



December 15, 2014

VIA ELECTRONIC FILING

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

Re: Turners Falls Hydroelectric Project (FERC No. 1889) and Northfield Mountain Pumped Storage Project (FERC No. 2485)
Response to Stakeholder Comments on the Initial Study Report and Meeting Summary

Dear Secretary Bose:

Pursuant to the regulations of the Federal Energy Regulatory Commission (FERC), Title 18 Code of Federal Regulations (18 C.F.R.), §5.15 (c)(5), FirstLight Hydro Generating Company (FirstLight), encloses for filing this response to comments on FirstLight's Initial Study Report (ISR) and ISR meeting summary for the relicensing of the Turners Falls Hydroelectric Project (TF Project, FERC No. 1889) and Northfield Mountain Pumped Storage Project (NMPS Project, FERC No. 2485). The current license for the TF and NMPS Projects expire on April 30, 2018.

On August 21, 2014, FirstLight filed a letter with FERC notifying stakeholders of the dates and times for the ISR meetings on September 30 and October 1, 2014. In its letter, FirstLight explained that fully completed reports would not be available given that field data collection was still on-going and data retained to date had not been properly QA/QC'd.

On September 15, 2014, FirstLight filed its ISR with the FERC as required by §5.15(c)(1) of the FERC regulations. With many field-based studies occurring in 2014 and data collections continuing through the late fall, there was limited information to report in the ISR as noted in the August 21, 2014 filing. Only two studies culminated in a final report; Study No. 3.1.1 *2013 Full River Reconnaissance* and Study No. 3.6.2 *Recreation Facilities Inventory*.

The ISR meetings were held on September 30 and October 1, 2014, and FirstLight subsequently filed its meeting summary on October 15, 2014. Stakeholder comments on the meeting summary were due by November 14, 2014. Comments were received from the following:

- United States Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- National Park Service (NPS)
- Massachusetts Division of Fisheries and Wildlife (MDFW) *

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- Franklin Regional County of Governments (FRCOG) and University of Illinois
- Town of Northfield
- Appalachian Mountain Club (AMC)
- New England Flow (NE FLOW) and American Whitewater (AW)
- Connecticut River Streambank Erosion Committee (CRSEC)
- Connecticut River Watershed Council (CRWC)
- The Nature Conservancy (TNC)
- Don Pugh
- Karl Meyer

* Note that the Massachusetts Natural Heritage and Endangered Species Program (NHESP) falls under the MDFW. The comments filed were from NHESP.

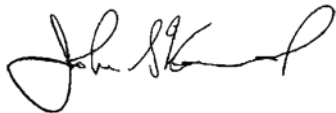
In this filing, FirstLight addresses stakeholder requests for clarification as well as additional information or analysis for study reports submitted as part of the ISR. In addition, FirstLight responds to stakeholders requests for additional studies or modifications to the FERC-approved study plan (see Attachment A). The comments provided in the stakeholder letters were placed in a matrix (Attachment A) and FirstLight provided a response. Note that some comments were paraphrased or summarized for brevity; however, it was FirstLight's intent to retain the substance of the comment. Some stakeholders had specific raw data requests for a given study. FirstLight has addressed these data requests in the matrix and plans on providing the requested data after being fully vetted.

FirstLight is filing this document with FERC electronically. To access the document on FERC's website (<http://www.ferc.gov>), go to the "eLibrary" link, and enter the docket number, P-1889 or P-2485. FirstLight is also making the document available for download at the following weblink: <http://www.northfieldrelicensing.com/Pages/Documents2014.aspx>

In addition to this electronic filing with FERC, a paper copy of the document is available to the public at the Northfield Mountain Visitor Center at 99 Millers Falls Road, Northfield, MA 01360 during regular business hours.

If you have any questions regarding the above, please do not hesitate to contact me. Thank you for your assistance in this matter.

Sincerely,



John Howard

Attachment A

Commenter	Comment	Response
FRCOG/CRSEC-5	<p>5. Key observations and trends of Detailed Site Assessments are unsubstantiated and incomplete.</p> <p>Page 6-3 of the FRR lists 11 key erosion observations and trends identified during the detailed site assessments conducted as part of the FRR land-based survey. Two of the 11 key observations (#5 and #9) refer to historical floods on the order of 50 years ago or older. We could find no reference to these observations in the Appendix H datasheets or the GIS files for the land-based or boat-based field work. When we asked for an example of these observations at the October 15, 2014 meeting on the FRR, FirstLight’s representatives said they would have to get back to us with the information. To date, we have not received these examples.</p> <p>Observations #7 and 8 mentioned that there were several sites that were stable or had received deposition in 2011 from Tropical Storm Irene.</p> <p>Observations were glossed over for those sites such as 2, 12, 15, 18, and 31 that showed slumps, overhangs, tension cracks, undercuts, or exposed roods in the lower 0-8 feet above the water line.</p>	<p>Observation #5 refers to the erosion and steep riverbank near the top of the upper bank which may have occurred during large historical floods where the river stages were much higher. Examples where these features were observed can be found in the land-based observation forms (FRR Report Appendix H) for sites 4, 6, 12, 15, 19, and 26. Observation #9 refers to the old landslides in high riverbanks and hillside, and are not the same as Observation #5. These old landslides may not be related to riverbank erosion processes, but rather may be caused by other global mechanisms such as high regional groundwater conditions. Examples where these features were observed can be found in the land-based observations forms for sites 9 and 24 as well as other areas which were traversed but did not have formal fields forms prepared.</p> <p>There was extensive discussion about deposition presumably related to Tropical Storm Irene in Section 6.2.</p> <p>The observations noted on the land-based forms for sites 2, 12, 15, 18, and 31 were self explanatory and did not require further discussion. Furthermore, these observations were specific to those specific sites and not the larger riverbank segment. Analysis and classification of the larger riverbank segments can be found in the tables, figures, and discussion in Section 6 of the final report.</p>
FRCOG/CRSEC-6	<p>6. The FRR is not in compliance with several elements of the QAPP.</p> <p>Overall, the FRR contains no mention about following QAPP procedures or quality assurance tasks. Additional comments follow.</p> <p>A. On page 14 of the QAPP and again on page 33, the QAPP states, “An appendix to the FRR report will include a comparison of the specific riverbank features and characteristics from the data logging files, or field data sheets, collected during the field surveys to a photograph of that same segment of riverbank captured from the digital geo-referenced video. A discussion will be presented in the FRR report based on this comparison. The process of comparing the data logging files to video/still images of a selected percentage of segments, or any segment of particular interest, provides a high level of quality assurance and control on the field data collection. This approach also provides a method for reference checking any subsequent interpretation of the field survey data after the survey has been completed.” The FRR did not contain an appendix like this as promised.</p> <p>B. Kit Choi is listed as the author of the FRR report on the cover. Section 4 of the QAPP did not list Mr. Choi as being involved in this project. It is very odd that the FRR was authored by someone not anticipated to be working on the FRR when the QAPP was written. What was his role and were other roles changed? Andrew Simon and Natasha Bankhead are listed on page 1-3 of the FRR, and these personnel were also not listed in the QAPP. Was the QAPP distributed to each new staff person such that they were familiar with the quality assurance requirements?</p> <p>C. Page 20 of the QAPP says that for Task 2a, identify and define riverbank features and characteristics, “observations made as part of this task will occur from a boat approximately 50-100 ft from shore, or closer if possible.” The FRR on page 5-2 says, “All field work associated with the boat-based survey was conducted from a slow moving boat located a relatively short distance from shore.” The FRR does not provide the actual distance from shore that the boat personnel made observations, nor the speed at which the boat was traveling.</p> <p>D. Field forms were not done or not provided in the FRR. There is thus no way to find out who did what on boat survey and how long it took.</p>	<p>A. FRCOG/CRSEC is correct. FirstLight did not include this appendix in the final report. This was an oversight which will be corrected. FirstLight will prepare the appendix in accordance with the QAPP and distribute to the Stakeholders as an addendum to the final report.</p> <p>B. Kit Choi is listed as one of five authors for the final report. The final report was a collaborative effort between the firms listed on the cover page, primarily Simons and Associates, NEE, and Gomez and Sullivan. In addition to the QAPP, those participating in the FRR were documented in a letter to MADEP on September 20, 2013 with resumes, titles, and the role of each individual in the FRR process. Resumes were submitted for Bob Simons, Kit Choi, Mickey Marcus, Andrew Simon, and Natasha Bankhead. MADEP reviewed the materials provided and approved the personnel for the FRR. FirstLight, their consultants, and MADEP met on November 5, 2013 in advance of the FRR to discuss both Study 3.1.1 and 3.1.2. A field tour of the river was conducted with key personnel on November 4-5th at which time the QAPP was distributed to all team members so they were familiar with its requirements.</p> <p>C. The boat-based survey was conducted in accordance with the requirements of the QAPP. Observations were made from a slow moving boat, approximately 50-100 ft. from shore. The speed of the boat ranged from approximately 1 to 1.5 miles per hour.</p> <p>D. As stated in the QAPP, “<i>data collected in the field will be mostly digital</i>” (Section 18) furthermore, Task 1a of the QAPP states that “<i>all field observations will be entered into a data-logger or recorded on field datasheets...</i>” For a variety of reasons, field personnel decided to record observations digitally via dataloggers and/or field computers. The only field datasheets used were those which were provided to the Stakeholders in Appendix H of the final report. All digital observations were provided to Stakeholders in the survey geodatabase (the template for field datasheets contained in the QAPP and RSP were turned into attribute tables for GIS layers). The Stakeholders currently have all data that was collected in the field.</p>

Commenter	Comment	Response
<p>FRCOG/CRSEC-7</p>	<p>7. Several deliverables listed in the RSP were either not provided or delayed. Several items promised in the RSP were either not provided or were delayed, hindering any reviewer’s ability to adequately review and comment on the report by the November 14th deadline. The following items were listed as deliverables in the final report, according to the August 14, 2013 Revised Study Plan (RSP), but were not provided. What follows is commentary on each deliverable.</p> <p>Task 1 – Land-Based Observations Data logging and field forms. CRSEC comment: Appendix H includes datasheets for the 38 detailed geotechnical sites. A field form for the land-based surveys shown as Table 4 on page 18 in the Appendix D QAPP was not used. Six weeks after release of the FRR, on October 30th, in response to requests by CRSEC, Gomez and Sullivan sent CRSEC the GIS files and reported using a pentop computer to record field observations. We request copies of the digital data logging and field forms that were used instead of the forms described in the QAPP.</p> <p>Task 2 – Classify Riverbank Features, Characteristics, and Erosion Data logging and field forms. CRSEC comment: Boat-based field forms were specified in the QAPP. On October 30th, Gomez and Sullivan sent CRSEC the GIS files and reported using a pentop computer to record field observations. The GIS files included the same information as Appendix I, which had no locational information associated with it, making it difficult to utilize in assessment of the findings. We request copies of the digital data logging and field forms that were used instead of the forms described in the QAPP.</p> <p>Task 3 – Spatially Define Riverbank Transition Points GPS data points denoting the start and end points of all riverbank segments. CRSEC comment: Appendix G of the FRR showed all the riverbank segments on maps; however, no feature information, including GPS data points denoting the start and end points of all riverbank segments, was included with this, making it cumbersome to compare the Appendix I segment table with the Appendix G maps. In response to a request for the data, including a specific request for the GPS start and end points for the segments, Gomez and Sullivan sent CRSEC the GIS files on October 30th. No geo-referencing information was provided by FirstLight for the segments and FRCOG GIS staff had to create the GPS information data layer so that the other GIS data layers could actually be used.</p> <p>Data logging and field forms. CRSEC comment. Again, no data logging and field forms, as specified in the RSP deliverables list and the QAPP, were provided to us as part of our data request. We again request copies of the digital data logging and field forms that were used instead of the forms described in the QAPP.</p> <p>Task 4 – Video and Photographic Documentation Geo-referenced video of the entire Turners Falls Impoundment. CRSEC comment: Appendix K simply states, “DVD available upon request.” We requested it and received a thumb drive on September 25th that contained the videos and all photographs – but the video had no geographic references. In response to another request, it was not until October 13th that we received an email from Tim Sullivan of Gomez & Sullivan with a link to a website (http://bit.ly/1uBADod) that had information allowing us to know which video covered what river segment, and the time stamps associated with each video.</p> <p>Comparison of 2007 and 2014 photo logs, where applicable. CRSEC comment: The FRR did not include this. One CRSEC member, the Connecticut River Watershed Council, notes that their August 19, 2013 comment letter on the RSP expressed confusion about the purpose of this task and also recommended against taking photos while the leaves were still on trees. 2 It appears that FirstLight also saw little value in this task, despite adding it between the updated study plan and the RSP. Did it serve as data control and reference checking?</p>	<p>Task 1: The information to be captured in the field form shown as Table 4 on page 18 of the QAPP was presented as: 1) the more detailed field datasheets found in Appendix H of the final report, and 2) the attribute tables contained in the GIS data provided to the Stakeholders. Far more information was captured using the revised forms and GIS layers than would have been collected using the original table cited. The land-based forms were provided to the Stakeholders at the time the report was filed and the GIS data were provided shortly thereafter. The Stakeholders have all the information that was collected in the field. As set forth in a letter from FirstLight to FRCOG/CRSEC on October 29, 2014 there are no other data to provide.</p> <p>Task 2: See response to FRCOG/CRSEC comment 7. The QAPP stated that either field datasheets or dataloggers would be used to record field observations. Field personnel chose to use dataloggers/field computers, as has been done in all previous FRRs. All information has been provided to Stakeholders when FirstLight filed the final report and distributed the geodatabase. The Stakeholders have all the information that was collected in the field. There are no other data to provide.</p> <p>Task 3: The geodatabase provided to the Stakeholders by FirstLight contained 12 different features classes. Included in this geodatabase were layers titled “Riverbank_Segment_Endpoints” and “Riverbank_Segments_Boat_Survey.” The riverbank segment endpoints were the segment transition points collected in the field. The riverbank segment boat survey file contained the actual line segments which contained all pertinent attribute and classification information. FirstLight provided the GPS endpoints as requested.</p> <p>As to the field data forms, see response to Task 1 and 2 as well as FRCOG/CRSEC comment 7.</p> <p>Task 4 – Comparison of 2007 and 2014 photo logs, where applicable: FRCOG/CRSEC is correct. The FRR did not include this. This was an oversight which will be corrected. FirstLight will review the 2007 and 2014 photo logs and, where applicable, provide discussion comparing the photos. This will be provided to the Stakeholders as an addendum to the report</p>

Commenter	Comment	Response
FRCOG/CRSEC-8	<p>8. CRSEC has no evaluation of recommended Stabilization/Preventative Maintenance Sites in the FRR.</p> <p>The 1998 Erosion Control Plan (ECP) established the approach the licensee would take to comply with License Articles 19 and 20. The ECP's objective was to minimize or prevent erosion in the Turners Falls Pool, and the ECP identified key steps to meet the objective. One step was prioritizing erosion sites to apply erosion control methodologies or treatments. Section 3.0 of the ECP identifies the two top criteria for priority erosion sites: potential and imminent threat to structures, and sites that contribute the greatest quantity of sediment to the river. The FRR was developed to document riverbank conditions and to provide information later used in ranking erosion conditions along the river.</p> <p>The 2013 FRR does not provide CRSEC with enough information to rank the sites that might contribute the greatest quantity of sediment to the river. In the previous 15 years, CRSEC has worked closely and in partnership with the licensee to assess erosion sites and develop a priority list for bank stabilization or preventive maintenance. The 2013 FRR is the first instance of unilateral decision making by FirstLight. We hope it will rejoin CRSEC in a collaborative effort to reduce erosion and protect the river and its prime agricultural riparian lands.</p>	<p>FirstLight selected the proposed sites for bank stabilization because 1) they meet the objectives of the ECP as noted by FRCOG/CRSEC (potential and imminent threat to structures and sites that contribute the greatest quantity of sediment to the river), and 2) they are projects FirstLight feels can be reasonably permitted and completed before expiration of the current license.</p> <p>As has been consistent with past FRRs and the ECP, FirstLight will hold a meeting with Stakeholders to discuss the proposed list of repair sites in the first quarter of 2015.</p>
FRCOG/CRSEC-9	<p>SUMMARY</p> <p>What we want to emphasize here is that the 2013 FRR does not accomplish the goal of adequately analyzing the extent of active and potential erosion along the banks. We have the following recommendations for the Commission:</p> <p>A) The FRR introduction should be re-written to explain the purpose of the FRR and how it resulted from serious concerns about erosion in the Turners Falls pool by stakeholders and the Commission. All mention of the 2012 Simons report should be deleted.</p> <p>B) The methodology for assessing the extent of erosion should be revised to eliminate the current segment- based analysis. The video and photos from 2008 and 2013 should be assessed to analyze extent of erosion, and a new set of statistics determined. CRSEC feels that ideally a third party chosen by FERC should do this analysis.</p> <p>C) The stages of erosion should be re-calculated according to FirstLight's own definition of the stages, or re- defined to follow the recommendations of the Field Geology Services 2007 Fluvial Geomorphology study of the Turners Falls Pool.</p>	<p>The 2013 FRR followed the FERC and MADEP approved methodology as outlined in the RSP and SPDL. The RSP represents extensive consultation with Stakeholder groups and is appropriate for a reconnaissance level survey. Furthermore, the professional experts who conducted the survey were approved by MADEP in advance of the study and have decades of experience worldwide conducting similar work. Specific deliverables that Stakeholders noted which FirstLight has not yet completed were acknowledged by FirstLight in the previous responses and will be provided to the Stakeholders as an addendum to the final report.</p>
3.1.2 Causation Study		
FRCOG/CRSEC-1	<p>We request that FERC direct FirstLight to issue a Progress Report for Study 3.1.2, including the missing items described below, on or before January 31, 2015 to provide FERC staff and stakeholders with the opportunity and "sufficient time for technical review of the analysis and results" of Tasks 1, 2 and 3.</p>	<p>While tasks 1-3 have been completed, written material has not yet been developed for presentation. This would typically occur in the final report. FirstLight has met all FERC reporting guidelines to date including filing a Progress Report Summary (Summer 2014) and Initial Study Report (September 2014) and will continue to meet the reporting guidelines required in 2015, including an Updated Study Report in September 2015.</p>
FRCOG/CRSEC-2	<p>FirstLight provided no information in the ISR about how the work completed under Tasks 1-3 informed the 2014 Field Studies or will inform the 2015 Field Studies. FirstLight did not propose any modifications to ongoing studies or propose new studies pursuant to §5.15 (c)(1). We find this position troubling and completely unsupported by the information provided in the ISR. FirstLight should be able to support their position that no data gaps were identified, no modifications to ongoing studies are needed, and there is no need to propose new studies. We request copies of all the data sets reviewed by FirstLight as well as a discussion of the analysis and conclusions associated with completed Tasks 1-3 on or before January 31, 2015, pursuant to §5.15(b). We also request an opportunity to comment on the Progress Report.</p>	<p>In accordance with the RSP, SPDL, and feedback received from MADEP, FirstLight developed a report identifying where and how the Detailed Study Sites associated with Study 3.1.2 field efforts were selected. FirstLight provided multiple drafts to Stakeholders (5/12 (MADEP), 6/6 (CRSEC), and 9/15 (final draft)) and met with Stakeholders on multiple occasions (6/4, 6/24, and 8/4) before finalizing the list of detailed study sites. The Selection of Detailed Study Sites Report (filed with FERC as Appendix B of the Study 3.1.2 ISR), combined with the RSP and 2013 FRR report, provide extensive, detailed information on how tasks 1-3 were used to inform field studies associated with this Study.</p> <p>FirstLight was required to file the ISR with FERC less than one week after completing field work for the season. The ISR represents the data that was available to FirstLight at the time of filing. FirstLight continues to review and post-process all field data collected in 2014 as required by the RSP and SPDL.</p> <p>FirstLight does not believe it would be appropriate to produce a partial report based on incomplete analyses for study 3.1.2. The majority of this study has not been completed, and FirstLight should have the opportunity to conduct it as set forth in the RSP.</p>
FRCOG/CRSEC-3	<p>Task 1: Data Gathering and Literature Review: We request a complete list of all the existing data and literature sources for the topics listed on pages 2 and 3 of the Initial Study Report Summary- Relicensing Study 3.1.2. Stakeholders request the missing text for the 2004 FRR be provided immediately. We request all the available boat wave data, including the data for</p>	<p>The preliminary list of data and literature sources for the topics listed on pages 2 and 3 of the ISR were provided on pages 3-26 – 3-28 of the RSP. In addition to the list found in the RSP, additional information was referenced for work completed as part of Tasks 1-3. Additional resources used are cited below:</p>

