December 14, 2015

VIA ELECTRONIC FILING

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

Re: FirstLight Hydro Generating Company, Turners Falls Hydroelectric Project (FERC No. 1889) and Northfield Mountain Pumped Storage Project (FERC No. 2485).
Response to Stakeholder Requests for Study Modifications and/or New Studies Based on the Updated Study Report and Meeting Summary

Dear Secretary Bose:

Pursuant to the regulations of the Federal Energy Regulatory Commission (Commission or FERC), Title 18 Code of Federal Regulations (18 C.F.R.) §5.15(f), FirstLight Hydro Generating Company (FirstLight) encloses for filing this response to comments on FirstLight's Updated Study Report (USR) and USR 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 September 14, 2015, FirstLight filed its USR with the FERC as required by § 5.15(f) of the FERC regulations. As part of the USR filing, the following reports (Table 1) were filed with the meeting summary:

Table 1: Reports filed with USR on September 14, 2015

Study No.	Name
3.2.2	Hydraulic Study of Turners Falls Impoundment, Bypass Reach and below Cabot
3.3.4	Evaluate Upstream Passage of American Eel at the Turners Falls (Year 1- 2014- report)
3.3.10	Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River (Interim Report)
3.3.14	Aquatic Habitat Mapping of Turners Falls Impoundment
3.3.17	Assess the Impacts of Project Operations of the Turners Falls Project and Northfield Mountain Project on Tributary and Backwater Area Access and Habitat
3.3.18	Impacts of the Turners Falls Canal Drawdown on Fish Migration and Aquatic Organisms
3.4.2	Effects of Northfield Mountain Project-related Land Management Practices and Recreation Use on Terrestrial Habitats
3.6.3	Whitewater Boating Evaluation
3.6.4	Assessment of Day Use and Overnight Facilities Associated with Non-Motorized Boats
3.6.7	Recreation Study at Northfield Mountain, including Assessment of Sufficiency of Trails for Shared Use
3.7.3	Traditional Cultural Properties Study

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In addition to the above reports, FirstLight filed four other study reports in 2014 (Table 2).

Table 2: Reports filed with ISR (and on 12/31/2014)

Study No.	Name	Addendum
3.1.1	2013 Full River Reconnaissance	FERC required addendum filed on 2/24/15.
3.6.2	Recreation Facilities Inventory and Assessment	FERC required addendum filed on 6/15/15.
3.7.1	Phase 1A, 1B and II Archaeological Surveys (Phase 1A only)	Massachusetts Historic Preservation Commission required revision filed on May 15, 2015
3.7.2	Survey and National Register Evaluation of Historic Architectural Resources	Massachusetts required addendum filed on November 16, 2015

The USR meetings were held on September 29-30, 2015, and FirstLight subsequently filed its meeting summary on October 14, 2015. Stakeholder comments on the meeting summary were due by November 13, 2015. Response to comments are due within 30 days of November 13, 2015; however, because this falls on December 13, 2015 (a Sunday), the due date defaults to December 14, 2015. Comments were received from the following:

- United States Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- National Park Service (NPS)
- Appalachian Mountain Club (AMC)
- Connecticut River Streambank Erosion Committee (CRSEC)
- New England Flow (NE FLOW), American Whitewater (AW), AMC, Crab Apple Whitewater and Zoar Outdoor- Joint comments on whitewater boating study
- Connecticut River Watershed Council (CRWC) and AMC- Joint comments on completed recreation studies
- CRWC
- The Nature Conservancy (TNC)
- Karl Meyer

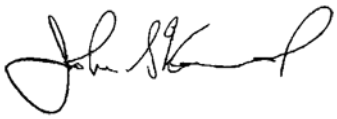
Many of the comments received do not specifically request modifications to approved studies or request new studies. For example, some commenters requested further discussion of study results and conclusions; made recommendations for protection, mitigation, and enhancement measures; addressed ongoing and future consultation; and/or requested information or raw data that was subsequently provided by FirstLight. The focus of FirstLight's response summary (attached) is on those comments and requests that would require FERC to make a determination on whether a study modification or new study is justified in accordance with FERC's study plan criteria for modified and new studies.

