that the basis for its recommended monitoring plan is to monitor high flow events to document their impacts "[g]iven FirstLight's conclusion that high-flow events are the major cause of erosion." Inter-Fluve's recommendation is flawed for several reasons. First, identification of high flow events as the dominant or primary cause of erosion in the TFI is not just "FirstLight's conclusion" as Inter-Fluve states. The conclusion that high flows are the dominant cause of erosion has been demonstrated repeatedly by those that have studied erosion in the TFI regardless of the methods used. Such findings are consistent with past evaluations conducted by others including the 1979 and 1991 U.S. Army Corps of Engineers ("USACE") evaluations. Second, there is no nexus to Project operations as it pertains to naturally occurring high flows and their corresponding impact on erosion. Finally, conclusions regarding high flows based on BSTEM modeling were not made by calculating erosion during a single event, but by determining amounts of erosion that occurred for all flows that generally coincide with high erosion rates. In other words, unless there is a mass failure event at a specific-site during a specific high flow event, it is unlikely that such monitoring would be informative.

Inter-Fluve goes on to recommend that MassDEP consider requiring FirstLight to conduct continuous turbidity monitoring at selected representative near-shore sites just upstream and downstream of locations identified as prone to erosion. As is demonstrated in Study No. 3.1.3, which Inter-Fluve did not reference in their report, the primary driver for elevated suspended sediment levels in the TFI is naturally occurring high flows. Suspended sediment levels during low to moderate flows when the hydroelectric projects have control of the river are a fraction of those observed during high flows. Inter-Fluve's recommendation for continuous turbidity monitoring is unnecessary and not consistent with the findings of past studies that evaluated this.

Comment Location	Inter-Fluve Review Comment	FirstLight Response
Section 3.1, Page 6	In general, Inter-Fluve finds that the project documentation does not present sufficient information to demonstrate that the studies fully meet the stated goal. The conclusions presented in the Original Study are founded on the fundamental assumption that the models adequately represent hydrologic, hydraulic, and erosion processes relevant to the study area. However, Inter-Fluve finds that the documentation does not adequately demonstrate that the modeling tools used in the study appropriately quantify the processes suspected to be driving the erosion within the TFI.	Inter-Fluve's comments regarding the documentation generalizations that fail to provide any information as Deliverables produced by FirstLight were developed Inter-Fluve notes that the conclusions presented in the the models adequately represent hydrologic, hydraulic calibrated to field collected datasets, which spanned a models. Discussion pertaining to the calibration of ea
Section 3.1, Page 6	A conceptual model of bank profile evolution and erosional processes in the TFI, communicated at the beginning of the report, would have been helpful in guiding the reader and reviewer through the process of justifying the utility of the selected modeling tools.	The process of vetting the modeling tools was conduc culminated in the approval of the study methodology scoping phase included extensive consultation regards including " <i>justifying the utility of the selected modelin</i> supported the use of BSTEM. Furthermore, when conducting Study No. 3.1.2, Firstl qualitative and quantitative assessment as well as con- included a review of past erosion evaluations that hav (2007)). Such past evaluations included conceptual m processes in the TFI. In addition, Simon and Hupp (19) conceptual model of bank-slope development for streat This comment was addressed both during the study se as during the study itself.
Section 3.1, Page 6	The conceptual model would be based on a thorough literature review of erosional processes in impoundments, field observations specific to conditions in the TFI, and analyses of existing data. The methodology for evaluating the causes of erosion would then follow from an understanding and representation of the erosional processes in the context of the geomorphic trajectory.	See response above. This is exactly what was done fo conducted by FirstLight were built upon this foundati

Table 1. Response to Specific Comments – Sections 3 and 4

provided by FirstLight are broad unsubstantiated s to what the exact perceived shortcomings were. in accordance with the FERC-approved study plan.

e Original Study are based on the assumption that c, and erosion processes. All models utilized were a sufficient duration to ensure accurate and robust ach model is included in the applicable study reports.

cted during the study scoping phase, which in FERC's Study Plan Determination. The study ling the proposed methodology for the study, *ng tools*". MassDEP's own comments on the study

Light employed a three-level approach that included nputer modeling. The qualitative assessment we been conducted in the TFI by others (e.g., Field nodels of bank profile evolution and erosional .986) and Simon (1989) had previously developed a eambanks, which is similar to Field (2007).

coping portion of the licensing proceeding as well

or Study No. 3.1.2. All subsequent evaluations ion.