Commenter	Comment	Response
	<p>the Flagg site, downstream of the Route 10 bridge, and in the vicinity of the Northfield Mountain tailrace and from 1997 and 2008, and the groundwater elevation data from 1997-1998.</p>	<p>References:</p> <p>Bankhead, Natasha, Andrew Simon, Robert Thomas, Lauren Klimetz, and Danny Klimetz, 2010, "Sediment Loadings from streambanks and levees along the Sacramento River and selected tributaries, National Sedimentation Laboratory Technical Report Number 71</p> <p>Connecticut River Joint Commissions supported by Rivers and Trails Conservation Assistance Program of the National Park Service through the Connecticut River Valley Partnership Program in a guide entitled, "River Dynamics and Erosion."</p> <p>Connecticut River Power Company, 1954 "Observation of Erosion on Banks of the Connecticut River Bellows Falls to Vernon September 2-3, 1954,"</p> <p>Federal Emergency Management Agency (FEMA), 1999, "Riverine Erosion Hazard Areas - Mapping Feasibility Study,"</p> <p>Field Geology Services, 2004, "Fluvial Geomorphology Assessment of the Northern Connecticut River, Vermont and New Hampshire"</p> <p>Field Geology Services, 2007, "Fluvial Geomorphology Study of the Turners Falls Pool on the Connecticut River between Turners Falls, MA and Vernon, VT"</p> <p>Erik Hankin and Karen Prestegaard, 2008, "Scales of Bank Roughness and Their Relationship to Bank Erosion Processes,"</p> <p>D.F. Hill, M.M. Beachler, P.A., 2002, "Hydrodynamic Impacts of Commercial Jet-Boating on the Chilkat River, Alaska," Johnson Department of Civil & Environmental Engineering, The Pennsylvania State University</p> <p>R. H. Jahns, 1947, Geologic Features of the Connecticut Valley, Massachusetts, as Related to Recent Floods, USGS Water Supply Paper 996</p> <p>Leopold, Wolman and Miller, 1964, <u>Fluvial Processes in Geomorphology</u></p> <p>Richard D. Little, "Geologic History of the Connecticut River Valley near Greenfield, MA"</p> <p>Stephen T. Maynard, David S. Biedenharn, Craig J. Fischenich, and Jon E. Zufelt, 2008, "Boat-Wave-Induced Bank Erosion on the Kenai River, Alaska," Engineer Research and Development Center, USACE</p> <p>Gerald C. Nanson, Axel Von Krusenstierna, Edward A. Bryant and Martin R. Renilson, 1993, "Experimental measurements of river-bank erosion caused by boat-generated waves on the Gordon river, Tasmania,"</p> <p>New England Environmental, 2001, Full River Reconnaissance Survey-2001</p> <p>New England Environmental, 2004, Full River Reconnaissance Survey-2004</p> <p>Northrop, Devine and Tarbell, Inc., 1991, "Connecticut River Riverbank Management Master Plan (Draft), Northeast Utility Service Company, Inc.</p> <p>Pollen, Natasha and Andrew Simon, 2005, "Estimating the mechanical effects of riparian vegetation on stream bank stability using a fiber bundle model," Water Resources Research, Vol. 41, American Geophysical Union</p> <p>Tammy Marie Rittenour, "Glacial Lake Hitchcock"</p> <p>Schumm, 1977, <u>The Fluvial System</u></p> <p>Simon, Andrew, Natasha Pollen-Bankhead, and Robert E. Thomas, 2011, "Development and Application of a Deterministic Bank Stability and Toe Erosion Model for Stream Restoration," Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses, and Tools, Geophysical Monograph Series 194, American Geophysical Union</p> <p>Simons & Associates, 1992, "Analysis of Bank Erosion at the Skitchewaugh Site in the Bellows Falls Pool of the Connecticut River"</p> <p>Simons & Associates, 1996, "Discussion of Erosion at Vernon Station"</p> <p>Simons & Associates, 1998, "Erosion Control Plan for the Turners Falls Pool of the Connecticut River"</p>

Commenter	Comment	Response
		<p>Simons & Associates, 1998, "Long Term Riverbank Plan for the Turners Falls Pool of the Connecticut River"</p> <p>Simons & Associates, 2008, "Full River Reconnaissance – 2008 Turners Falls Pool, Connecticut River"</p> <p>Simons & Associates. (2012). <i>Riverbank Erosion Comparison along the Connecticut River</i>. Prepared for FirstLight. Midway, UT: Author.</p> <p>Simons & Associates. (2013). <i>Analysis of Erosion in Vicinity of Route 10 Bridge Spanning the Connecticut River</i>. Prepared for FirstLight. Midway, UT: Author.</p> <p>Simons, Li & Associates, 1983, "Erosion Study to Determine Boundaries for Adjacent Development – Calabacillas Arroyo, Bernalillo County, New Mexico," prepared for the Albuquerque Metropolitan Arroyo and Flood Control Authority</p> <p>United States Army Corps of Engineers, 1979, "Connecticut River Streambank Erosion Study Massachusetts, New Hampshire and Vermont"</p> <p>U.S. Army Engineer Waterways Experiment Station, 1983, "Streambank Protection Guidelines,"</p> <p>USACE, 1991, General Investigation Study, Connecticut River Streambank Erosion Study, Connecticut River Turners Falls Dam to State Line, MA</p> <p>Vermont Agency of Natural Resources, 2007, "River Corridor Planning Guide to Identify and Develop River Corridor Protection and Restoration Projects"</p> <p>Vermont Agency of Natural Resources (Mike Kline and Kari Dolan, River Management Program), 2008, "Fluvial Geomorphic-Based Methodology to Reduce Flood Hazards and Protect Water Quality"</p> <p>Vermont Agency of Natural Resources, DATE, "Mitigating Flood-Related Fluvial Erosion Hazards (FEH) Using River Corridor Protection, Fact Sheet"</p> <p>The VANR suggested an alternative approach in their 2007 "River Corridor Planning Guide to Identify and Develop River Corridor Protection and Restoration Projects."</p> <p>Woodlot Alternatives, 2007, "Connecticut River Hydraulic Analysis Vernon Dam to Turners Falls Dam"</p> <p>Other information:</p> <p>Aerial photographs (1929, 1939, 1952, 1980)</p> <p>Connecticut River Joint Commission (CRJC) (Ref.) info on dams</p> <p>USGS streamflow data, Connecticut River at Montague, North Walpole</p> <p>History of the town of Hadley, MA (hadley350.org)</p> <p>An account of the 1896 flood (Charles Thayer)</p> <p>Historic flood photos 1936</p> <p>Relative to providing the requested information, after fully vetting the data, FirstLight will provide the following data in the 1st quarter of 2015:</p> <ul style="list-style-type: none"> • Boat wave data from 1997 and 2008. • Groundwater data from 1997-1998. • Turners Falls Impoundment elevation data and flow data for 2013

Commenter	Comment	Response
FRCOG/CRSEC-4	On page 20 of Attachment A, the summary notes that Kimberly Noake MacPhee (FRCOG) asked about the data gaps identified under Task 1. Missing from the Meeting Summary is FirstLight's answer to Ms. MacPhee that "no data gaps were identified". Stakeholders question this assertion and, therefore, we are requesting the list of all the data and literature sources reviewed by FirstLight under Task 1 so that we can identify any data gaps and offer suggestions to improve the field studies for 3.1.2 prior to the Second Field Season.	<p>The preliminary list of data and literature sources used for Task 1: Data Gathering and Literature Review were provided on pages 3-26 – 3-28 of the RSP. The preliminary list of data/literature has been updated to reflect work completed for Tasks 1-3. Additional resources used are cited in the previous response.</p> <p>Between the previously identified data/literature cited in the RSP and the extensive field data collection efforts conducted in 2013/2014 as part of Studies 3.1.1 and 3.1.2 FirstLight believes that enough data has been collected/is available to conduct the analyses outlined in the RSP and SPDL. If data gaps are identified as the 2014 field data collected is reviewed and post processed they will be addressed during the 2015 field season; however, based on preliminary review of the data collected, FirstLight does not anticipate significant, if any, gaps to be identified.</p>
FRCOG/CRSEC-5	Task 2: Geomorphic Understanding of the Connecticut River. Two sentences in the ISR and one slide in a PowerPoint presentation for a completed task are not acceptable and do not meet the requirements of §5.15(c)(1)(2). We request that FERC direct FirstLight to provide a list of the existing data that was reviewed, as stated in the RSP, "to gain a better understanding of the geomorphology of the Impoundment and Connecticut River within the study area" and a complete discussion of this task, as outlined in the RSP and the FERC Study Plan Determination Letter (SPDL), in a Progress Report issued on or before January 31, 2015.	As previously mentioned, the complete list of literature used for this task is available in the RSP or cited above. While this task has been completed, written material has not yet been developed for presentation. The RSP contemplates that this material would be presented as part of the final report.
FRCOG/CRSEC-6	FirstLight provided little detail in their Study Plan regarding the proposed historical trend analysis of bank conditions. There was no mention of this SPDL work in the ISR. The Meeting Summary (Attachment A-19) indicates that FirstLight will provide this analysis in the final report and "that FirstLight surveyors are comparing aerial images with project boundary maps to try to get a sense of the movement of the riverbank over time." We request that FERC direct FirstLight to provide stakeholders and FERC staff with 1) the digital data set for this task and 2) a complete description of the methodology for this task as outlined in the FERC Study Plan Determination Letter (SPDL). This information should be provided in a Progress Report issued on or before January 31, 2015.	The preliminary GIS/CAD analysis comparing the aerial images with the project boundary has been completed, however, this dataset still requires final review. FirstLight will provide stakeholders with the digital data of the project boundary from the original survey in the 1 st quarter of 2015.
FRCOG/CRSEC-7	We also note that FERC recommended that FirstLight include an analysis of operational changes through the period 1999 to 2013 to identify any correlation between operational changes and observed changes in erosion rates, and that this analysis should be conducted as part of study 3.1.2. The ISR contained no indication that this analysis would be done, what the methods might be, or what the final product would look like. Stakeholders are once again being denied the ability to review this task or seek improvements to it.	FirstLight recognizes the additional analysis of operational changes required by FERC in the SPDL. FirstLight has incorporated this into Tasks 5 (Data Analyses), 6 (Evaluation of the Causes of Erosion), and 7 (Report and Deliverables) of the RSP. As stated in the ISR, these tasks will not be completed until 2015/2016. Once completed, the results of this analysis will be included in the USR and final report as required by FERC in the SPDL.
FRCOG/CRSEC-8	Task 3: Causes of Erosion. FirstLight states that the potential causes of erosion and potential primary cause of erosion identified in the RSP were reviewed and no changes are proposed at this time. We request a detailed discussion of this completed task be provided to stakeholders and FERC staff on or before January 31, 2015 pursuant to §5.15(b) so that we have the opportunity to propose modifications to the study plan "in light of the progress of the study plan and data collected." (§5.15(c)(2)).	<p>FirstLight identified the list of potential causes of erosion contained in the RSP based on the robust literature and data available for this reach, years of professional experience on the Turners Falls Impoundment (dating back to the mid-1990's), and widespread experience on similar rivers throughout the world. After completion of Tasks 1 and 2, as well as observations made during the 2013 FRR, FirstLight believes the proposed list found in the RSP adequately covers all potential causes of erosion and therefore does not require further changes.</p> <p>As previously stated, while Tasks 1-3 have been completed, written material has not been developed for presentation. This would typically occur in the USR and final report.</p>

Commenter	Comment	Response
FRCOG/CRSEC-9	Task 4: Field Studies and Data Collection. FirstLight listed this task as ongoing. Remaining Activities were described in one line as “complete field data collection efforts.” This is not acceptable. Once again, the paucity of information in the ISR reaffirms our position that FERC staff and stakeholders have been denied sufficient time for technical review of the analysis and results and a meaningful opportunity to seek improvements in Study Plan 3.1.2, and especially for this critical and complex Task 4.	<p>As stated in the RSP, Task 4 contained the following sub-tasks:</p> <ul style="list-style-type: none"> • Task 4a: Install Proposed Water Level Monitors in the Impoundment • Task 4b: Full River Reconnaissance • Task 4c: Identification of Fixed Riverbank Transects <p>Task 4a was still ongoing when the ISR was filed. Water level loggers remained installed until mid-November 2014. There were no data to report on this task at the time of the ISR. Water level data are currently being reviewed and post processed and will be provided to stakeholders in the 1st quarter of 2015.</p> <p>Task 4b was completed in 2013/2014. A full report was filed September 2014 detailing the methods, analysis, and results of the 2013 FRR.</p> <p>As for Task 4c, the final locations of detailed study sites (including the methodology used to determine those locations) was presented in the report titled <i>Northfield Mountain/Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability – Selection of Detailed Study Sites</i> filed September 2014 as Appendix B of Study No. 3.1.2 ISR. This report represented the culmination of multiple rounds of consultation with Stakeholders as noted in the Study 3.1.2 ISR (main report text and Appendix A).</p> <p>The remainder of Task 4c (i.e. examination of fixed riverbank transects (a.k.a. detailed study sites)) was not completed until one week prior to the filing of the ISR. As such, there were no data results to report at the time of filing and therefore no data for the stakeholders to review. The ISR for Study No. 3.1.2 combined with its Appendices and the 2013 FRR report represented all of the information that was available for presentation at the time of filing. Specific tasks that were conducted during 2014 field efforts are discussed below.</p> <p>Field studies to determine the resistance of the channel banks to hydraulic and geotechnical forces have been carried out and completed at 25 sites. In situ testing of the critical shear stress of surface materials and the cohesion and friction angle of internal bank materials were conducted. Core samples of internal bank material were collected to determine bulk unit weight and pore-water pressure at the testing depth. In addition, bulk samples were obtained for particle-size analysis. Laboratory results of particle size and bulk density have not yet been received from the laboratory. Bank-material resistance data will be used to populate BSTEM at each site.</p>
FRCOG/CRSEC-10	Task 4c: Identification and Examination of Fixed Riverbank Transects: This task is listed as complete in the ISR. In their SPDL, the FERC recommended that FirstLight consult with stakeholders prior to final transect selection. In our opinion, this task is not complete for three important reasons. First, the list of fixed riverbank transects and data collected from these sites during the 2014 Field Season should be evaluated against the concerns and limitations of the BSTEM model. Second, the findings and conclusions of the 2013 Full River Reconnaissance (FRR) have been called into question. Finally, the CRSEC has recently corresponded with FirstLight about information to be included for each of the detailed study sites and there are issues that remain unresolved.	<p>In accordance with the SPDL, FirstLight met with Stakeholders on 6/4 (MADEP), 6/24 and 8/4 (CRSEC, CRWC, and MADEP) to discuss the selection of detailed study sites for Study No. 3.1.2. Multiple drafts of the Selection of Detailed Study Sites report were issued for review and multiple Stakeholder comment letters and FirstLight responses (3.1.2 ISR Appendix A) were filed prior to selecting the final list of detailed study sites. The Selection of Detailed Study Sites Report represents extensive consultation between Stakeholders and FirstLight.</p> <p>In regard to the “concerns and limitations of the BSTEM model,” as expressed in the letter from the University of Illinois filed by FRCOG, BSTEM is the best available model for conducting this work and the sampling methodologies are state of the art. Furthermore, Dr. Andrew Simon is the senior developer of the BSTEM model and Dr. Natasha Bankhead is the developer of the RipRoot model—both of whom participated in FirstLight’s study.</p> <p>The selection of fixed transects was based on the findings of the 2013 FRR combined with field observations made by Dr. Simon, Dr. Bankhead, and Kit Choi (geotechnical engineer) based on geotechnical and geomorphic characteristics observed. The transects represent a range of conditions along the reach, are spaced at reasonable intervals and in most cases are locations where there are repeat surveys to serve as points of model calibration. BSTEM is a physically-based model that will provide results based on how the driving forces (hydraulics and gravity) interact with the resisting forces (critical shear stress, geotechnical shear strength, and root reinforcement). There is nothing flawed with FirstLight’s transect sampling procedures.</p>