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/Documents2015.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

Attached: Response Summary

Commenter	Comment	Responses
Study No. 3.1.2 Northfield Mountain/Turners Falls Operations Impact on Existing Erosion and Potential Bank Instability		
NMFS-1	FirstLight mentions in its PAD that it will explore the possibility of increased energy production through the use of a higher water surface elevation in the upper Northfield Mountain reservoir. FirstLight filed a temporary amendment that would allow an increase in the upper reservoir (currently 1000.5 ft raising it to 1004.5 ft) from December 2014 through March 2015. Currently, FirstLight has applied for another temporary amendment that would expire in 2018. In both of these amendment applications, FirstLight states several reasons supporting the need to allow this flexibility in their operations. Should either the draft or final license application include an operational change from existing operations, the Commission should order FirstLight to modify this study and explore the degree to which future operations under the increased water surface elevation would impact bank erosion rates which in turn affects habitat and water quality for migrating diadromous species. Given the data that have been collected, and the model runs from Relicensing Study 3.8.1, a flow file should be generated that presents water surface elevations over time that simulate river conditions when Northfield Mountain is operating under more flexible conditions.	In its Draft License Application, FL is proposing to use the full Upper Reservoir storage capacity (proposed 1004.5 to 920 ft) year round. FL agrees that the operations model (HECResSim) will be used to simulate how greater use of the Upper Reservoir storage may change water level operations in the Turners Falls Impoundment (TFI). A baseline model will be developed to reflect the current FERC-licensed Upper Reservoir operating range and a model will be conducted whereby the Upper Reservoir storage capacity is expanded. The flows from these two simulations will then be evaluated in the hydraulic model to predict water surface elevation changes at different locations in the TFI. FL agrees that additional analysis is needed to evaluate water level fluctuations in the TFI if additional Upper Reservoir storage capacity is used, although this analysis has not been completed. FL proposes to model this directly in the hydraulic model developed for the TFI as part of Study No. 3.2.2. More specifically, the Northfield Mountain pump/gen schedule currently used in the hydraulic model will be revised to reflect a new schedule based on additional Upper Reservoir storage capacity. From this analysis, a comparison of water elevations at various locations in the TFI under baseline conditions (existing Upper Reservoir storage capacity) and under conditions with the additional Upper Reservoir storage capacity can be evaluated.
CRSEC-1	FirstLight made no mention of the SPDL task regarding operational changes. CRSEC Requests that FirstLight be directed to describe the methodology for this analysis, conduct the analysis, and identify how it will use the information.	FL is aware of FERC's SPDL recommendation to "include an analysis of operational changes through the period 1999 to 2013 to identify any correlation between operational changes and observed erosion rates." FL will be incorporating this analysis into Task 5 – Data Analyses and Task 6 – Evaluation of the Causes of Erosion. A complete discussion of the methodology used for this effort, the findings of the analyses, and how the findings will be used in the larger study will be included in the final report.
CRSEC-2	Submit a list of the historical information to be evaluated, including property maps, aerial photographs, and other maps and information that can be compared to assess river channel movement and erosion over time.	The full list of datasets used for this task will be presented in the final report for Study No. 3.1.2.