Comment Location	Inter-Fluve Review Comment	FirstLight Response
Section 3.1, Pages 6- 7	A proposed conditions model should be developed to incorporate the proposed changes to project operations. The results of the proposed conditions model should be compared to the results of the existing conditions model. Differences in the results would reveal locations where the model predicts that changes to project operations will result in changes to erosion rates. ⁹	As noted by Inter-Fluve in footnote 9, this recommend Analysis and the superseded 2023 Supplemental Anal
	⁹ Note to reader: This finding was made before the AIP and the Supplemental Study were issued. The Supplemental Study addresses this item by providing an evaluation of erosion rates under proposed operating conditions and by comparing the results to the existing condition results.	
Section 3.2, Page 8	The Supplemental Study (FirstLight, 2023) provides no information about the individuals who authored the report	
	Based on the contents of the Supplemental Study, Inter-Fluve finds that there has been continuity in the consulting companies who have prepared the studies but is unable to conclude that there has been continuity in advisory staff or project staff throughout the duration of the relicensing process.	The individuals on the study team have remained cons Andrew Simon has served as the lead for Study No. 3.
Section 3.2.2, Page 8	The study methods and the study conclusions are based on many assumptions that are not explicitly stated and summarizedEven if the assumptions have been appropriately validated, the conclusions drawn are predictions that have yet to be affirmed.	FirstLight has provided extensive documentation deta parameters. This includes a detailed study plan, a thre reports, and numerous responses to stakeholder comm unsubstantiated generalization that fails to provide any shortcomings were.
		In addition, Inter-Fluve's comment regarding modelin affirmed seems to run contrary to their own recommen 3.1 of the Review). The use of modeling to determine widely accepted approach in FERC licensing proceed
Section 3.2.2, Page 8	The Supplemental Study does not indicate if or how the modeling procedure for the supplemental work may differ from or have evolved from the modeling procedure from the Original Study, and if or how that may affect results and interpretations. Furthermore, the report does not specify if the same version of each of the model software packages (e.g., HEC-RAS, River2D, BSTEM-Dynamic, HEC-ResSim) was used consistently throughout the study period; different versions can produce slightly different results and introduce an additional source of error into the calculations.	The modeling procedures and model versions that were consistent with those that were employed for Study N used to determine the hydrologic input parameters for supplemental analyses. This is clearly discussed throu

dation was completed in the 2024 Supplemental lysis that Inter-Fluve reviewed.

sistent throughout the licensing proceeding. Dr. 5.1.2 and the subsequent supplemental analyses.

ailing the methods used and the model input evolume study report, numerous supplemental nents. Inter-Fluve's comment is a broad y information as to what the exact perceived

ng results being predictions that have yet to be indation that such modeling be conducted (Section is the potential impact of proposed operations is a lings.

ere used for the supplemental evaluations were No. 3.1.2. The HEC-ResSim Operations Model was r the existing and proposed scenarios for the ughout the supplemental report.