Commenter	Comment	Response
FRCOG/CRSEC-11	We asked the Univ. of Illinois experts to comment on the suitability and limitations of the BSTEM, HEC-RAS and River2D models and data collection methods with respect to the unique conditions of the Turners Falls Impoundment. The experts identified several significant data gaps and limitations in the FirstLight methodology.	With the exception of the discussion regarding seepage processes and the assertion about a groundwater model, the U. of Illinois letter agrees that the bank-sampling methodologies and BSTEM represent the state of the science. As previously noted, Dr. Simon, the senior developer of the model and Dr. Bankhead the developer of the RipRoot model included within BSTEM are part of Study 3.1.2. Statements in the letter regarding HEC-RAS and River2D are similarly supportive of the methodology and models.
FRCOG/CRSEC/Univ. of Illinois 12	BSTEM was designed to couple the processes of fluvial erosion and mass failure that are both integral to bank erosion analyses; to our knowledge, that model (along with its predecessor, the ARS Bank Stability Model) was the first model available for engineering practice outside an academic research setting to couple those processes using physics-based formulations. The model was developed at the USDA National Sedimentation Laboratory; for the last several decades that group has been at the forefront of developing techniques to quantify bank erosion and develop models for practical usage.	The ARS Bank Stability Model is the same model as BSTEM. They are one and the same, developed at the USDA-ARS National Sedimentation Laboratory by Dr. Simon and his team.
FRCOG/CRSEC/Univ. of Illinois 13	An integral part of the problem (fluctuating water levels) is the knowledge of the water level in the water body and the phreatic surface (or more accurately, the pore pressure distribution) of the groundwater. The BSTEM model includes the effect of the water level difference that is of primary importance to the problem, but the water levels are specified as parameters. Therefore how the water level difference is specified in the proposed analysis is very important. Accurate treatment involves not only the magnitude of the drawdown but also the rate of drawdown, as the water table does not adjust at the same rate as the stage of the water body.	The Static version of the BSTEM model requires the user to provide both a water-surface elevation and a groundwater elevation for the "static" simulation of conditions. This, however, is not the version of BSTEM that will be used in this study. The Dynamic version, which has been in use since 1998, allows for input of a flow series using time steps of the user's choice. Typically daily time steps are used. This version of the model has been used to simulate bank erosion, retreat and bank-derived sediment loads for periods up to 100 years at locations as diverse as Mount St Helens, WA; Sacramento River, CA; Mississquoi River, VT; Burnett River, QLD, Australia, etc. The Dynamic version of the model includes a near-bank groundwater mode to dynamically handle drawdown conditions.
FRCOG/CRSEC/Univ. of Illinois 14	An appropriate treatment would involve an unsteady state 2D groundwater model (e.g., SEEP/W) applied to a cross-section using the maximum drawdown rate over the maximum magnitude of drawdown (the boundary conditions of the groundwater model) to determine the appropriate values of the input parameters pertaining to the water levels used in BSTEM. In review of the Revised Study Plan (RSP), there is no mention of proposed groundwater modeling; mention is made that a single transect of three piezometers was established and monitored at a site and that the groundwater responded to the river water stage quickly. We would recommend that such data be used with caution in the absence of a site-specific model on which such data would serve as calibration, which could then allow the full range of potential boundary conditions to be evaluated. We would also caution that such data should not be extrapolated to all sites in the system as the stratification and hydraulic conductivities along the ~20-mile long impoundment are certainly not uniform.	This comment is incorrect. The BSTEM Dynamic includes a nearbank groundwater model. There is no need to extrapolate data from the piezometers, nor will this be done, because there is a groundwater model within BSTEM to handle fluctuations in the phreatic surface. Calculations of the elevation of the phreatic surface will be made during each time step to update the pore-water pressure distribution and, therefore, calculations of frictional strength and matric suction.
FRCOG/CRSEC/Univ. of Illinois 15	In terms of the magnitude and rates of variation in the river stage (the river stage input as a parameter in the BSTEM model), we understand that an unsteady state HEC-RAS model will be developed and calibrated. We feel that HEC-RAS is an appropriate model for this purpose. The modeling proposed includes cross-sections at 500 feet longitudinal spacing sampled from longitudinal bathymetric transects. For a river with mild slopes such as the Connecticut River where the bankfull width is typically 600 to 700 feet, having cross-sections spaced at 500 feet is quite resolute for a 1D model and will characterize spatial geometry variations at an appropriate scale. Utilizing stage recorders to obtain calibration data as proposed is also appropriate. Calibration of roughness coefficients using the steady flow calculation procedure as indicated in the RSP should be performed when flow through the system is confirmed to be steady (flow input equal to flow output from the system).	FirstLight is in the process of updating the HEC-RAS model for the Impoundment as part of Study No. 3.2.2. As part of this update, new cross-sections have been established at ~250 ft. longitudinal spacing.

Commenter	Comment	Response
FRCOG/CRSEC/ Univ. of Illinois 16	Regarding other aspects of the geotechnical slope stability calculations used in BSTEM, beyond the issue of rapid drawdown, we feel it would be appropriate if the project geotechnical engineer confirmed that the factor of safety values calculated by BSTEM for planar failure are indeed less than that calculated from the analysis of rotational failure.	<p>In geotechnical engineering, a slope stability analysis always involves a search of many trial failure surfaces, including planar, circular, and block (wedge) surfaces, and the critical surface will be identified in the analysis. In BSTEM, only planar failure surfaces are used in the slope stability analysis. However, whether a planar failure surface is more critical than a circle or a wedge depends on the type of soil involved. For cohesion less soils such as sands and low-plasticity silts, shallow planar failure surfaces typically have lower factors of safety than circular failure surfaces. Based on observations made of the exposed stream banks in the 2013 FRR, it was noted that the predominant bank materials are low-plasticity silt (ML), sandy silt (ML) and silty sand (SM). Very limited plastic clay (CL) and clayey sand (CL) materials were also observed, but all of the silts we observed are either nonplastic or have low plasticity. Therefore, the planar failure surfaces used in BSTEM are applicable for the stream bank materials of the Connecticut River along the Turners Fall Impoundment.</p> <p>It should be noted that more deep-seated and rotational failure surfaces have been observed in higher slopes and hillside which have very irregular and hummocky terrain. In the opinion of the technical team, these are old landslides that are not directly related to riverbank erosion processes, but rather caused by other mechanisms such as high regional groundwater conditions. It is also possible that these higher slopes are more clayey and thus resulted in circular rotational failure surfaces. Investigation of these slopes is beyond the scope of Study No. 3.1.2 as it is clear from field investigation that any erosion processes found on these high slopes are not the result of potential project operations.</p>
FRCOG/CRSEC/ Univ. of Illinois 17	Quantifying the parameters used in the fluvial entrainment routine of BSTEM has been proposed using both a submerged jet test in the field and by determining grain-size distributions which can then be used to specify the critical shear stress parameter when the soil is non-cohesive. The submerged jet test is generally considered to be the standard to quantify the parameters used in the entrainment rate formulation for bank erosion. The field methods proposed and the specific formulations used by BSTEM are the best that are currently available to quantify the fluvial entrainment of bank materials. However, the entrainment rates thus determined must be understood to still involve substantial uncertainty. Thus the issue of calibration as proposed in the study becomes important.	FirstLight agrees that the instruments used for this study are the best currently available. Resulting parameter values are calibrated based on the individual instrument characteristics. Final calibration of erosion rates is a function of roughness as based on characteristics of the bank surface (i.e., vegetation) and the role it plays on effective stress acting on individual grains.
FRCOG/CRSEC/ Univ. of Illinois 18	The issue of calibration must be treated with some caution in a study where causality is intended to be quantified (as specified in the objectives). For example, it has been observed that areas of significant bank retreat exist in areas of low boundary shear stress. One approach of calibration would be to modify the critical shear stress parameter to a very low value and modify the erodibility coefficient to a very high value in the entrainment rate formulation to achieve the magnitude of fluvial entrainment and subsequent mass failure observed in the low fluvial shear areas – thus achieving a calibrated model. However, a calibrated model does not guarantee that the physics of the model is correct; in other words, if the original values used in the model did not yield the observed bank deformation, it is also possible that other causative factors are involved that are not accounted for in the models.	<p>The calibration procedure proposed is the same as is used in most hydraulic modeling efforts, that is using Manning's n. This parameter plays an important role relative to grain roughness in determining the effective stress acting on individual grains. The effect of fine roots is also considered. Dr. Simon's research at USDA-ARS National Sedimentation Laboratory has shown that the critical shear stress of root-permeated bank materials can be an order of magnitude higher than bare soils. These factors will be considered in calibration.</p> <p>Calibration of BSTEM requires an understanding of geotechnical and hydraulic processes as they affect riverbanks in the field and as they are simulated in the model. We agree that calibration of the BSTEM model will require care. For this study, detailed study sites include a number of locations where historic transect data have been surveyed since 2000, thus providing bank change data over time for use in model calibration. Geotechnical and erosion properties of riverbank soils have been collected in the field at the detailed study sites, providing site-specific properties of these materials for use in calibration. Historic water level data are available at a number of sites over the calibration period (back to 2000), which, coupled with a calibrated hydraulic model will provide detailed water level and flow information at the detailed study sites in this calibration effort.</p> <p>A wide range of site types, including eroded, stable, and stabilized sites, located throughout the length of the Impoundment and covering the range of hydraulic reaches of the Impoundment are included in the detailed study sites. Those conducting the modeling effort (as well as the field data collection to parameterize the model), actually developed the model and associated routines, and have applied the model more than any other people in the world. As a result, this modeling effort is the most robust of any ever conducted on any river system given the number of detailed study sites, the type and extent of data for calibration, and the personnel conducting the modeling effort. In addition, the team includes a geotechnical engineer and hydraulic engineer/geomorphologist who have considerable experience in analysis of slope stability and riverbank erosion processes to consult with and review the modeling process. Full use of the available data and expertise will be made in the calibration process. As noted in the RSP other analysis techniques will also be applied in developing an understanding of the riverbank erosion processes as BSTEM modeling is one component of a comprehensive analysis approach.</p>

Commenter	Comment	Response
FRCOG/CRSEC/ Univ. of Illinois 19	One causative factor that we feel is of high importance pertaining to the issue of bank retreat and not incorporated into the modeling is erosion associated with seepage from water continually being transported into and out of the banks associated with frequent stage changes; (note that this is a separate issue from the rapid drawdown problem described previously, but it is a related issue). This physical factor is not accounted for in the BSTEM model - although this is not a fault of the model or the choice of model, but rather a limitation in the current state of the science. This makes the issue of assigning causality to various factors very difficult.	Seepage forces were identified in the RSP as a potential cause of erosion. Further discussion on seepage can be found in the responses below.
FRCOG/CRSEC/ Univ. of Illinois 20	In geotechnical engineering practice, seepage forces are typically accounted for by ensuring that a critical hydraulic gradient is not exceeded along a flow path through the soil, which is particularly important when considering groundwater flow beneath dams or excavations below the water table (e.g., Terzaghi et al., 1996). In sophisticated models analyzing slope stability, the seepage forces may be accounted for with respect to their reduction of the effective stress and thus the frictional shear resistance along potential failure planes. However, quantifying processes associated with gradual sapping of soil grains which may eventually lead to the development of piping is still a developing field. Advances are currently being made in this field of research as it relates to stream bank erosion, including substantial contributions by the USDA National Sedimentation Laboratory (the agency that developed the BSTEM model); but to our knowledge, quantitative models are still in the research stage and have not advanced to the level of practical engineering usage.	FirstLight is aware of the potential role of seepage forces in erosion. Seepage forces were identified in the RSP as a potential cause of erosion in the Impoundment. No significant evidence was observed of this type of erosion at the project site during 2013/2014 field efforts. In the land-based survey in 2013 and then in 2014 for about 50 different sites on both sides of the river, evidence of piping erosion such as sinkholes, depressions, cloudy discharges from seepage, or exposed piping channels were not observed, except in very limited areas. FirstLight is aware that the predominant site materials (sands, silts) are susceptible to internal erosion and therefore this mechanism cannot be ruled out, however, site observations indicated that this process is not a significant mechanism that contributes to bank erosion. As pointed out by Garcia and Waterman, a rigorous analytical modeling of seepage and piping is still not available for engineering or scientific applications.
FRCOG/CRSEC/ Univ. of Illinois 21	The current state of the science associated with bank retreat due to seepage forces is well described in a review paper by Fox and Wilson (2010). In its most developed condition, it (seepage erosion) can lead to development of soil pipes and cavities and collapse of overlying soil strata as described in Hagerty (1991a; 1991b); in those papers, the terms piping and sapping are used to describe the removal of soils by seepage exfiltration from a bank face. Fox et al. (2007) provide evidence that lateral flow can be generated in more pervious strata when the vertical component of the hydraulic conductivity between layers is less than an order of magnitude different. The sapping of grains from a strata, particularly when the grains being removed are fine-grained and provide some cohesion to the strata, is also expected to reduce the resistance of the surface to fluvial erosion. Therefore fluvial erosion may still be eroding the toe of the bank, but the effect of stage changes on sapping grains from strata and its effect on fluvial erosion cannot currently be decoupled.	FirstLight's experts have the qualifications to consider seepage. In fact, Dr. Simon is one of the co-authors in the Fox et al., (2007) paper and another paper with Dr. Fox on the role of seepage. Seepage erosion is more common in areas of contrasting permeabilities where strong hydraulic gradients can be developed (as described by Hagerty). As stated in the response above, evidence of these processes were not observed during 2013/2014 field work other than in some localized areas typically associated with upslope processes.

Commenter	Comment	Response
FRCOG/CRSEC/ Univ. of Illinois 22	<p>Due to the fact that the science has not yet advanced sufficiently to quantitatively model the process of seepage erosion and its effect on bank retreat, correlation to other sites where this process has been observed to be a dominant process is appropriate. The shape of the Connecticut River near- bank region described by Field Geology Services (2007) warrants special consideration and provides an indication of the dominant processes occurring in the near-bank region.</p> <p>Hagerty et al. (1995) considered a gently sloping bench just below the ordinary low water level to be characteristic of rivers having controlled stage; the particular case considered was navigation pools on the Ohio River, although examples were also provided from observations elsewhere in the country. They clearly state that the process of bench formation is not fully demonstrated, but that the evidence suggests a process whereby the permanently submerged portion of the bank becomes more stable, and the above-water portion of the bank migrates at a faster rate than the below-water portion of the bank – even though both may be migrating more slowly than the pre-controlled condition. In each of the cases described by Hagerty et al. (1995), a primary cause of bank migration in the portion of the bank above the maintained low water stage was associated with the piping / sapping mechanism. A stable bench at a migrating bank is not a typical landform in an unregulated river. When a bank is eroding due to fluvial entrainment, migration of the deeper portions of the bank will generally drive the migration of the upper portion of the bank because the shear stresses generally increase with depth. Therefore, for a bench to form on or above the lower bank, at some point in time the lower portion of the bank must not be driving migration of the upper portion of the bank. This is not meant to imply that fluvial action cannot still erode the toe of the bank above the bench; rather it is simply meant to point out that the process is not typical of a migrating bank and that other processes may be involved.</p> <p>The presence of the undercut “notches” located near the normal water stage with the maximum extent of the cut not extending deeper below the water surface also suggests other mechanisms are likely acting in concert with fluvial erosion; note that Table 6.1 of the FRR indicates that approximately 43% of the river banks show evidence of this feature. A notch whose maximum extent is located near the normal water surface suggests the effect of both wave action and sapping associated with the steepest part of the groundwater table following a period of drawdown, and its influence in making the bank material more susceptible to fluvial erosion.</p>	<p>The process of undercutting via grain by grain erosion due to wave action was observed on several occasions during the field campaign as field crews scrambled to get packs and testing equipment to higher ground. Wave action may also play a large if not dominant role in the development and sustainability of the bench/beach that extends from the base of the upper bank. The existence of this bench/beach, therefore does not in any way preclude the steepening and undercutting of the bank toe by wave action and fluvial action if stresses exceed the critical stress.</p> <p>Bank form and migration are the result of various causes and processes which are being studied. The use of BSTEM is one tool being utilized to understand and evaluate these various causes. Other tools and approaches as described in the RSP are also being employed in this effort. This comment focuses on results of previous studies discussing analysis of erosion processes and bank form which are premature at this point, since to date no computer modeling or other application of other techniques have yet been conducted. These comments will be considered as work progresses through the current study.</p>
FRCOG/CRSEC/ Univ. of Illinois 23	<p>Finally, we would like to reiterate that the objectives for which the modeling is intended to satisfy (decoupling and quantifying the various causative factors) is daunting, if not impossible in a strict sense, given the current state of the science regarding the physical processes and our ability to contend with physics occurring at a variety of spatial scales and with high spatial heterogeneity. This does not imply that a modeling approach, which will always require simplifications, is without value. In general, we feel the proposed approach of using BSTEM is a sound practical approach that will provide insights into which processes are important in a relative sense. However, such findings should be strongly qualified; a finding that suggests that the fluctuating stages associated with the pumped storage operations has no impact on the bank retreat or, conversely, that it is entirely responsible for the bank retreat would not be defensible given the uncertainties involved.</p>	<p>FirstLight agrees that using BSTEM is a sound practical approach. As discussed in response to the previous comment and in the RSP, BSTEM is one of the tools being employed in developing an understanding of riverbank erosion. The magnitude and duration of a range of causative forces as well as other factors are being considered in this study. The relative strength and effects of a range of causes are being assessed, evaluated and quantified. At that point the study results will speak for itself and can be evaluated. .</p>
3.2.1 Water Quality Study		
CRWC-1	<p>CRWC expressed concern in our July 28, 2014 comment letter and again verbally at the ISR meeting held on September 30, 2014 about the varying depths and distance from the banks to which the temperature loggers will be placed upstream of the Turners Falls Dam, within the bypass reach, and downstream of the Deerfield River confluence. We continue to be concerned that the depths may be representative of different conditions.</p> <p>CRWC request: FirstLight should either modify the study plan to make all loggers consistently placed, or propose one location in each of the three study segments that to have duplicate loggers to demonstrate the varying logger locations lead to insignificantly different results.</p>	<p>FirstLight developed the sampling locations and depths based on the recommended protocols from MADEP. To address CRWC’s concerns, FirstLight will install all loggers in the thalweg at mid-depth, except for those stations specifically targeting nearshore areas (Stations 13-18). For shallow installations in wadeable areas (e.g., Turners Falls bypass reach) the loggers will be installed in the thalweg just off the bottom. These shallower areas will be well mixed and the installation will occur so that the logger will remain well-hidden (i.e., not suspended from a buoy) to prevent vandalism.</p>