CRSEC-3	Use the approach discussed in Northrup, Devine & Tarbell 1991 Connecticut River Riverbank Management Master Plan to measure erosion (bank position) over time.	FL has not proposed, nor has FERC required FL, to conduct a quantitative analysis to measure the amount of erosion or changes in bank position over time. The approved study plan involves historic comparisons that are qualitative in nature, to provide context for the overall study. The FERC SPDL states that FL should "perform its historic geomorphic assessment using available mapping…to analyze trends in bank position within the Turners Falls Impoundment." The SPDL recommends using the 1970 vintage survey as a base map to conduct this qualitative assessment. As stated in previous filings, FL reviewed the map and found that a comparison using the 1970 vintage survey was not possible, because there are no bank or edge of water lines observed on the 1970 survey. FL is instead using the various aerial imagery datasets which are available over a range of years (from prior to Northfield Mountain Project construction through today) to conduct this qualitative analysis. Analysis of these aerial imagery datasets is much more effective in analyzing trends over time. FL believes the proposed approach is consistent with the objectives of the RSP and of the FERC SPDL. At this time FL has no plans to adopt the Northrup, Divine, and Tarbell (NDT) approach to conduct a quantitative analysis as requested by the CRSEC. The NDT Master Plan shows that the "measured" changes in the riverbank based on aerial photographs were approximately the same order of magnitude as the "accuracy" of the photos due to a variety of issues, such as distortion and tilt. Unless actual changes are significantly larger than the accuracy limits of the photos, quantitative analysis of historic aerial photos is not useful, as FERC pointed out in the SPDL. FL is, however, conducting some very useful qualitative analysis based on the photos.
CRSEC-4	FirstLight has data for the 22 permanent transects that go back to 1990, not 1999 as indicated in its January 22, 2013 filing with FERC. This dataset represents 25 years of bank position at these location (including surveys done through 2015). In our January 9, 2015 filing with FERC, CRSEC requested that FirstLight provide transect data in a useful format with just the left and right bank shown in cross-section at a scale that makes evaluating trends in bank position over time actually possible. To date, this information has not been provided.	Not all permanent transects were surveyed annually starting in 1990 as the CRSEC states. While some survey data does exist at select transects from 1990-1999, consistent annual surveys did not occur until 1999. All available survey data will be reviewed as part of this study. However, special emphasis will be placed on the surveys conducted from 2000-2014 as this is the period of time modeled in BSTEM. Available survey data used as part of this study will be presented in the final report for Study No. 3.1.2. All survey data included with the final report will show the left and right bank at a useable scale as requested by the Stakeholders.
CRSEC-5	We note that the data for the 22 permanent transects include the water surface elevation at the time the survey was conducted. This information can be used along with more recent aerial photographs (1990-2015) and other available data sets to evaluate trends in bank position for larger sections of the riverbank over the last 25 years.	Water surface elevations will be included on the cross-sections for each transect in the final report if they were collected in field at the time of the survey (this may not have been consistently done over the period of record). This information may be of limited use due to the fact that the surveys may take several hours per location during which time the water level may vary.
CRSEC-6	LIDAR mapping from April 26-28, 2013 (leaf-off) is available from TransCanada, and FirstLight has already obtained it and used it for Study 3.2.2. This data should be used for Task 2 of the causation study.	The LiDAR dataset collected by TransCanada is one of many datasets used by FL as part of Task 2.