Comment Location	Inter-Fluve Review Comment	FirstLight Response
Section 3.2.3, Page 8	 Manning's "n" values (i.e., values representing the roughness of the channel bed) can have a substantial effect on hydraulic calculations. Using Manning's "n" values to calibrate a model can mask limitations of the model. The Original Study did not include a summary or comparison of the field-identified versus the calibration-tuned roughness values. The Original Study did not include a discussion of the appropriateness of the calibration-tuned values and the implications of using those values on the results and conclusions of the study. 	Manning's "n" is commonly used in hydraulic routine adjust effective stress acting on the bank face and toe elements. BSTEM can accept a unique n-value for eac saved in the modeling files as part of calibration proce calibration with measured changes in geometry over t at each site are shown in Appendix L of the 2017 repo- compared to field observations.
Section 3.2.3, Page 9	The Supplemental Study indicates that, "Allowable deviations in flow stabilization" identified in FirstLight's Agreement in Principle (AIP, 2022) were not simulated because of the inability to predict when these allowances would be invoked. The Supplemental Study states that deviations are only permitted to occur during up to 3% of the total hours of operation between April 1 and November 30 and claims that the contribution to erosion would be negligible and thus representation in the modeling is unnecessary. This claim represents an untested assumption that has not been quantified or discussed with respect to model results and study conclusions.	Project operations that would occur during the brief p fall within the operational bounds that occur during of condition that would occur during those brief periods modeling. Had such operational conditions had an imp modeling results.
Section 3.2.3, Page 9	The Supplemental Study indicates that comparative boat wave analyses were only performed for eight of the twenty-five detailed study sites, (i.e., eight sites where the Original Study concluded that boat waves contributed to erosion). The omission of the boat wave analyses at the remaining seventeen sites makes it impossible for the study to identify sites where boat wave erosion may become a problem under the proposed operating condition.	As part of Study No. 3.1.2, wave analyses were condu TFI. Based on the results of Study No. 3.1.2, it was for in causing measurable erosion in certain situations (e., considerably thus allowing greater duration of wave e toe/face). As a result, the supplemental evaluations co assessed the impact of boat waves at those locations.
Section 3.2.4, Page 10	Model results indicate that the changes to the project operations will affect (both positively and negatively) erosion rates at sixteen of the twenty-five detailed study sites. For any detailed study site where the model predicts a change in erosion rates, we must conclude that the model results support the conclusion that project operations affect erosion at that site If all twenty-five sites are considered, three (11%) predict a reduction in erosion rate between the baseline and AIP scenarios, nine (36%) predict no change, and thirteen (52%) predict an increase in erosion. These results clearly suggest that the model predicts that a majority of the detailed study sites will experience an increase in erosion rates following the proposed changes (as modeled) in Project operations.	The conclusion that "[t]hese results clearly suggest the detailed study sites will experience an increase in ero. Project operations" is a gross mischaracterization of t reported. Although thirteen sites show an increase in erosion, or and greater than 0.16 ft ³ /ft/yr. As discussed in the repo are considered insignificant because they represent ve accuracy. The remaining nine sites have differences in a median of 0.04 ft ³ /ft/yr, which is considered immeas
Section 3.2.4, Page 10	The finding that the proposed operations will result in increases in erosion becomes even stronger if sites where previous bank stabilization projects have been constructed are removed from the analysis.	See FirstLight's response in Section 2.3.

es in modeling. In BSTEM, however, "n" is used to according to vegetation and other roughness ch of its 5 layers. Various values were used and edures, with the final value determined by the period. Calibration values of "n" for each layer ort and are within acceptable bounds. n-values were

beriods of time when FirstLight is allowed to deviate ther times of the year. As such, the operational of deviation are indirectly accounted for in the pact on erosion it would have been observed in the

ucted at all 25 detailed study sites throughout the bund that boat-generated waves were only effective .g., where water surface elevations do not vary energy to focus on a narrow range of the bank onducted after Study No. 3.1.2 was completed only

hat the model predicts that a majority of the psion rates following the proposed changes...in the results and ignores the magnitude of the values

only four of them have an increase greater than 5% orts, erosion rates equal to or less than $0.16 \text{ ft}^3/\text{ft/yr}$ ery low rates of erosion and are within survey n erosion rates between 0.01 and 0.16 ft³/ft/yr, with surable.

Comment Location	Inter-Fluve Review Comment	FirstLight Response
Section 3.2.4, Page 10, Footnote 11	¹¹ The Original Study states that predicted erosion rates equal to or less than 0.16 ft ³ /ft/yr are considered insignificant because they are within the accuracy of the survey data used to calibrate the BSTEM model. This appears to be a limitation related to measurements, not model calculation tolerances. Neither the Original Study nor the Supplemental Study identifies the model calculation tolerance for any of the models. Neither study provides a quantitative or statistical analysis of model error associated with the study as a whole.	Given that BSTEM was calibrated to field collected determined to be the same as the potential survey error final study report, the change in bank geometry at the measured change in geometry over the same period. A the difference between the simulated and measured error survey error. The potential survey error, or total survey the slope length times the potential vertical error. The surveyor responsible for collecting the cross-sectional vary between 0.1 to 0.2 ft ² /yr. This value was then corr TFI, which found that 0.16 ft ³ /ft/yr corresponded to the analyses determined that erosion rates less than 0.16 ft are immeasurable.
Section 3.2.4, Page 11	The extrapolation methodology, and thus summary statistics, may be problematic in that they rely solely on proximity and do not account for differences in land use or bank material properties, which the BSTEM modeling has shown to be an important factor in erosion rates.	The extrapolation methodology does not rely solely of methodology that was used accounts for the very thing bank material properties, and other bank features and of the April 2017 final report for Study No. 3.1.2.
Section 4.1, Page 11	Neither the Original nor the Supplemental Study addresses the current or proposed impacts of project operations on the existing impairment to stream-side vegetative cover. Neither study addresses the current or the proposed impacts of bank erosion on turbidity, total suspended solids, and sediment within the TFI, or other qualitative and minimum water quality standards that fall under MassDEP's regulatory purview.	As discussed in Section 2.1 of this response, Inter-Flu information as part of their review. Potential Project-r impairments are discussed in FirstLight's 401 WQC A extensive discussion pertaining to suspended sediment
Section 4.1, Page 12	Regardless of any model limitations, the results of the Supplemental Study indicate that proposed project operations are likely to increase the risk of erosion at 13 out of 25 detailed study sites. On this basis alone, future observations and a mitigation plan to address emerging conditions in the TFI would be prudent.	As discussed in earlier responses, this is a gross misch magnitude of the modeled differences.