Commenter	Comment	Response
MDFW-1	The Division understands that temperature loggers will be placed at varying depths and distances from the banks upstream of Turners Falls Dam, within the bypass reach, and downstream of the Deerfield River confluence. Installing temperature loggers at variable depths may make it difficult to compare temperature data across sites. Therefore, the Division supports comments submitted by the Connecticut River Watershed Council, Inc. requesting that FirstLight either: a) modify the study plan to ensure that all loggers are consistently placed; or b) propose one location in each of the three study segments that have duplicate loggers to demonstrate that varying logger locations does not yield significantly different results.	See above response to CRWC-1.
3.3.1 IFIM Study		
MDFW-1	<p>Task 1: Consult with Agencies and Interested Stakeholders to Determine Study Area, Study Reaches, and Habitat Suitability Curves</p> <p>Page 3 – The ISR confirms that, in consultation with the technical study team, FirstLight will identify transect locations for mussels in Reach 4 and that all representative habitat types will be represented. Based on FERC’s Aquatic Study Plan Determination (SPD), modeling habitat persistence in Reach 4 is contingent on the presence of state-listed mussels in this reach. No state-listed mussels were found during 2014 surveys; therefore, it is our understanding that no modeling of habitat persistence would be required in Reach 4. Nevertheless, in the SPD (page B-16) FERC determined that it is not appropriate to preclude specific habitat types and that FirstLight should include transects in unsuitable habitat. In order to generate data suitable for developing quantitative HSI curves, the Division requests that transect placement and modeling of unsuitable habitat be reallocated from Reach 4 to Reach 5 using the proposed sites listed in Table 1, below (Ref. J, K, L; “state-listed mussels absent”).</p>	FirstLight anticipates that a reasonable number of transect locations for the IFIM in Reaches 4 and 5 will be selected in consultation with all interested stakeholders during 2015. However, collection of data in unsuitable habitat will not accomplish development of quantitative HSI curves as under such circumstances, no observations can be made correlating the presence of target species with specific habitat conditions. The FERC SPD has approved an alternate approach for HSI curve development, which is binary (Category 1) HSI criteria using the DELPHI method, using field data, information from published and gray literature, and expert opinion of experienced biologists..
MDFW-2	<p>Task 2: Method for Assessing State and Federally Listed Mussels</p> <p>Page 3 – The ISR confirms that FirstLight will develop quantitative binary HSI criteria for all state-listed mussels documented within the project area during fall/winter 2014, and that screening level assessment tasks (2a) will occur after field data is collected. Based on the meeting minutes and agreements of the May 15, 2014 teleconference between FirstLight, FERC, and the Division, all transect data (including benthic velocity data) collected in Reaches 4 and 5 in 2015 should be made available to resource agencies and the DELPHI team (Study 3.3.16) to develop and refine HSI criteria.</p>	FirstLight is proposing to develop HSI curves for mussels using the Category I Delphi method. The meeting minutes from the teleconference state that “Fisheries and Wildlife stated that this data [the benthic velocity data collected in reaches 4 and 5] may be useful to refine the suitability criteria the DELPHI is charged to develop.” FirstLight will provide the data from Reach 5 to the Delphi panel when it is available.
MDFW-3	<p>Task 3: Field Data Collection</p> <p>Page 3-108 of Study 3.3.1 proposed to collect supplemental transect data in Reach 5 to develop a more detailed HEC-RAS hydraulic model to assess state- and federally-listed mussel species. Study 3.3.1 proposes to target six sites in Reach 5 with the highest abundances of yellow lampmussels, as detected during the 2009 mussel surveys performed per the Holyoke Hydroelectric Project. FirstLight proposed to place one transect through each of Sites 2-7 (for a total of six sites and transects), with depth, column velocity, and substrate data to be collected; additional transects would also be collected upstream and downstream of each mussel survey site. Although the ISR does not specifically address this aspect of the study, it is our understanding that data collection associated with this task will occur in 2015.</p> <p>Surveys conducted in 2009 and 2013 for the Holyoke Hydroelectric Project detected Yellow Lampmussels at fifteen (15) sites in Reach 5, with abundances varying widely between sites; Eastern Pondmussel and Tidewater Mucket were detected at one site. FirstLight’s approach would provide accurate hydraulic modeling of sites with the highest Yellow Lampmussel populations; however, it would not provide information on sites with moderate or low mussel abundances, or allow comparison of parameters across a range of abundances.</p> <p>Therefore, the Division would suggest modifying the proposed approach to: a) place three (3) transects within sites of high Yellow Lampmussel abundance (Table 1, Ref. A-C); b) place three (3) transects within sites of medium abundance (Ref. D-F); c) place an additional three (3) transects within sites of low abundance (G-I); and d) place an additional three transects within sites where Yellow Lampmussels were not found (Ref. J-L), consistent with the Division’s comments under Task 1, above. Transect placement should be finalized in consultation with the technical study team, and if necessary, additional transects added to ensure adequate assessment of measured parameters relative to abundance.</p>	FirstLight anticipates that a reasonable number of transect locations for the IFIM in Reaches 4 and 5 will be selected in consultation with all interested stakeholder during 2015, including transects to evaluate state-listed mussels.

Commenter	Comment	Response
MDFW-4	Task 6a: Habitat Modeling (Reaches 1-4) Page 5 – The ISR confirms that habitat modeling will commence following preparation of calibrated hydraulic models in Reaches 1-4, and in consultation with agencies and stakeholders in late 2014. Based on the meeting minutes and agreements of the May 15, 2014 teleconference with FirstLight, FERC, and the Division, the 2007 occurrence of Yellow Lampmussel in Reach 3 warrants habitat modeling for this species. However, quantitative or DELPHI-driven HSI curves will likely not be available until after the 2015 field season. Therefore, the Division requests that modeling of mussel habitat in Reach 3 be postponed until 2016, once category II HSI curves are available.	FirstLight is proposing to develop HSI curves for mussels using the Category I Delphi method. FirstLight anticipates these criteria to be available in 2015.
3.3.2 Upstream & Downstream Passage of Adult Shad		
Meyer-1	I concur with FERC's requirements of an intensive array of radio and telemetry receivers throughout the TF Power Canal to track migrating shad in the canal. However, I request that FERC require FirstLight, in consultation with stakeholders, add an array temperature monitors calibrated to the radio and telemetry sites to understand whether canal delays for American shad—lingering for an average of 8 days in the TF Canal, are forcing these fish to spawn in this privatized, lake-like habitat because of warmed, shallow, and slow water conditions.	Adult American shad spawning in the canal will be addressed under <i>Study 3.3.6 - Impact of Project Operations on Shad Spawning, Spawning Habitat and Egg Deposition in the Area of the Northfield Mountain and Turners Falls Projects</i> . This study requires water temperature to be measured when spawning is observed
USFWS-1	In its February 21, 2014 SPD, FERC acknowledged that comments were submitted for studies 3.3.2, 3.3.3, and 3.3.5 regarding the type and number of radio telemetry receivers and/or antenna arrays proposed in response to FL's Revised Study Plan (RSP). However, because FL's RSP proposed to refine the telemetry arrays based on field testing, FERC's SPD did not specifically address the comments received; rather, FERC recommended that FL include the results of the testing and calibration in its study report. Stakeholders would then have an opportunity to comment on the results, including recommending additional antennas and/or receivers, if necessary. No reports on the field testing for any of the three studies was provided in the ISR; therefore stakeholders cannot provide comments on the adequacy of the telemetry arrays pursuant to section 5.15 of the Commission's regulations. FL will be holding a stakeholder meeting to review the final set-up for four radio telemetry studies (the three mentioned previously plus 3.3.15) on November 17, 2014. As this meeting date is after the deadline for filing ISR comments, the Service requests that FERC accept stakeholder comments related to radio telemetry set-up for the four referenced studies through December 17, 2014 (30 days after the November 17, 2014 meeting).	At the November 17, 2014 meeting, the type and number of radio telemetry receivers and/or antenna arrays proposed in response to FirstLight's Revised Study Plan (RSP) was discussed. The stakeholders and FirstLight agreed to move some redundant telemetry receivers from the canal to river locations near Cabot Station and the entrances of the Cabot and Spillway Fish Ladders. If FERC concurs with these modifications, as FirstLight requested by letter dated December 8, 2014, this issue should be resolved.
3.3.3 Downstream Passage of Juvenile Shad		
USFWS-1	Attachment D of the Meeting Minutes contains operational information from Cabot Station (hourly operation of each unit for years 2009, 2011, 2012, and 2013 from August 1 through November 30). However, FERC directed FL in its February 21, 2014 Study Plan Determination for Aquatic Studies, that FL provide those data for "each test turbine evaluated during this study." So in addition to data for Cabot Station, FL should provide operations data (for the same time period) for Station 1.	FirstLight does not record MW or cfs by unit at Station No. 1. The only available data is total station MW.
3.3.4 Upstream Passage of Eel		
USWFS-1	The proposal for 2015 is to install temporary eel trap/passes at various eel concentration areas. These traps will be installed and checked every two or three days. Based on past experience at other eel traps at the Holyoke Project, Merrimack River Project, and elsewhere, we expect eel passage to be episodic and very high passage nights are possible. On these occasions, eel mortalities have resulted as the traps became overloaded. As we have no information on the nature of eel movements in the project area and the timing and numbers of eels that will be captured, we recommend more frequent trap checks once eels start to be collected in significant numbers. This will assure that numbers do not exceed the capacity of the collection container and that the water system is operating effectively. Daily trap checks should continue as long as collection numbers remain high. In addition, daily checks that are proposed to occur after rain events should be extended beyond the immediate day following the event to assure that numbers collected have declined.	Based on experience at other facilities, and as approved by FERC in the SPDL, FirstLight intends to check the traps every 2-3 days with daily checks after rain events.
3.3.5 Downstream Passage of Eel		
USFWS-1	Attachment D of the Meeting Minutes contains operational information from Cabot Station (hourly operation of each unit for years 2009, 2011, 2012, and 2013 from August 1 through November 30). However, the Service has requested and FERC directed FL in its February 21, 2014 Study Plan Determination for Aquatic Studies, that FL provide those data for "each test turbine evaluated during this study." So in addition to data for Cabot Station, FL should provide operations data (for the same time period) for Station 1.	FirstLight does not record MW or cfs by unit at Station No. 1. The only available data is total station MW.

Commenter	Comment	Response
3.3.6 Shad Spawning		
Meyer-1	<p>Further information/study needed: I concur with FERC that a full spawning study of the Turners Falls Power Canal be conducted in 2015, undertaken in consultation with stakeholders. Temperature monitors should be deployed to assess impact on migratory delay and spawning on-set; and cumulative impacts of head gate and bypass use of spill gates should be factored into the study to determine the impact of silt deposits on spawning success.)</p>	This study requires water temperature to be measured when spawning is observed.
3.3.7 Entrainment Study		
CRWC-1	<p>The ISR for study 3.3.7 indicates Task 1 is mostly complete. The August 14, 2013 Revised Study Plan (RSP) stated that in Task 1, FirstLight “will develop a summary of the life history traits and habitat requirements of key resident species as they relate to these factors affecting entrainment at the Northfield Mountain Project and Turners Falls Project from standard literature sources.”</p> <p>The key resident species nor any of their traits or requirements were provided in the ISR. However, despite FirstLight’s objection to presenting results before a final report, Section 1.2 of the ISR, under Task 1, says, “Preliminary results indicate that most of the common resident fish are unlikely to be in the area of the intakes due to their habitat preferences, and therefore, unlikely to be entrained or impinged. Two species, walleye and fallfish, prefer habitat that is found in front of the Northfield Mountain Project intake/tailrace and may be more susceptible to entrainment or impingement depending on length. Most of the common resident fish are likely to sustain their populations even if individuals of the population are entrained because with the exception of largemouth bass, white suckers, walleye, white perch, and fallfish can double their numbers every 1.4 to 4.4 years (species summaries accessed at www.fishbase.org, 2012) and are not isolated populations due to the presence of upstream and downstream fish passage facilities.”</p> <p>Stakeholders are not able to evaluate such a statement when additional data are not provided. Stakeholders have to wait until March 2016 for this final report to be submitted. An ISR and/or the USR next year is an appropriate time to discuss species and methods so that stakeholders can get a sense of how the study is progressing.</p>	The desktop portion of the fish entrainment study has begun however to complete the desktop resident fish assessment the results of Study Plan 3.3.11 Fish Assemblage study is needed to determine resident fish assemblage composition. In addition to complete the report turbine mortality studies as described in Study Plan 3.3.3 Downstream Passage of Juvenile Shad and Study Plan 3.3.5 Downstream Passage of Adult Eels need to be conducted in 2015.
3.3.9 2D Hydraulic Model		
CRWC-1	<p>Three transects vs. four FirstLight explained that it did not add a fourth transect as required in the September 13, 2013 Study Plan Determination 1 because the intake structure extends out under water to be close to Transect 1 shown in Figure 3.3.9-2 of the RSP. It is not clear to us how the stakeholders will understand velocity conditions experienced by fish in the large area that is typically underwater between transect 1 and the end of the wetted area at the eastern end of the tailrace.</p>	The part of the intake or tailrace tunnel exit structure is typically underwater and has a top of wall elevation of 180 feet as shown in Figure 3.3.9-4 of the Revised Study Plan. As such the water in the area of the concrete roof panels is shallow compared to the surrounding entrance canal area. Additionally, due to its location relative to the intake face is generally calm only experiencing the formation of small back eddies with relatively low velocities.
CRWC-2	<p>Vector Maps The ISM Summary leaves out a detail on page A-8. I asked if the consultant could make vector maps with vector arrows in the study reach of the Connecticut River (5km upstream and downstream of the Northfield Mountain tailrace). FirstLight’s consultants said it wouldn’t be 3D, but they could provide arrows showing which way the river was flowing at various flows and turbine production runs. I said that would be very helpful, and there was wide agreement in the room from stakeholders that these kinds of maps would be useful. The ISM Summary merely says, “Gary explained that only two-dimensional modeling was being done for the Northfield Mountain intake and Impoundment discharge area.” This indicates no commitment to make the vector maps.</p> <p>CRWC request: In the August 14, 2014 RSP, it states that the final report will contain, “Vector maps showing the magnitude and direction of water velocities.” The final report for study 3.3.9 should specifically have vector maps showing the entire study stretch (5 km above and below the Northfield Mountain tailrace) of the Connecticut River under various river flow and pumping and generating conditions.</p>	Vector maps indicating the magnitude and direction of water velocities will be provided in the Final Report as indicated in the Revised Study Plan.
Meyer-1	<p>Further information/study needed: In the Initial Study Report Study Meeting Summary for stakeholder in October 2014, a request was made that FirstLight provide vector maps with arrows and indication of directional flow around the Intake and Tailrace Channel at the Northfield Mountain Pumped Storage Project. This is critical information for flow, erosion, and sediment displacement and needs inclusion. This is information that has been missing on Northfield Mountain Pumped Storage Impacts since at least 1974.</p>	Vector maps indicating the magnitude and direction of water velocities will be provided in the Final Report as indicated in the Revised Study Plan.

Commenter	Comment	Response
USFWS-1	At the October 15, 2014 ISR meeting, the value of documenting water flow direction in the study area with vector arrows was discussed. This information will aid in a number of related studies including monitoring of adult radio-tagged American shad for both up and downstream movement, juvenile radio-tagged American shad on downstream, and possibly radio-tagged sea lamprey that will be transiting through this study area and are to be monitored for effects by the Northfield Mountain Pumped Storage Facility. We would like clear confirmation that vector maps for water flow under will be incorporated to provide important information on potential project effects for the noted species studies and potentially other important as yet to be identified effects.	Vector maps indicating the magnitude and direction of water velocities will be provided in the Final Report as indicated in the Revised Study Plan.
3.3.10 Odonate Study		
MDFW-1	Task 3: Qualitative Surveys for Larvae and Exuviae to Determine Species Presence Page 1 – The ISR confirms that qualitative surveys for larvae and exuviae were conducted during the 2014 field season in all proposed reaches, and the Division looks forward to receiving this data and a summary report. Further, the Division has received independent records of state-listed odonates within the proposed study reaches, and encourages FirstLight to contact the Division regarding the use of this data in refining 2015 study plans.	A summary report will be provided to stakeholders in 2015 prior to initiating the quantitative surveys. FirstLight will contact the NHESP to obtain the referenced information.
MDFW-2	Task 4: Quantitative Surveys of Emergence/Eclosure Behavior Page 1-2 – The ISR confirms that Task 1 and 3 results will be used to inform additional data collection, replication, stratification by habitat, and to finalize emergence speed study methods. The Division looks forward to contributing to these discussions and working with FirstLight to develop the quantitative survey approaches. Further, in the SPD (page B-55-56) FERC requested an analysis of precipitation data in the ISR so as to establish a reasonable justification for conducting or not conducting surveys following a precipitation event. The Division looks forward to the inclusion of this data in the summary report of Task 3 activities, and to further discussion on how it will be used in the quantitative surveys of Task 4 and 5.	A summary report will be provided to stakeholders in 2015 prior to initiating the quantitative surveys.
3.3.11 Fish Assemblage		
TNC-1	Stratified Random Sampling FirstLight makes an assertion that the sampling design in the USFWS proposal is substantially different from that described within Study 3.3.11, specifically referencing the stratified random sampling design of Study 3.3.11. However, all of the components of the stratified random sampling design that were originally in Study 3.3.11 remain in the USFWS proposal. Therefore, the USFWS proposal has the same level of statistical precision as FirstLight’s proposal.	The sampling design in the other reaches calls for a relatively high statistical precision, Thus, the use of the proposed visual sampling technique in the lower reach will result in bias and statistical imprecision that will render the data inconsistent with other reaches and may lead to biased conclusions.
TNC-2	Data are Inconsistent with Other Reaches FirstLight states that using a different method in the riverine portions of the project area will “...result in bias and statistical imprecision that will render the data inconsistent with other reaches and may lead to biased conclusions...1” However, Study 3.3.11 includes methods that require different sampling gear types for different habitat types: “FirstLight anticipates using a variety of techniques to sample the various habitat types within the study area... The type of gear utilized will be dictated by habitat type.” Therefore, FirstLight’s study proposal also includes differences in gear among habitat types. Note also that USFWS proposed using snorkeling in all riverine portions of the study area: “Visual observation surveys will be conducted in the riverine portions of the study area. Below Cabot station, this will be the only sampling method employed... In both the bypass reach and the riverine reach below Vernon Dam, visual observation will be used in addition to the other gear types...” This type of consistency in data collection, where riverine portions are always sampled with snorkeling, would reduce any potential bias caused by using a different sampling method. On the other hand, FirstLight proposes eliminating sampling in the Connecticut River below Cabot Station altogether, such that there would be no current data and no current sampling methods consistent with other study reaches. This would certainly lead to inconsistency in results across the project area, which FirstLight recognizes would be undesirable.	FirstLight proposes to use existing electrofishing data from 2009 along with new information collected in the bypass reach and upstream of Turners Falls Dam to address the study goals. In August and September of 2009, 11 km of the river reach between the end of the bypass reach and the Rt 116 bridge were sampled via electrofishing. Unlike the proposed snorkeling, this data can be quantified based on sampling effort. Since the bypass reach and river above the Turners Falls Dam will be sampled using multiple gears including electrofishing any information on species not collected via electrofishing can be collected. FirstLight believes that using existing quantitative electrofishing data and the data collected in the bypass and above Turners Falls will meet the study goals and objectives and provide sufficient information needed by the jurisdictional agencies and the Commission for their evaluations and environmental analysis.
TNC-3	Standard Gear Biases FirstLight also lists several of the inadequacies and potential biases of snorkeling as justification for not using the method. However, it is well-understood among fisheries biologists that every gear has its own set of biases and disadvantages. In fact, this was part of the reasoning behind using multiple gear types for Study 3.3.11 – to minimize gear bias in the fish assemblage assessment – and why the 2008 and 2009 EPA studies, which exclusively used boat electrofishing, were identified as inadequate for describing the fish community. That is, boat electrofishing has its own set of biases; as stated in Study 3.3.11, “While electrofishing is considered to be an effective method for capturing fish in littoral areas of flowing water, capture probabilities are typically lower for small fish or those lacking swim bladders. It is also not effective at capturing fish from deep water unless modified.” Furthermore, many of the disadvantages of visual surveys listed by	As indicated by the agencies, snorkeling is not an ideal sampling method. It is not possible to quantify results as identification of small similar looking species such as cyprinids and centrarchids cannot be accurately identified; the likelihood of miscounting fish is very high due to missed fish or double counting; pelagic schooling fish are unlikely to be accurately enumerated and accurate counts, weighing, and total length metrics cannot be collected. However recent collected electrofishing data can be quantified and as proposed can be compared with the proposed multiple gear collections in the bypass and upstream of the dam.

Commenter	Comment	Response
	FirstLight were cited to proponents of visual surveys who also offer suggestions for overcoming some of the disadvantages as well as several advantages to the method (e.g., see Thurow et al. 2013). Certainly, snorkeling is not an ideal sampling method or it would have been included in the original study plan; however, it has at least one distinct advantage: it is strictly non-lethal and therefore removes any possibility for impact to shortnose sturgeon.	
TNC-4	<p>Validation of the Method</p> <p>FirstLight asserts that sampling accuracy of snorkeling methods should be validated by comparing results with electrofishing estimates, but that these electrofishing estimates “cannot be performed.” We are unsure of the meaning of this statement. In the USFWS proposal, they clearly indicate how the snorkeling methods would be validated: “In both the bypass reach and the riverine reach below Vernon Dam, visual observation will be used in addition to other gear types to validate the technique as well as collect data that could be used to calibrate the visual observation-only data collected below Cabot Station...” Contrary to FirstLight’s comment, we see that USFWS has addressed the issue of validation and calibration.</p>	Since electrofishing is proposed for all reaches above the Turners Falls Dam, it can be validated similar to how USFWS proposed to validate snorkeling. The advantage of using the electrofishing data is that it can be quantified unlike the snorkeling visual observations.
TNC-5	<p>Snorkeling in Large Warmwater Rivers</p> <p>FirstLight argues that in Bonar et al. (2009), a fisheries manual for standardized sampling methods, snorkeling “is not a recommended method for large warmwater rivers.” FirstLight is correct that visual observation is not listed among the other methods for standardized sampling in warmwater streams. However, Bonar et al. (2009) does not discourage use of snorkeling in warmwater rivers, nor do they discuss the option; Thurow et al. (2013) also does not make a distinction regarding the value of visual survey methods for this habitat type. Therefore, it is not accurate to state that visual survey is “not a recommended method” for sampling in this area; it is just not listed among the standardized methods for large warmwater rivers. The opening text of Bonar et al. (2009) describes the purpose of the book and the criteria for including methods for each stream category. It is not surprising that snorkeling was not included among standardized sampling methods because there are several other methods for sampling fish in large warmwater rivers that are more broadly used and therefore more appropriate to list as standardized sampling methods. Indeed, the only reason USFWS is considering snorkeling is because of the risk of harm to shortnose sturgeon by every one of the other techniques listed under methods for large warmwater rivers in Bonar et al. (2009). That is, snorkeling may be the only method that can be used to sample the fish assemblage in this reach of river. Furthermore, Bonar et al. (2009) certainly does not encourage abandoning the possibility of sampling because methods are not specifically listed under a particular habitat type. Rather, Bonar et al. (2009; p. 4) states, “Selection of appropriate sampling gear is important when conducting a survey. All gears have inherent biases... When standard sampling, fisheries scientists benefit by using gear that will capture the most fish in the assemblage of interest.” At present, visual survey is the only method that has been identified as possible for capturing fish in the Connecticut River below Cabot Station.</p>	FirstLight has identified the recently collected electrofishing data as the most appropriate data for characterizing resident fish in the areas where sampling is not allowed. FirstLight identified a validation method and proposes to use data collected upstream to validate the data.
TNC-6	<p>Meeting Stated Information Needs</p> <p>In Study 3.3.11, under the criteria “Existing Information and Need for Additional Information,” it states that the 2008 EPA Connecticut River sampling effort that took place in Turners Falls Impoundment “did not have the same goals and objectives as this study; thus, data collected is not sufficient to assess the abundance, occurrence, or distribution of fish within the study area or in relation to project operations...” FirstLight proposes to use data collected in 2009 in the reach below Cabot Station under the same EPA Connecticut River sampling effort. However, the goals and objectives of the 2008 and 2009 EPA sampling efforts were the same; the goals and objectives for the fish assemblage assessment in the Turners Falls Impoundment and below Cabot Station are the same. It follows that the 2009 EPA sampling effort also “did not have the same goals and objectives” as Study 3.3.11 as it applies to the Connecticut River below Cabot Station, and therefore that these data are “not sufficient to address the abundance, occurrence, or distribution of fish within the study area or in relation to project operations.”</p>	Given the choice between using the 2009 quantitative electrofishing data and the qualitative snorkeling information, FirstLight believes that the 2009 electrofishing data provides quantitative data to allow sufficient information needed by the jurisdictional agencies and the Commission for their evaluations and environmental analysis.
USFWS-1	<p>As noted in Appendix E of the October 15, 2014 ISR meeting minutes, FERC required FL to consult with the agencies on ways to modify the study plan methodology to avoid all effects to shortnose sturgeon (SNS) while providing sufficient information for the agencies. Stakeholders met on June 3, 2014 to discuss ways to avoid SNS effects. The Service sent FL proposed changes to the study plan via electronic message dated September 9, 2014, recommending that FL use snorkeling, SCUBA diving, or hookah diving to collect fish assemblage data in the reach below Cabot as well as other riverine reaches. Appendix E contains FL’s rationale for choosing to not adopt proposed changes. Below are the Service’s responses to concerns raised by FL.</p> <ol style="list-style-type: none"> 1. The use of visual sampling will result in bias and statistical imprecision. 2. Visual observations are an alternative for surveys in wadeable stream and coldwater rivers. 	<p>Since electrofishing is proposed for all reaches above Turners Falls Dam, it can be validated similar to how USFWS proposed to validate snorkeling. The advantage of using the electrofishing data is that it can be quantified unlike the snorkeling visual observations.</p> <p>Given the choice between using the 2009 quantitative electrofishing data and the qualitative snorkeling information, FirstLight believes that the 2009 electrofishing data provides sufficient information needed by the jurisdictional agencies and the Commission for their evaluations and environmental analysis.</p>

Commenter	Comment	Response
Meyer-1	FirstLight has declined to undertake any study in the By Pass Reach of the Connecticut River due to stated concerns of interference with spawning and development of embryos of federally endangered shortnose sturgeon in this area. Information from the 2009 EPA study is insufficient to quantify presence and abundance of resident and migratory fish in this reach during critical migration and spawning periods—April through June. That investigation used only 3 sites in the By Pass Reach and was not undertaken to illuminate key species requirements in the current ILP for this critical reach.	FirstLight plans to conduct the fish assemblage study in the bypass reach after June as required by NMFS.
Meyer-2	NMFS notes that FirstLight has failed to consult with stakeholders on SNS issues here. I am in agreement with USFWS that a dedicated snorkeling, SCUBA, or hookah diving assessment of this critical reach of the four-state CT River be conducted in the riverbed between the Turners Falls Dam and downstream of Cabot Station during the April-June migration and spawning window--and that it continue after FirstLight's suggested June 30 beginning target date.	FERC required FirstLight to propose a study to avoid any potential impacts to endangered shortnose sturgeon, and FirstLight held a meeting with stakeholders on June 3, 2014 to address this issue. A 2009 electrofishing survey of the area below Turners Falls Dam downstream to the Route 116 Bridge was conducted as part of a larger Environmental Protection Agency effort to sample the entire Connecticut River from Lake Francis to the freshwater extent of the tidal estuary. Sampling occurred at three 1-km stations in the bypass reach and eight 1-km stations between the bypass reach and the Route 116 Bridge in Sunderland. The species composition and relative abundance is typical of fish assemblages described for inland fishes of Massachusetts. FirstLight believes that these recent data, coupled with the data FirstLight will obtain in the Turners Falls Impoundment will provide sufficient information on species composition and relative abundance in the Project area to accomplish the study's goals and objectives.
3.3.12 Cabot Emergency Water Control		
CRWC-1	It is useful to see the flows in Tables 4-1b and 4-2 and how often these occur during emergency and non- emergency events. What would be most useful to CRWC is to know from fisheries agencies what flows are of a concern, and then have a table showing all the data for those flows. For example, Table 4-2 presents periods when more than four spill gates were open. But are flows of interest experienced when there are 1-4 gates open, and if so, how often? Knowing the reason for each non-emergency spill gate release could also help stakeholders understand which releases could reasonably be delayed or modified to minimize impacts on shortnose sturgeon in the future. Tabular information about flows at the sluice gate and reason for opening (trash or otherwise) would be helpful. As for the question about whether or not field studies are necessary, CRWC recommends FirstLight provide all data needed for discussion, then schedule a meeting or conference call of stakeholders to discuss this matter in more detail.	FirstLight will work with fisheries agencies to refine the data analysis and initiate a meeting with stakeholders.
Meyer-1	Further information/study needed: FirstLight has supplied a grid information for emergency gate and by pass flume openings for the years 2005 – 2012, though 2010 is missing, and we have no information on gate openings and placement for 2011 and 2012 in some instances, other than that there were no instances when greater than 4 emergency flume gates were open. This study information should be updated with full information for years 2011, 2012—as well as 2013 and 2014 gate opening numbers, placements and CFS information.	The analysis included data from 2005 through 2012 from April through June for each of those years, as required by the FERC-approved study plan. The ISR and ISR meeting summary included data on gate openings as well as discharge information.
Meyer-2	FirstLight contends that its operations of Bypass flume gates above Cabot Station are aimed at either emergency load rejection at Cabot Station, or opened to flush debris. They also contend that it is rare to have more than one flume spill gate open, though most of the numbers belie this statement--and the number of days when 4 or more gates have been open during SNS spawning window is highly significant and impactful. Opening of 4 flume gates needlessly diverts flows approaching 4,000 CFS out of the Connecticut's By Pass Reach at TF Dam, and sends it into the canal to be needlessly flushed back into the river in a configuration that impacts migratory species and imperils annual spawning attempts of the federally-endangered CT River shortnose sturgeon. In May 2014, I personally witnessed 3 consecutive days when two or more spill gates were open at the TF canal bypass above Cabot—all at the same time of day: 12:25 pm. These openings occurred while both Station 1 and Cabot were generating, which would appear to indicate that the spill gates had been left in this position for hours, or perhaps days, as part of flow regulation in the canal--rather than emergency or debris clearing. I have sent this information to both FERC and the federal and state fisheries agencies.	The emergency spill gate data were reported on a 10-minute time step, not daily. As presented in Table 4-1, more than one emergency spill gate was open 2.1% of the time during the period studied. Regarding 2014, this period was not required to be analyzed as part of this study. Also, two of the three gates downstream of the log boom are used to provide attraction water for the Cabot fishway. As stated in the report, "The maximum Cabot fish ladder attraction water provided through the other two gates is approximately 335 cfs." These two gates were not part of this analysis, as they are not used for emergency or maintenance purposes. Cabot personnel commonly need to remove large debris from the intake racks at Cabot Station, and from the debris boom upstream of the station.
Meyer-3	The continuous openings of two or more bypass gates, up to six and seven gates open on a "non-emergency" basis on the TF canal above Cabot Station during SNS spawning and early life stage periods threatens the recovery of the Connecticut River's only federally endangered migratory species. As I have witnessed, multiple gates open on the canal while both Station 1 and Cabot were in operation indicates that canal flow is at times being regulated at this site, rather than at the TF Gatehouse, where excess flow could be delivered to the	Two of the three gates downstream of the log boom are used to provide attraction water for the Cabot fishway. Data for 2013-2014 was not included because the RSP as approved specified 2005-2012 as the period of analysis. The report includes data from 2010. See page 4-7 and the time series plot in Appendix B for information on the conditions