lata, the "model calculation tolerance" was or of the underlying data. As discussed in the 2017 end of the simulation was compared with the A given calibration run was considered acceptable if rosion over the period was less than the potential ey variance (TSV), was calculated as the product of e vertical error was determined by the licensed l information. Based on this, the TSV was found to mpared to the erosion distribution values for the he 5th percentile erosion rate. The results of these ft³/ft/yr would be considered insignificant as they

n proximity as the comment states. The gs that the comment states it does not - land use, characteristics. This is discussed in Section 6.1.2.1

ive did not review the full body of relevant related impacts as they pertain to existing Application. In addition, Study No. 3.1.3 contains at load and suspended sediment transport in the TFI.

haracterization of the results and ignores the

Comment Location	Inter-Fluve Review Comment	FirstLight Response
Section 4.2, Page 12	Some processes that affect bank erosion and post-event recovery do not appear to have been incorporated into the analytical models. These processes include, but are not limited to, vegetative recovery, seepage, piping, rotational failure, deposition, and ice effects.	BSTEM model runs were executed on an hourly time- collected data. Although BSTEM does not model rota which are known to be more critical in these situations the role of vegetation in bank stability via the RipRoo that indicates that piping or seepage would be conside As noted in his 2016 review of the study, Dr. Eddy La
		<i>convolutional and volume that BSTEM is capable of evaluation of evaluat</i>
		Supplemental analyses were conducted as part of Stud on erosion processes.
Section 4.2, Pages 12-13	The Original Study was performed using standard and enhanced custom modeling tools available at the time. In the intervening years, the Army Corps of Engineers Hydraulic Research Center has improved the HEC-RAS software package to include 2-dimensional unsteady flow hydraulic modeling, RASMapper tools, and BSTEM modeling tools within an integrated calculation framework. These tools combine the capabilities of 1- dimensional and 2-dimensional unsteady flow hydraulic modeling and a version of BSTEM. If the Project Proponents choose to continue to develop and validate the erosion model of the study area, they might consider adapting the models to an integrated computational framework if the adaptation would result in a better representation of processes affecting the study area and reduce or eliminate some potential sources of modeling error.	The adaptation recommended by the comment would <i>affecting the study area</i> ". The version of BSTEM used is vastly superior to that which is included in the HEC state-of-the-science and includes the functionality nee 3.1.2 and the subsequent supplemental analyses.

e-step over a 15-year period and calibrated to field ational failures, it instead models planar failures as and would occur first. BSTEM also considered of sub-model. Little evidence was found in the field ered a potential primary cause of erosion in the TFI. angendoen of the USDA noted that:

aluating the four potential primary causes of sion algorithms are indeed the state-of-thepast five years have been incorporated into r models such as HEC-RAS v5 (U.S. Army f Reclamation), RVR Meander (University of tish/French/German government agencies); ational community...The study performed by with respect to identifying and evaluating the

dy No. 3.1.2 to evaluate the potential impact of ice

not result in a "*better representation of processes* d in this licensing proceeding (BSTEM-Dynamic) C-RAS software. BSTEM-Dynamic represents the eded to satisfy the goals and objectives of Study No.

CERTIFICATE OF SERVICE

Pursuant to Rule 2010 of the Rules of Practice and Procedure of the Federal

Energy Regulatory Commission, I hereby certify that I have this day caused the foregoing

document to be served upon each person designated on the official service list compiled

by the Secretary in these proceedings.

Dated at Washington, DC, this 8th day of July, 2024.

/s/ Mealear Tauch

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