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	<p>river in the Bypass Reach, which would nourish, rather than destroy SNS chances for successful spawning at Rock Dam and below Cabot. During SNS spawning season, mid-April – June 30th, endangered species protections dictate that all flow, save for documented, specific emergency situations, be controlled at the Head Gates of the Turners Falls Dam.</p> <p>Information for years 2013 and 2014 should further be included, and a Study and study season for 2015 should be implemented that documents both the reason and instances when emergency gates were open—and any flume gates above 1 that were open to vent flow from the canal to the bypass.</p> <p>I would also like FERC to have FirstLight include information for 2010, as the May 4 time of 8-gate emergency spill operation occurred exactly at the time frame when Northfield Mountain had burped up a massive sediment spill into its intake, and was trying to flush that pollution downstream. It would be helpful to know the position of both the Bypass flume gates and the positions of TF Dam headgates and bascule and tainter gates at that juncture—as it most definitely impacted SNS present for spawning that year. This would again offer data on whether the TF canal flows were being regulated via emergency by pass flume operation.</p>	<p>relative to May 4, 2010.</p>
NMFS-1	<p>The data presented in the ISR and its supplement only partially fulfills the goals and objectives outlined in FirstLight's Revised Study Plan: 1) Determine the frequency with which the emergency water control gates are operated to discharge large quantities of water; and 2) Describe the operation of the bypass flume that results in bypass flume spill events. However, the information presented in the ISR fails to address the third goal and objective: 3) Evaluate the impact of these events on sediment transport and bottom velocities within known shortnose sturgeon spawning and rearing habitat below Cabot Station. Synthesis of the data in relation to potential impacts on shortnose sturgeon spawning and rearing is critical information. We expect this information will be necessary for the Biological Assessment you and FirstLight will need to prepare to initiate formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended. The report for Study 3.3.12 is incomplete without this analysis. We request you require FirstLight to carry out this analysis and complete the study as ordered.</p>	<p>FirstLight will work with fisheries agencies to refine the data analysis and initiate a meeting with stakeholders.</p>
NMFS-2	<p>In addition, the 2014 Initial Study Report Summary for this study (3.3.12) states under Section 1.4- Remaining Activities: As demonstrated in the summary report, the emergency spillway/log sluice gate discharge events during the sturgeon spawning period are infrequent and generally of low intensity in relation to river flow. FirstLight 's position is that the field data collection aspect of this study is not necessary. As stated in the RSP, a mutual agreement will be reached in consultation with interested stakeholders to determine whether additional study is necessary. It is our understanding that FirstLight has not started consultation with stakeholders on whether field verification is necessary.</p>	<p>With the presentation of the Initial Study Report, FirstLight initiated consultation with stakeholders on this issue. FirstLight will initiate a meeting with stakeholders to discuss the need for field verification.</p>
Pugh-1	<p>The report uses the number of gates open to analyze discharge through the spill gages. This is an incorrect metric to describe spill events. Rather than analyze the volume of and frequency of spill gate discharge, the report focuses on the number of gates open. This is seen in the text of section 4, Results and Discussion, where the focus is on the number of gates open, the percent of time open, and the number of times when five or more gates were open. It is also seen in the tables. Tables 1 and 3 describe the percent of gates open and the frequency of gate openings. Table 2 details the times when five or more gates were open. Only in Table 2 is discharge noted. Discharge from the spill gates for the full period of record is only available as graphs in Appendix B.</p> <p>The data provided in the report shows that the magnitude of discharge (large quantities of water) is not correlated with the number of gates open. Table 2 lists the events when five or more gates were open. Of the 27 events listed, six were less than 3,000 cfs and, of those, two were less than 1,000 cfs. An analysis of the magnitude, in cubic feet per second, and frequency of spill events is needed to understand the impact of spill gate openings.</p>	<p>Personal communication with the commenter occurred on November 11, 2014 after the submission of these comments. The commenter was unaware of the supplemental information filed with the ISR meeting summary for this study (Appendix F of the Meeting Summary).</p>
Pugh-2	<p>Cabot Emergency Spill Gates Paragraph 2 describes Table 4-2 as having 26 occurrences when at least five spill gates were open. Table 4-2's title is the periods of time when four or more spill gates were open but lists occurrences when five or more gates were open. It would be surprising if, during the period of time analyzed, four gates were never open.</p>	<p>The title of Table 4-2 is "Periods When More Than Four Spill Gates Were Open From April 1-June 30, 2005-2012." Data regarding the frequency when four gates were open were presented in Table 4-1.</p>
Pugh-3	<p>Sluice Gate In section 2.2, Bypass Flume/Log Sluice Gate, the CRASC schedule for opening the gate for downstream passage shows that the gate should be open from April 1 (Atlantic salmon smolts) through July 31 (American shad adults). The gate should be open 24 hours a day so it is unclear why the gate is closed 23% of the time from April 1 to June 30 (CRASC downstream operations schedule).</p>	<p>As described in the report on Page 2-2, the sluice gate is open "except for brief periods of sampler deployment or rack maintenance and longer periods when high river flow would pose an erosion threat at the sluice discharge if the gate were left open."</p>

Commenter	Comment	Response
Pugh-4	Table 4-2 Grouped by time periods (color bands separating periods), there were 26 separate periods when five or more gates were open. Twenty-one averaged more than 4,000 cfs. Two averaged less than 1,000 cfs. The number of gates open may generally reflect discharge but this is not always the case. Most notably on April 1, 2006 five gates discharged only 539 cfs.	Time series information of gate discharge in relation to river flow was provided in Appendix B of the ISR for this study.
Pugh-5	Appendix B Based upon an evaluation of the graphs, there were 28 instances when discharge from the spill gates was greater than 4,000 cfs. In 2006 there were eleven times from the end of March to mid-June when spill gate discharge was greater than 4,000 cfs. As seen in Table 4-2 and Appendix B, the number of gates open does not correlate with discharge. Significant discharge is possible with only three gates open when each gate discharges approximately 1,500 cfs. A table similar to Table 4-2 should be provided that describes periods of time when any spill gates are open. This will allow an evaluation of the frequency and magnitude of spill gate events.	<p>Personal communication with the commenter occurred on November 11, 2014 after the submission of these comments. The commenter was unaware of the supplemental information filed with the ISR meeting summary for this study (Appendix F of the Meeting Summary).</p> <p>The commenter indicated that “Table 4-1b still does not address my concerns with the number of times and at what level spill events occur as I describe below.”</p> <p>FirstLight will work with fisheries agencies to refine the data analysis and initiate a meeting with stakeholders to discuss the need for field verification.</p>
Pugh-6	<p>Appendix A (Kieffer & Kynard, 2007) shows the release on April 26, 2006. The mean discharge for this release was 4,808 cfs (Table 4-2). The image gives an indication of the intensity of spill gate releases.</p> <p>The impact on sturgeon spawning and incubation by releases from the emergency spill gates cannot be readily assessed solely through the magnitude and frequency of discharges. Objective 3 under Goals and Objectives in the study plan is: <i>“Evaluate the impact of these events on sediment transport and bottom velocities within known shortnose sturgeon spawning and rearing habitat below Cabot Station.”</i></p> <p>Kieffer and Kynard (2012) note that a single spill gate discharge can disrupt spawning, causing females to leave the spawning grounds. In 2006 there were eleven spill events greater than 4,000 cfs during the period of concern. In addition to causing fish to leave the spawning grounds, releases from the spill gates can deposit sediment on early life stages of sturgeon with the potential to suffocate eggs and free embryos.</p>	<p>Kieffer and Kynard (2007) also note that spill events at Cabot Station usually caused no identifiable increase in discharge at the USGS Montague City gage below Cabot Station, because there was only a shift in release location, rather than a shift in discharge volume. The data presented in the ISR support this.</p> <p>FirstLight will initiate a meeting with stakeholders to discuss the need for field verification.</p>
USFWS-1	Data presented in the ISR describes the number of gates that are opened and timing in defined incremental units. However, an analysis of the magnitude, in cubic feet a second, and frequency of spill events – defined as the when one gate is opened and ending when all gates are closed, is needed to appropriately understand the impact of spill gate events. That type and detail of information will be most helpful in later study work and analyses that will examine when effects of emergency discharge may be detected on shortnose sturgeon (SNS). The ISR does not address Study Objectives 3. The extent and relationship to which sediment transport and bottom velocities from spill gate releases may impact SNS are unknown and require further study as even perceived “limited” duration spill events may have the potential to impact SNS.	FirstLight will work with fisheries agencies to refine the data analysis and initiate a meeting with stakeholders.
3.3.14 Aquatic Habitat Mapping TF Impoundment		
Meyer-1	Further information/study needed: If migratory fish targeted for restoration in Northern Massachusetts and Vermont and New Hampshire are to continue to be diverted into the TF Power Canal, where few emerge upstream, then an addition to this study should be conducted: Aquatic Mapping of the Turners Falls Power Canal—as it is technically an extension of the Turners Falls Impoundment, and the public has a right to understand the habitat where their fish get privatized.	Annual canal drawdowns provide opportunities to observe the aquatic habitat in the Cabot Canal.

Commenter	Comment	Response
3.3.16 Mussels		
MDFW-1	<p><u>Task 3: Develop Binary HSI Criteria for State-Listed Mussel Species Documented in the Project Area</u></p> <p>Page 1 – The ISR confirms that binary HSI criteria, including input from regional scientists on proposed criteria, will be developed in cooperation with the Division. In Study 3.3.16, FirstLight proposed to collect information on depth, substrate, cover type, and benthic velocity for each individual state-listed species encountered to provide data for HSI criteria development. No state-listed mussel species were found in Reaches 1-3 during 2011 mussel surveys or in Reach 4 during 2014 mussel surveys. Therefore, no quantitative habitat suitability data will be available from Reaches 1-4 for developing HSI criteria. FirstLight also proposed to rely on data collected under Holyoke Gas & Electric’s Revised Study Protocol for the Holyoke Hydroelectric Project in Reach 5. The Division notes that data collection for the Holyoke Dam Project in 2009 and 2013 appears insufficient to develop HSI criteria (see Attachment 1, Year 2 Study Request, for details on data insufficiency).</p> <p>FirstLight proposes to develop quantitative binary HSI criteria for all state-listed mussel species based on field data collected for this study, existing information on state-listed species in other locations, and expert opinion. In the SPD (page B-77), FERC noted that data driven (category II) HSI criteria are developed by examining frequency distributions of microhabitat attributes (velocity, depth, etc.) measured at a sufficient number of observations across a range of mussel density and habitat conditions. FERC also noted (page B-78) that a substantial amount of habitat suitability data for the target mussel species in this study already exists, which should promote the development of sound HSI criteria in a cost-efficient manner.</p> <p>The Division supports the use of existing quantitative data and avoiding unnecessary collection of duplicate data in the development of quantitative HSI criteria. However, the Division is not aware of any quantitative data currently available for use in developing HSI criteria for target mussel species other than the qualitative and semi-quantitative data collected in Reach 5, which we find insufficient to develop data-driven HSI criteria. If additional, quantitative habitat suitability data exists that would be used as part of the development of data-driven HSI criteria for these species, the Division requests that this data be provided for its review and consideration. In the absence of sufficient quantitative data across a range of microhabitat attributes where these species are known to occur, the Division proposes the Year 2 Study Request (Attachment 1) to facilitate data collection necessary for quantitative HSI development.</p>	<p>FirstLight considers the development of binary HSI criteria using the Delphi technique a major component of its FERC-approved study plan that will be completed according to the schedule and methods outlined in the study plan. There is a large amount of information available for all three state-listed mussel species that occur in Reach 5 (Yellow Lampmussel, Tidewater Mucket, and Eastern Pondmussel), including qualitative and quantitative habitat data, information on life history and ecology, and distribution. Delphi panel experts will also likely have information and insight not readily available from journal articles or other publications. If an outcome from the Delphi panel is that additional data may be necessary to validate HSI criteria, then it will be discussed at that time.</p> <p>The FERC-approved study plan outlined and supported the development of binary (Category 1) HSI criteria with the Delphi technique, using field data, information from published and gray literature, and expert opinion of experienced biologists. The SPDL did not recommend additional data collection to validate HSI criteria. NHESP’s request for a quantitative field study to develop data-driven (category 2) HSI criteria is unsupported. NHESP incorrectly stated that FirstLight’s study plan proposed to develop binary HSI criteria “based on quantitative data collected in Reach 5 by Holyoke Gas and Electric”. As written in the study plan, and supported in FERC’s SPDL, existing field data in Reach 5 (i.e., data collected by Holyoke Gas and Electric) would be just one of several sources of information used to develop the binary HSI criteria. FirstLight recognizes that the Holyoke Gas & Electric study did not collect data on <u>every</u> parameter that may be important in HSI criteria development, but other field data, information from published and gray literature, and expert opinion will all help to fill any gaps. NHESP’s request does not show good cause for why the proposal should be approved, and does not explain: any material changes in the law or regulations applicable to the request; why the goals and objectives could not be met with the approved study methodology; why the request was not made earlier; and that significant changes in the project proposal or significant new information material to the study objectives has become available. Such explanation is required with any proposal for new information gathering or study under FERC’s regulations.</p>
MDFW-2	<p>Page 1 – The ISR confirms that FirstLight will consult with the Division during the DELPHI team selection process to determine an appropriate panel of experts. We request that FirstLight provide additional information on the proposed process by which the DELPHI team will refine HSI criteria and for stakeholder review and comment. The initial phase appears to require the identification of an appropriate third-party expert to chair and facilitate the DELPHI team. The Division has a list of potential, qualified experts and will provide this list to FirstLight for review and consideration.</p>	<p>FirstLight will chair and facilitate the Delphi team. FirstLight welcomes any suggestions from NHESP on qualified experts willing to participate in this process. The methods outlined in the study plan adequately describe the process. FirstLight’s mussel expert will take the lead on gathering and synthesizing existing information on a range of parameters that may be relevant to HSI development, and will engage with regional experts on an informal or formal basis during this process. Information sources and summaries for a range of parameters will then be reviewed by experts willing to participate in the process, and will help to develop and fine-tune the criteria. All sources of information, the process used to develop the final binary HSI criteria, and the final binary HSI criteria will be summarized in a written document and submitted to stakeholders for final review.</p>
USFWS-1	<p>As reported in the ISR and at the September 30, 2014 ISR meeting, no live yellow lampmussel were found in Reach 4. According to FL’s Revised Study Plan and FERC’s Study Plan Determination, development of binary HIS criteria would be based on quantitative data collected in Reach 5 by Holyoke Gas & Electric for the Holyoke Project. However, the Service has reviewed the recently completed Twelve Year Summary Rare Mussel Species Report 2003-2014 and it does not appear that data sufficient to develop HIS criteria were collected as part of that effort. For example, no velocity measurements were taken at the one quantitative survey site. Further, relying on a single site for quantitative sata does not reflect the variety of habitat used by yellow lampmussel. In its SPD, FERC noted that HIS criteria are developed by examining frequency distributions of microhabitat attributes measured at sufficient number of observations across a range of mussel density and habitat conditions. Because there are insufficient quantitative data to develop HIS criteria for yellow lampmussels, the Service supports the Year 2 study request submitted by the MA Natural Heritage of Endangered Species Program.</p>	<p>FirstLight believes that NHESP’s Year 2 study request is unfounded at this time, as discussed above.</p>
3.3.18 Canal Drawdown		
Meyer-1	<p>Further information/study needed: The 2014 Canal Drawdown study was flawed as it occurred over the course of two days, due to an error in spill gate function. Since this is a study of live and dead fish and organisms, as well as the presence of dissolved oxygen, a two-day study time frame represents a flawed evaluation. A night of drying, predation, and fluctuating oxygen presence confounds the results of this work. FirstLight does an annual drawdown of the canal—has down so for decades, thus a mistake at the</p>	<p>The canal was scheduled to start dewatering on Sunday evening, September 28, at 9PM. Sunday evening ISO-NE declared a generating emergency, Cabot was generating with all available units (Unit 5 was in a major overhaul) and the system operator would not let the drawdown begin until 9:40PM. Monday morning, September 30 there was a significant amount of leakage at the Gatehouse gates, especially gate #9, and it took more time than usual to seal the gates before a safe work clearance could be issued. The clearance was issued 11:45AM.</p>

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	time of a critical habitat study should corrected by conducting a second year of study.	It is fairly typical for a safe work clearance not to be issued until near noon time.
USFWS-1	<p>The canal drawdown was completed on September 29, 2014. At the ISR meeting, KA stated that, due to an issue with a gate, the field crews were delayed in initiating data collection; therefore, not all of the field work was able to be collected that first day.</p> <p>Because the field crews were not able to get into the canal to initiate the surveys until the afternoon of the 29th and were not able to complete data collections until the following day, an unknown amount of predation may have occurred that could influence survey results. Also, we were informed that large machinery was deployed into the pool in Sample Reach 1 prior to the field crew being able to electrofish that area. This large machinery activity clearly could have influenced the survey results.</p> <p>Due to problems associated with canal drawdown in 2014, the Services believes the study should be repeated in 2015.</p>	<p>Field studies of the drawdown did span over a 2 day period (September 29 and 30, 2014), however this situation would yield a conservative mortality estimate as fish collected on the second day of the drawdown had been in the canal over night. Since It is fairly typical for a safe work clearance not to be issued until near noon time, an additional year of sampling most likely would not produce different results.</p> <p>Although trucks were clearing debris near Cabot Station at the same time that the pool in front of Cabot Station was being sampled, this pool is large so debris removal did not interfere with the sampling effort. Over 200 fish were collected per 500 seconds of backpack electrofishing in the pool during the first day of the drawdown. Subsequent collections in the pool on Friday October 3, 2014 yielded additional live fish in this pool.</p> <p>It is premature to request a study be repeated before the results of the study are analyzed.</p>
3.3.19 Ultrasonic Array		
Meyer-1	Further information/study needed: the need for this 2016 study will be fully realized if planned studies of American shad movement and spawning in the canal confirm that these fish are experiencing significant migratory delay, and are being corralled into a migratory spawning trap by confused and insurmountable flows or pre-mature warming in artificial habitat that induces spawning in the canal—preventing fisheries restoration on the river in Northern Massachusetts, New Hampshire and Vermont.	This study is planned to be conducted in 2016 depending on the results of the 2015 Adult American shad radio telemetry study.
3.3.20 Ichthyoplankton		
USFWS-1	The Service submitted comments to FL on this study plan by electronic message dated September 17, 2014 – they were attached to this letter also.	FirstLight submitted its response to USFWS comments to FERC on October 16, 2014.
3.5.1 Baseline Inventory Wetlands, RTE, etc.		
MDFW-1	<p>Task 3: Sensitive Plant Survey Page 2 – The ISR confirms that FirstLight completed initial river reconnaissance to identify potentially suitable habitat for state-listed plant species. Based upon ongoing correspondence with FirstLight representatives, it is also our understanding that FirstLight has completed presence/absence surveys for state-listed plants within all potentially suitable habitat. The Division looks forward to receiving this data, a summary report, and a schedule of any additional field work associated with this element of the study anticipated for the 2015 field season.</p> <p>The Division requests that the summary report also include maps of proposed transect locations, as discussed between Division staff and FirstLight representatives during our October 22, 2014 site visit, for review and confirmation to ensure that all parties are in agreement.</p>	A summary report of sensitive plant surveys conducted in 2014 will be provided to agencies in early 2015. The report will include maps of proposed transect locations, as discussed between Division staff and FirstLight representatives during our October 22, 2014 site visit, for review and confirmation. Additionally, the summary report will include a schedule of additional field work associated with proposed sensitive plant survey transects. Prior to initiating any 2015 surveys FirstLight will consult with NHESP for concurrence on the study elements.
MDFW-2	<p>Task 6a: Tiger Beetle Habitat Field Evaluation Page 4 – Based upon ongoing correspondence with FirstLight representatives, it is our understanding that FirstLight has completed initial site reconnaissance (to identify all potentially suitable habitat) and conducted tiger beetles surveys. The Division subsequently conducted a site visit with FirstLight representatives on November 3, 2014 to discuss selection of transects. The Division looks forward to receiving a summary report, which should include maps of potentially suitable habitat as well as proposed transect locations, as discussed with Division staff during our November 3, 2014 site visit, for review and confirmation to ensure that all parties are in agreement.</p>	A summary report on the tiger beetle habitat field evaluations will be provided to stakeholders in early 2015. The summary report will include maps of potentially suitable habitat and transect locations, as discussed with Division staff during our November 3, 2014 site visit.
3.6.1 Recreation User Survey		
AMC-1	The TRC official indicated that important questions requested by FERC concerning trails, river access, and satisfaction with the facilities were omitted in part or whole. For example until August 22, 2014, a question was omitted about the adequacy of river access points, which we consider very significant. In a study lasting from January to December, that is a significant omission.	During the development of the Recreation User Survey and the Northfield Mountain Trail User Survey, one user preference related question, and modifications to two other preference related questions were inadvertently omitted. Upon noting the omission, the survey instruments were immediately revised and the revised survey was used starting in August 2014. Even though there were omissions to the original survey questions, the omissions were not significant because the recreational user survey and the Northfield Mountain trail survey that were used from January 2014 to August 21, 2014 included open-ended questions that allowed respondents to comment on any Project recreational topics, such as trails, river access, hours of

Commenter	Comment	Response
		<p>operation, and recreational facilities.</p> <p>A preliminary review of surveys through June 2014 indicated that many respondents had taken advantage of the open-ended questions to address these issues. Finally, based on the number of survey responses that were obtained during the study season through June (>600) it is anticipated that hundreds of the revised surveys will have been collected during the period August through December. For all of these reasons, we do not agree that there was a significant omission, nor do we agree that the revised survey needs to be re-administered in 2015.</p>
AMC-2	<p>The study was done in a manner that could lead to incorrect results and conclusions. No effort was made to survey whitewater boaters at the put-in below the Turners Falls Dam on days when there was water in the bypass reach. This area gets considerable use—but this recreational use study could miss them entirely. Similarly, weather conditions determine the number of cross-country skiers using the Northfield Mountain Recreation Area, yet it is not clear how this was taken into account. And a website was consulted rather than speaking directly with rock climbing groups. Not until Sept. 19 was that corrected.</p>	<p>FERC’s Study Plan Determination Letter required the Licensee to distribute on-site surveys at sites listed in the recreation facilities inventory and assessment study plan (Study 3.6.2). The put-in area below Turners Falls Dam is not a formal recreation site and was not included in the FERC-approved 3.6.2 study plan. Whitewater boaters were counted and/or surveyed at other recreation sites along the bypass area, such as Station No. 1, Cabot Woods and Poplar Street. Therefore it is unnecessary to survey recreational users at the bypass put-in below Turners Falls Dam.</p> <p>Regarding weather conditions, recreational use counts and administration of recreational user surveys were conducted following a statistically sound, random sampling design, in accordance with the FERC-approved study plan. Surveys were administered throughout the winter months of Jan-March, 2014 and are also being administered in December, 2014. See response to AMC-7 for additional details regarding surveys of cross-country skiers.</p> <p>While surveys were not conducted at the three parking areas between August 25, 2014 and September 19, 2014, the Licensee continued to conduct spot counts at these sites during that period. Because the surveys were collected in the right areas to reach climbers, we do not agree that the study will lead to incorrect results or conclusions, or that there is a need to conduct any additional surveys of climbers.</p>
AMC-3	<p>A residential abutter survey was mailed out months late.</p>	<p>The residential abutter survey was sent out on July 29th, reminder postcards were sent in August, and a final follow-up letter was sent on September 4, 2014. The letter was sent to those individuals who had not sent in their response with the purpose of notifying them that surveys would continue to be collected. The FERC-approved study plan anticipated that approximately 25-40% of the targeted mail surveys would be completed and returned. The number of mail surveys returned to date is 94 out of 211. Thus, the survey resulted in a greater than anticipated return rate of 44%. The timing of the mailing did not affect the successful completion of this survey.</p>
AMC-4	<p>The study surveyed only formal access sites. The inventory of sites included some informal access sites to the river. The informal sites contain the kinds of activities that have been generally ignored by the FirstLight recreation facilities and include many more fishing, swimming, and boater access sites. If these informal access points were closed by the landowner—than what?</p>	<p>The FERC Study Plan determination letter approved FirstLight’s proposal to administer the on-site survey at Project recreation facilities and identified the recreation facilities listed in the study plan 3.6.2.</p>
AMC-5	<p>Because the questions required by FERC were significant and omitted, the questionnaires should be re-administered from January 1 to August 21, 2015, to make up for the missing data.</p>	<p>See response to AMC-1.</p>
AMC-7	<p>The study should continue to contact cross-country skiers throughout the 2014-2015 winter season to make sure their concerns are adequately represented. Cross-country skiing is one of the primary activities at Northfield Mountain.</p>	<p>A total of 58 contact surveys were collected at Northfield Mountain in the months of January, February, and March 2014 with the majority of these surveys (48) being collected in February. Additional surveys will be collected in December 2014. We expect that this number of surveys should be more than sufficient to evaluate winter skiing conditions and facilities, and therefore it is not necessary to extend the recreational user survey into 2015 at the Northfield Mountain facility</p>
AMC-8	<p>The survey of rock climbers should continue until Sept. 18, 2015, to make up for the variance in the study plan.</p>	<p>Climbers at the three parking lots that provide access to Project climbing areas will have been surveyed from January 2014 through December 2014, except for the brief period noted in response to AMC-2. The number of surveys anticipated to be collected from climbers as a result of surveys conducted at these access sites should be more than adequate to evaluate climber perceptions of Project facilities. Accordingly, the Licensee is not proposing to re-administer the recreational user survey at the rock climber access points in 2015.</p>
AMC-9	<p>The list of abutters should be expanded to include private clubs, such as those dedicated to fishing and boating that abut the Project. Second, the entire survey should be sent to this constituent group.</p>	<p>FirstLight provided the survey to residential abutters in accordance with the FERC Study Plan determination letter, which noted that the residential abutters to the Project would represent various recreation interests at a rate similar to the population in general, and that additional direct surveying of non-governmental groups was not necessary, but that stakeholder groups may distribute surveys to their own members. In accordance with the study plan, FirstLight will survey private clubs along the shoreline such as the Franklin County Boat Club, to determine use at their facilities.</p>

Commenter	Comment	Response
AMC-10	The full surveys should be administered during 2015 at informal user/access sites to increase the accuracy about public recreational use of the Connecticut River and surrounding lands and concerns about access if these private sites were closed to the public by the landowner. Rather than using random processes, the surveys should be administered on days when users are present. For example, it makes no sense to visit the whitewater put-in below the Turners Falls Dam when there is no spillage into the bypass reach. Nor does it make any sense to visit a swimming site on a cold, rainy day. These sites should be studied in a more focused manner.	See response to AMC-4 regarding surveys at informal access sites. The study was conducted utilizing random sampling as approved in the study plan.
CRWC-1	<p>As noted during the ISR meeting, the user contact surveys did not implement FERC-required changes until August of 2014. This missed a large part of the peak summer season, and most or all of the winter ski season. CRWC continues to be concerned about this omission, despite FirstLight assuring us that it will have no effect on study results.</p> <p>The residential abutter survey was mailed out on July 30, 2014, rather than in the spring as stated in the RSP. After CRWC received some communications from abutters that they either did not receive the letter or were given only a few days to fill out the form, CRWC requested a copy of the cover letter to the survey. The letter and survey were apparently sent by certified mail, meaning recipients needed to go to the post office to pick it up. The letter requested a response by August 11 2014, less than two weeks after the letter was sent out. Given August being a vacation month, and the added detail of needing to pick up the certified letter, it is likely that abutters did only have a few days to return the form.</p> <p>The final report for this study should show a diagram of where the pressure tube traffic counters were placed at each site. During a visit to the Poplar Street parking area in August 2014, I noticed that the pressure tube counter was located in a section of the parking lot that most people would never drive over; it was located very close to the river and the vast majority of parking would take place farther away from the river. If the pressure counter was never moved all season, it will need to be re-done in 2015.</p> <p>CRWC recommendations: User contact surveys should be re-done from January to August 2015 with the full set of FERC-required questions. The pressure tube counter should be re-done at the Poplar Street launch in 2015.</p>	<p>See response to AMC-1.</p> <p>See above response to AMC 3.</p> <p>A map showing the tube counter locations will be provided in the final report. While the tube counters provide helpful information, we are not relying solely on information from the counters to determine use at each recreation site. The spot counts and calibration counts give us an understanding of the use patterns at each recreation site, which is then reinforced by the tube counter information. Therefore continuation of the tube counter at Poplar Street will not provide any additional information that cannot be obtained through currently collected data.</p>
NPS-10	A TRC representative noted a number of issues in Study 3.6.1, Recreational Use/User Contact that warrant additional work. Information requested by FERC about trails, river access, and visitor satisfaction were omitted in part or whole. There was no question included until the revision of forms until late August about the adequacy of river access points. Whitewater boaters were not surveyed at the put-in below the Turners Falls Dam on days when there was water in the bypass reach. This is a high use area and the focus of Study 3.6.3.	See response to AMC-1
NPS-11	It is unclear how weather conditions were considered to determine the number of cross-country skiers using the Northfield Mountain Recreation Area. A single season for a weather dependent activity cannot provide adequate information absent conditions conducive to cross country skiing.	See response to AMC-7
NPS-12	Rock climbing groups were not contacted until Sept. 19, so a large portion of the season was not evaluated.	See response to AMC-8
NPS-13	The residential abutter survey was not mailed out until well into the summer, and the applicant has so far not availed itself of the offer of several NGOs to assist it by providing directed queries to their memberships, which in many cases would offer access to precisely those users who would have good information on uses and facility needs.	See response to AMC-3 and AMC-9.
3.6.2 Recreation Inventory		
AMC-1	In this filing, AMC expresses concerns on Study 3.6.2 conducted by FirstLight GDF Suez, and makes recommendations on how ongoing studies 3.6.1 and 3.6.4 can have a more successful conclusion. AMC requests that portions of the Study 3.6.2 be redone or extended in time because of variances from the original study plan. Specifically, the recreational facilities should be inventoried with other than a 'business as usual' baseline context. For example, the inventory should define both the types of recreation that are suited to the facility and the types that are currently excluded due to facility or other constraints. Put-ins and take-outs for flatwater and whitewater recreation should be inventoried from the Vernon Dam to the Sunderland Bridge, in order to make this study consistent with Study 3.6.4.	<p>For Study 3.6.1, see above response to AMC-1.</p> <p>The intent of the baseline inventory was to record the general condition of existing recreational facilities at the Projects. . The FERC study plan determination letter recognized that the purpose of this study was not to inventory all recreational facilities along the Connecticut River, and FERC did not recommend additional facilities to be inventoried. In contrast, Study 3.6.1 is designed to evaluate recreation use and user's perceptions about the adequacy of recreation sites and facilities will be used to provide further information about a user's recreational experience and whether the facilities are currently meeting recreation needs at the Project.</p>

Commenter	Comment	Response
AMC-2	The process of inventorying the sites in the study is flawed because it does not accurately describe the nature or limitations of the facilities. For example, the concrete boat ramp at the state-owned Barton Cove site is designed to launch and retrieve watercraft from trailers. That's a limited use. Car top boaters, motor or non-motorized, who currently use that facility have to drag their craft over the concrete, which can damage hulls, or they are forced to go elsewhere to access the river. The study needs to contain information on what potential recreation groups are not well served by such a facility, and if a potential enhancement opportunity exists. Otherwise First Light's study is like reporting on activity at a bird feeder that only serves millet. Providing suet or sunflower seeds would attract a more diverse set of birds and the same for many of the recreation sites inventoried in this study. Information is needed on how these facilities can reasonably provide the greatest recreational opportunities to the greatest number of user groups and people, not a static status quo equals perfection perspective. Otherwise this study exercise and conclusion by FirstLight GDF Suez that project facilities are in good condition and functioning well is a self-fulfilling prophecy that is without merit.	See above response to AMC-1.
AMC-3	This study also fails to inventory all of the sites included in other FirstLight studies. For example, the Poplar Street access point in Turners Falls (a.k.a. Montague City) is the furthest downriver site in this study, but in Study 3.6.4 sites are listed downstream to the Sunderland Bridge. Those downriver sites, especially the informal access sites, should be included in this inventory. The informal access sites are at greatest risk and the analysis should set the stage as to what might be done to resolve those risks, either on-site or at a different location as a Project mitigation or enhancement feature.	See above response to AMC-1.
AMC-4	Site 11 - Boat Tour and Riverview Picnic Area, is an example of the limited functionality of the recreation facilities provided by FirstLight. The only "boating" provided at this large site across the road from the Northfield Mountain Recreation Area is access to the commercial riverboat. It costs money to ride on the riverboat. If one wants to launch any kind of private boat into the Connecticut River at this prime location, no facilities are provided. Boat trailers cannot reach the river. One could carry a canoe or kayak, but functionally it is a long way from the parking area and would be difficult and inconvenient. If one did that, the launching area in its current state is inadequate. This site was rated as in "good overall condition and functioning as intended at the time of the site visit." This ignores the fact the site is only functioning for a narrow commercial recreational activity, though broader public access facilities could be beneficial. Yet, the evaluation sheet provided for this facility in Appendix A indicates no need for expansion or improvement. We disagree.	See above response to AMC-1.
AMC-5	Site 12 – The Northfield Mountain Visitor Center inventory does not include access/facilities at the rock climbing areas.	Once on the Licensee's property, climbers access the climbing areas over the existing Northfield Mountain trail system. A trail assessment for Northfield Mountain is being conducted under Study Plan 3.6.7. The Licensee does not provide or promote any climbing routes or specific facilities, other than the trails for access, on their property for this activity. Parking areas and trailheads outside the Project, and therefore non-Project facilities, were not inventoried as part of Study 3.6.2. However, user counts were conducted and user surveys were administered at these sites in order to estimate level of climbing activity and climber perceptions.
AMC-6	Sites 16 and 17 - The Barton Cove inventory fails to properly evaluate what individuals/user groups are excluded or discouraged from using the facilities. Lacking is an evaluation of the kinds of boats that can be served or access times, e.g. hours of usage or the Memorial Day to Labor Day timeframe. Yet on the field evaluation sheet for Site 16 in Appendix A, it was noted as "carry in," that no dock existed and it was not ADA accessible.	See above response to AMC-1. Site 16 indicates that canoes and kayaks can be launched at the site and the facility is open from Memorial Day Weekend to Labor Day Weekend from 9:00 am to 6:00 pm on weekends and 9:00 am to 5:00 pm Monday through Friday. Site 17 indicates that it is a hard surface launch which is open 4:00 am to 10:00 pm typically between the months of April through October.
AMC-7	No phone number for transportation around the Turners Falls Dam was listed. The assessment sheet did not list the presence of a telephone at the site.	The phone number is listed on sign kiosks at Poplar St., Barton Cove Day Use parking lot, Riverview Picnic Area, Munn's Ferry Campground, and the Barton Cove Canoe Rental office at the water front. Individuals may call from the canoe and kayak rental office when they are open.
AMC-8	Several upstream informal recreation sites for swimming and boat launching were identified earlier in the study, which is testimony to the lack of adequate recreation provided by the licensee. Similar sites down to the Sunderland Bridge should also be inventoried, in the same fashion as in Study 3.6.4.	See response to AMC-1.
AMC-9	The study did not evaluate the area where whitewater boaters launch to surf waves below the Turners Falls Dam and to run the bypass reach. This is the section of river evaluated in Study No. 3.6.3, Whitewater Boating Evaluation. The informal put-in used by virtually all whitewater boaters immediately below the Turners Falls Dam was not included in this inventory. It is entirely within Project boundaries and within the geographical scope of this study. This is a serious omission and should be inventoried as an informal site.	This site was assessed as part of 3.6.4.

Commenter	Comment	Response
AMC-10	<p>Site 23 – The Cabot Woods Fishing Access fails to evaluate the serious difficulties in getting down to Rock Dam for fishing, swimming, or boating. At one time, FirstLight built stairs to access Rock Dam—some footings still exist—but the Applicant has verbally indicated that they were vandalized and removed. (The inventory report in Appendix A noted “old staircase access” in this area.). No useful access alternatives to date have been provided since the stairway was removed. Whitewater boaters who want to portage a kayak or canoe to play at Rock Dam would have an extremely difficult time. This major omission should be part of the site inventory. The inventory in Appendix A listed a “flat gentle slope to H2O” in the evaluation (with “steep to water and trails” scribbled in the margin), but it is unclear where that flat, gentle slope might be. Getting down to the bypass reach is extremely steep as exemplified during an evaluation of this area -- FirstLight provided walking sticks to participants because of the difficulty in getting down to the water. (See following photo taken at the Rock Dam sandy beach during that site-visit with participants holding a walking stick.)</p>	<p>See response to AMC-1. The evaluation of flat gentle slope to water is along the roadway to the canal and by the upper parking lot. Swimming is expressly prohibited at Rock Dam due to changes in volume and flow which makes this area unsafe for swimmers.</p> <p>In reference to AMC’s comment regarding the walking sticks, a tailgate safety briefing was held in the Conte Lab parking lot with stakeholders prior to conducting a site walk of the entire bypass reach as part of the IFIM study. Walking sticks were provided for the purpose of walking the bypass reach; not for ascending river banks.</p>
AMC-11	<p>The site inventory in Appendix A lists “launching boats” as one function. It does not specify what kind of boats. In the field assessment, only portable toilets were listed as potential enhancements. AMC notes the sandy area in the eddy below Rock Dam could be an excellent launch site for canoes and kayaks, but proper access facilities are necessary to get there. Rock Dam is one of the most popular sites in this reach of the river. Tremendous opportunities for recreational enhancements exist and should be evaluated in this inventory.</p>	<p>Boat launching is not a noted activity at this site. Swimming is not allowed at Rock Dam due to unsafe conditions. See response to AMC-1.</p>
AMC-12	<p>Site 24 - The Turners Falls “Canoe Portage” inventory assessment is misleading. In standard English usage among boaters, a “portage” means a trail where one can individually carry a canoe or kayak around an obstacle in the river such as a waterfall or a dam. A portage is human powered, as is canoeing itself. On none of the other Connecticut River dams up for relicensing do motor vehicles substitute for human-powered portaging (even though some of TransCanada’s portage trails are severely deficient).</p> <p>The lack of an adequate portage at the Turners Falls Dam is often cited by paddlers as one of the major impediments to multiple-day trips on the Connecticut River. Paddlers typically designate the Turners Falls Dam as the end of the trip because a reasonable and functional portage trail does not exist. There is no designated portage trail around the Turners Falls Dam, yet the assessment concludes the current arrangement is a “portage.” This is analogous to designating a “trap and truck” operation as natural upstream migration for fish. If a paddler has a phone, and if he or she knows the number to call, and if anyone answers, and if a suitable vehicle is sent that won’t damage your canoe, then FirstLight sometimes provides motorized transportation around the dam. The site evaluation sheet for Barton Cove does not convey that a telephone exists at the site, nor does it mention the hours of operation for the truck. The logic in qualifying this site as having an adequate portage rating is unsupported.</p>	<p>Site 24 is the site that has been consistently utilized as the put-in for the canoe portage and therefore was the site that was inventoried as part of the FERC-approved study. Two objectives of Study 3.6.4 are to determine if alternate walkable canoe portages are feasible and the need for and possible locations for future carry-in boat facilities</p> <p>The portage phone number, which is provided on the signs reaches the Northfield Control Room which is staffed 24 hours a day, 7 days a week. Though not the official portage for the Project, individuals can also take-out at Unity Park and utilize the bike path to reach the Poplar Street put-in.</p>
AMC-13	<p>When studies were being proposed, the put-in for boaters being trucked around the Turners Falls Dam was listed as the confluence with the Deerfield River. This is a very steep, problematic site, with private land issues, erosion, and mud. The site being evaluated in #24 was switched to the Poplar Street site in Montague City, which was used as a take-out during the controlled flow whitewater study. No condition rating is listed for the put-in at Poplar Street. It was described as “very steep” and “unimproved.” It is sufficiently steep and difficult as a take-out that during the whitewater study FirstLight set up a mechanical winch and cable to haul boats up the slope to the parking lot, and FirstLight placed tarps on the ground to allow boats to slide over the rocks and roots. (See photo following of the lower pitch of the dirt trail from the parking area to the river at the Poplar Street site.) The inventory site visit form in Appendix A concludes there is a need for improvements to provide “stairs, canoe slide, portable toilet.”</p>	<p>See Response to AMC-12.</p>
AMC-14	<p>The current description of this dam having adequate portage facilities is erroneous and misleading as it is currently non-functional for the most part. If one were to use human power to portage around the Turners Falls Dam, the trip would be about a 4 1/2 mile carry down Route 2, a heavily-used state highway, across the Turners Falls Bridge, and down the main street of Turners Falls. ADA obstacles were noted in almost all of the site evaluations mentioned above, and the Poplar Street site was given a No for ADA compliance in the assessment sheet in Appendix A.</p>	<p>See response to AMC-12.</p>
CRWC-1	<p>This is a completed study. Though the RSP stated, “the bulk of this study was conducted in the summer of 2012,” that was not the case. With the exception of three sites, all sites were inventoried in the off- season by the same 2-person team during October 15-17, 2011, well before the relicensing studies had been drafted or approved. On October 16, 2011, 12 sites were inventoried. Given the length of daylight in the middle of October and drive time between sites ranging from the Vernon Dam to Unity Park in Turners Falls, it appears the team spent less than an hour at each site. One site was entirely left out, the fishway viewing area. The work done was incomplete and it was done when the surveyors would not have seen peak use.</p>	<p>See response to AMC-1</p>

Commenter	Comment	Response
CRWC-2	Site 11: Boat Tour and Riverview Picnic Area. The condition of the bathrooms was not given. They were probably locked at the time of the survey.	Although the study was conducted in the off season, FirstLight staff accompanied the team to this location and unlocked the bathrooms for the inventory. The bathrooms were observed to be in good, functioning condition, with no issues noted.
CRWC-3	Site 14: Cabot Camp Access Area. A building at the site is mentioned as being not open to the public. What is this building currently used for, and what was it used for in the past?	The building is currently unused. In the past it was a summer home and more recently it was utilized for company events.
CRWC-4	Site 15: Barton Cove Nature Area and Campground. The survey was done when the facility was closed. No information is filled in the field sheet for this site under "site facilities" – no mention of showers or the condition they were in, no mention of grills, picnic tables, or parking areas, or the condition of them.	See response to CRWC-2. Showers were recorded on the Barton Cove Nature Area Inventory form, as well as some of the grills and picnic tables. Site facilities at the campground were recorded on the map along with the inventory form. There were no issues at the time of the inventory with the condition of these items.
CRWC-5	Site 16: Barton Cove Canoe and Kayak Rental Area. The survey was done when the facility was closed The section of the report with the field forms attaches the Barton Cove Campground and Canoe/Kayak Rental Rates for 2011. This form is 3 years out of date. The company no longer provides the \$30 upriver shuttle, so it should not be assumed that this service is still in place. What other details are out of date? There is no mention that this site is the take-out location for portage around the dam. Is there signage indicating this? Is there a phone number provided, a phone provided, or information about how to get portage transport at this site?	See response to AMC-7 and CRWC-2. The original survey for this site was conducted in 2011 which was included as part of Appendix A. The appended rate sheet was the current sheet at the time of the inventory. The information included in the report is accurate and does not discuss an upstream shuttle. Information regarding the portage is included in Site 24.
CRWC-6	Site 17: (Barton Cove) State Boat Launch. No information is provided about the season that the dock is installed at the site. There is no information about the sign/kiosk at the site. The form for this site was filled out on October 16, 2011, well past peak use time. Even though the text in Section 5 states that there is a portable toilet that is seasonal, the form said that sanitation facilities were, "maybe portable – pulled already." Predictably, there was no evidence of overcrowding, even though I have heard stories of vehicles being parked out on Route 2 and getting tickets. Barton Cove is used quite heavily for ice fishing in the winter. How do people get their fishing shacks out on the ice? Is the gate opened in the winter, or is the area accessed somewhere else?	See response to AMC-1 regarding overcrowding. The dock is available during the summer. The sign at the site was reviewed and photographed during the inventory as were signs at other sites. A portable toilet was verified at the site after the initial site visit. Evidence of overcrowding was not evidenced by compaction, erosion or other typical indicators at the time of the site visit. Barton Cove is accessed via the Barton Cove Nature Area during the winter for ice fishing. The gate at the State Boat Launch is not open in the winter.
CRWC-7	Site 23: Cabot Woods Fishing Access. The site description states, "The access road along the canal is open to the public and is used for sightseeing." Note: this access road is used for fitness walking, dog walking, roller blading, bird watching, and bankside fishing in the canal. The field sheet indicates a flat gentle slope to the water. That may be true for the water in the canal, but not for the water in the bypass channel. The trails down to the water in the bypass channel are eroded and not maintained. The bypass channel is frequently used for informal swimming, something that would not have been determined during the October 17, 2011 site visit to fill out the form.	See response to AMC 10
CRWC-8	Site 24: Turners Falls Canoe Portage. This site assessment would be better broken into site 16 for the take-out and site 24, which is the Poplar Street boat launch. The Poplar Street boat launch is also used as a put-in for paddling between Turners Falls and the Sunderland Bridge, the only section of river with speed limits for motor boats and a ban on personal watercraft. The field sheet says it has 4 spaces, but it has more than 4. Because parking spaces are not marked, it appears the person completing the survey may have misinterpreted the location and configuration of parking. The site condition sections says, "The portage trail at the put-in site is currently functional, but as there have been no improvements to the put-in, no condition assessment was made of this area." This statement is astounding. Why would no condition assessment be made if there have been no improvements? This put-in is steep, eroded, and in poor condition. The field form indicates severe compaction, moderate erosion. There would also likely be no evidence of overcrowding when the survey was completed on October 17, 2011.	There were no improvements to assess the condition of the Poplar Street Site at the time of the site visit. Evidence of overcrowding at this site would have included compaction, erosion, refuse or other typical indicators in the parking area at the time of the visit. The erosion and compaction noted at the site were attributed to users traveling down the embankment and not to overuse. There was no other evidence of overuse. See response to AMC-1.
CRWC-9	CRWC requests that more up to date information be collected during times of peak usage, that a survey be completed of the fishway viewing area, and that more thoughtful "assessment" of the sites take place.	See response to AMC-1.
NE FLOW-1	Anecdotal accounts from boaters and the whitewater boating study participants demonstrate that the 2.7-mile long natural river reach below the Turners Falls Dam is a recreational resource for whitewater boaters of varying abilities and craft. Whitewater boaters access this reach of river at informal access locations. Unfortunately, the Initial Study Report fails to include any assessment whatsoever of the adequacy of these facilities for use by whitewater boaters. The Licensee's hydropower operations leave this section of the river largely dewatered, and as a result, the frequency in which whitewater boaters use informal facilities are limited. The fact that the principal limitation on the use of these facilities is the Licensee operations cannot serve as a basis for excluding these facilities from its assessment. Given that there is an expectation that the usage of these facilities will increase following relicensing, the Licensee should be required to include them in its study plan. Accordingly, AW and FLOW request that FirstLight revise this study to include an inventory and assessment of the facilities used by whitewater boaters when accessing the 2.7-mile natural river reach below the Turners Falls dam to identify: 1)	The purpose of this study was to assess the condition of the sites identified in the FERC-approved study plan. The purpose of study 3.6.3 was to evaluate the bypassed river reach as a potential recreational resource for whitewater boaters. As part of that study, participants were asked about their perceptions about the potential resource, including flows and access. The results of study 3.6.3 will provide the information necessary to evaluate the potential for whitewater boating, and the facilities/access needed to support potential future boating use. The access site near site 20 was evaluated during study 3.6.4 as there are no existing facilities at this site. Access at Rock dam

Commenter	Comment	Response
	<p>access near Site 20 where whitewater boaters put-in during the on-water portion of the Whitewater Boating Study; 2) access to Rock Dam near Site 23 and at other potential park-and-play locations; and, 3) Poplar Street whitewater boating take-out used during the on-water whitewater boating study. In preparing this revision to Initial Study Report 3.6.2, the Licensee should utilize information obtained from questionnaires completed by participants in the on-water portion of the Whitewater Boating Study along with comments received from boaters obtained either informally or during post-run debriefing sessions. We request that the Licensee include an assessment of whether each of these locations provide safe, adequate and convenient access to the natural river reach, along with an assessment of the adequacy of parking, sanitation or other amenities.</p> <p>An assessment of each of these access points would reveal significant concerns. Several of these locations lack adequate parking, lack appropriate sanitary facilities, and involve steep or difficult put-ins or take-out access that would discourage use. Providing this information will assist FERC in completing its Environmental Assessment/EIS for the project and preparing appropriate License conditions.</p>	<p>was included as part of the assessment of Site 23: Cabot Woods Fishing Access. Poplar Street was assessed as part of Site 24. The results from Study 3.6.4 will address boating access along this stretch of the river.</p>
NPS-1	<p>The Executive Summary of Study 3.6.2 concludes that “Most of the facilities at these sites were given a condition rating of 4” [4 being the highest rating], “indicating that most facilities are in excellent condition, and function as intended.” However, the inventory did not identify limitations of the various facilities or their intended purposes. At Barton Cove for example, the ramp is concrete and while well suited for trailered boat access, but it presents problems for other users such as car top and non-motorized users who have to drag their boats over the concrete or else carry them which is often not feasible. The study should evaluate the needs of other potential users as well as how the limited facility affects their use or in many cases, might actually discourage their use at this location. What could be done to improve the facility for a broader range of users? The conclusion that the facility is adequate and functions well simply does not take into account other potential users. This type of analysis has been repeated at other locations as discussed below.</p>	<p>See response to AMC-1.</p>
NPS-2	<p>The NPS echoes the comments filed by the Appalachian Mountain Club regarding Study 3.6.2 and supports their recommendations for completing studies 3.6.4 and 3.6.1. There is simply not enough information to properly evaluate recreational needs associated with the project given the conduct and status of the current studies.</p>	<p>The Licensee expects that the completion of the applicable FERC approved Recreation Study Plans will provide the information to evaluate recreation needs at the Projects.</p>
NPS-3	<p>While Study 3.6.4 lists sites downstream to the Sunderland Bridge, Study 3.6.2 only goes as far as the Poplar Street access known as Montague City near Turners Falls. The informal access sites below that location need to be included in this inventory, both for swimming, fishing and boating access, not just the formal access sites. The informal access sites are at risk as many are essentially at will by the current owners. How will access be provided if some or all those were to be discontinued?</p>	<p>See response to AMC-1.</p>
NPS-4	<p>Site 11 known as the Boat Tour and Riverview Picnic Area, is located across from the Northfield Mountain Recreation Area. No convenient facilities for free public use are provided at this location, only access to commercially operated riverboat cruises. Trailers can’t access the river and in order to launch a kayak or canoe, a user would have to negotiate a long walk from the parking area and the actual launch site is not well suited for these uses. However, the site was rated in the study as being in “good overall condition and functioning as intended at the time of the site visit,” yet its only real function is for commercial use. There is little doubt that if the facility were improved to accommodate public launch facilities, it would see considerable use. The evaluation sheet in Appendix A does states that there is no need for expansion or improvement. That may be the case from the limited perspective of the commercial operator, but for the public at large, their needs are not being served or considered.</p>	<p>See response to AMC-1.</p>
NPS-5	<p>Sites 16 and 17 at The Barton Cove fail to evaluate types of user groups that are either excluded or discouraged from using the facilities as noted above relative to any users other than those with trailered boats. The study does not evaluate other types of boats that could be used were the facility improved to accommodate a full range of users. While there is a commercial rental outfitter at Barton Cove, there is no option for free public use. Therefore, between Barton Cove and the Boat Tour and Riverview Picnic Area, there is an almost complete lack of free public use for non-motorized users. For a river this size with several large population centers nearby, this constitutes a surprisingly limited amount of real public access.</p>	<p>See response to AMC-6.</p>
NPS-6	<p>Site 23 known as the Cabot Woods Fishing Access does not include the fact that at present it is virtually impossible to safely access this location. Stairs down to the Rock Dam were built at one time, but have long since been vandalized and removed. Although this area is potentially popular for whitewater boating, no option or alternative has been identified. Access proved difficult during the evaluation where FirstLight gave participants walking sticks due to the challenges posed by getting to the river. While there is a sandy eddy location which would be an excellent location for launching boats, getting to it is problematic. The inventory should identify the problems associated with this “access” and identify measures that could be</p>	<p>See response to AMC-10.</p>

Commenter	Comment	Response
	taken to allow safe and reasonable access. Simply stating that stairs were vandalized is not a justification for effectively eliminating this resource.	
NPS-7	Site 24 is identified as the Turners Falls Canoe Portage; however, it does not adequately function as one. In order to actually portage (without use of a vehicle), a paddler needs to traverse a 4 plus mile carry down Route 2, cross the Turners Falls Bridge, and continue down the main street of Turners Falls. This situation is often cited by paddlers as one of the major impediments to multiple-day trips on the Connecticut River. The Turners Falls Dam is normally identified as the end of the trip due to the lack of an actual portage trail. However, the assessment indicates that the area functions as a portage.	See response to AMC-12.
NPS-8	In order to accurately be characterized and used as a portage, FirstLight must enhance/provide a realistic system where a paddler can arrange for a suitable vehicle. Through paddlers will need to make arrangements in advance which although somewhat limiting, would provide a potential solution. It should be noted that the evaluation sheet for Barton Cove did not state if such a telephone option exists at that site to traverse around the Turners Falls Dam. During the study proposals, the confluence with the Deerfield River was identified as a put-in location. However, that site is steep, erodes easily and is not controlled by the applicant. In fact, during the controlled whitewater study, the Poplar Street site was used as a take-out. That site was challenging as FirstLight had to set up a mechanical winch and cable to haul boats up to the parking lot. Tarps were placed on the ground to facilitate hauling over roots and rocks. Needed improvements include stairs, a canoe slide and a portable toilet." Even as such, that location would not be considered feasible for ADA compliant access.	See responses to AMC-12.
NPS-9	As part of Study 3.6.3, the Whitewater Boating Evaluation utilized a put in area where whitewater boaters launch to surf waves below the Turners Falls Dam and run the bypass reach. The informal put-in used by the boaters immediately below the Turners Falls Dam was not included in this inventory under 3.6.2 although it is within project boundaries and should be listed as an informal site with potential for improvements.	See response to AMC-9.
3.6.4 Overnight Camping		
AMC-1	This study appropriately spans the river reach from the Vernon Dam down to the Sunderland Bridge. So should Study 3.6.1.	In accordance with FERC's Study Plan Determination Letter, the downstream terminus of the study area for Study 3.6.1 is the Poplar Street access site in Montague City.
AMC-2	This study should query user groups on the adequacy of portage trails as one of its areas of assessment, rather than claiming that a functional "portage" exists, as was done in 3.6.1.	The FERC-approved study plan for Study 3.6.4 states the Licensee will determine the feasibility of an alternate "walkable" portage trail through the review of existing literature and through field assessments. Pursuant to the FERC SPDL, interested stakeholders were consulted on the literature research and invited to participate in the field assessment in August 2014. This input, combined with information on portage trails collected as part of 3.6.2 should provide sufficient information to evaluate portage trail adequacy, need and alternatives.
3.7.3 TCP		
CRWC-1	CRWC hopes that FERC and FirstLight can broker a conversation with the tribes to allow for adequate consultation. The study due date can be extended beyond the first quarter of 2015 to accommodate consultation.	As detailed in the ISR, the Licensee has made numerous attempts to engage the Narragansett Indian Tribe and the Nolumbeka Project with respect to the TCP and has reached out to FERC with respect to consultation.