Commenter	Comment	Responses
CRSEC-7	Review of the methods involved in the Massachusetts Shoreline Change Project. Though this is a study of coastal erosion, it nevertheless involves overlaying aerial photos as well as LIDAR images over time and incorporating actual transects, all amidst a water level that changes on a sub-daily basis, just like the Connecticut River in the Turners Falls pool. This methodology could be reviewed by FirstLight for consideration in this study requirement.	To the extent that it may help in the qualitative analysis of trends over time to provide context for the larger study, FL will review the methodology involved in the Massachusetts Shoreline Change Project for consideration in this study requirement. Notably, there are no actual transects surveyed on the ground as part of the Shoreline Change Project; they are simply lines drawn on maps or photographs. As with the NDT Master Plan, this raises the issue of accuracy of the maps and photographs; unless the actual changes are significantly larger than the accuracy limits of the maps and photos, a quantitative analysis is not possible. While FL will review the methodology of the Shoreline Change Project, it will not incorporate any quantitative analysis as previously discussed.
CRSEC-8	CRSEC requests that FirstLight be required to produce a description of their efforts to research ice along the Connecticut River, and to incorporate relevant and more recent literature related to icing along river banks, such as the one provided to CRWC from CRREL	Research has been conducted and is ongoing to review pertinent information regarding ice. Potential sources that have been contacted or researched online include the United States Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL), TransCanada, the USGS, and NOAA, to name a few. For example, weather stations in the vicinity of the Connecticut River have been identified and data have been requested and are being downloaded from NOAA. USGS field offices in Massachusetts, Vermont, and New Hampshire have been identified and initial contacts have been made to determine what ice-related data are available. Some detailed discussions with the USGS and TransCanada have occurred indicating the types and location of available information. Articles referenced by the CRSEC in their comment letter (Prowse, 2001 and Ettema, 2002) will be reviewed as part of this effort. A complete list of articles, data, and other pertinent information utilized in the analysis will be provided in the final report.
CRSEC-9	Data Analysis – Boat Wakes. CRSEC notes- We object to the variance in methodology for Task 5b that FirstLight has undertaken. FirstLight selected a new boat wave model and proceeded with field studies associated with this variance without consulting FERC or stakeholders. CRSEC requests: (1) Discussion of why the approach for Task 5b as originally described in the Approved Study Plan is no longer valid or why this additional work was needed to supplement Task 5b. (2) Detailed information about the boat wave sub-model from BSTEM, including data input requirements and the "custom developed image processing tool" (3) How the difference in time intervals for the collected boat wave data is being handled. The water surface elevation data is input as hourly figures while the boat wave data is collected every 15 minutes. (4) It was stated at the September 30, 2015 USR meeting that boat wave data collected in 2015 would be extrapolated in the sub-model over the same 14-year interval of the other BSTEM input data. Without an explanation of how this can reasonable and accurately be done, this is troubling and could significantly skew the model. A sensitivity analysis should be provided. (5) Literature citations for peer reviews and other scholarly articles about the application of the BSTEM boat wave sub-model. (6) The rationale for choosing the 3 monitoring locations described on page 7 of the USR and why data was collected on a different time-step than other BSTEM inputs. We note that the Approved Study Plan for Task 5b states that data will be collected at a sub-set of the fixed riverbank transects (2 to 3 sites) over a range of flow conditions. This doesn't appear to be the case for the 3 new monitoring locations chosen for the BSTEM sub-model.	(1) The original approach described in Task 5b of the RSP is still valid, still provides benefit to the study, and is still being conducted. The data collection which occurred in 2015 is consistent with, and more robust than, what was described in the RSP. The only new addition to this portion of the study is the BSTEM boat wave sub-model. The sub-model provided added value on top of the original approach defined in the RSP. Since boat waves have been observed to cause erosion in the TFI, it was determined that additional information and analysis beyond the original scope would be useful to improve understanding of this phenomenon. Based on this assessment, a quantitative and mechanistic approach was utilized to quantify erosion associated with boat waves. To do so, it was necessary to develop a boat-wave sub model. Analysis of boat waves was incorporated into BSTEM to quantify the effect of boat waves on erosion. BSTEM analysis of boat waves will provide additional detailed analysis beyond the original analysis approach. (2) Six video cameras along with four wave loggers were placed in the TFI to document boat traffic and associated waves. The "custom developed image processing tool" is simply software to process the wave logger data to differentiate boat waves from wind-generated waves. Specific input for BSTEM regarding boat waves include: date/time, local water depth, wave period, and maximum wave height. Data collected by the wave loggers includes water surface elevation (via capacitance wave staff collected at a sub-second time step and time stamp). Cameras provided images of boats passing each of the loggers. Time periods for passage of individual boats were compared to periods of wave trains in the logger record. The wave characteristics of boat waves and wind waves are readily identified from the logger record as the wind-generated waves have a much higher frequency but smaller amplitude compared to boat waves. A discussion of how boat waves are handled in BSTEM follows (see 3).

Commenter	Comment	Responses
		(3) Water surface elevations were developed on an hourly basis using a calibrated HEC-RAS model based on availability of historic water level data collected on an hourly basis. Boat wave data were collected on a sub-second basis (at 30Hz frequency, not 15 minutes) since boat waves peak at a frequency on the order of seconds. A boat traffic time series comprising the standard wave parameters of maximum wave heights and wave periods was developed from the measured data. It was converted to shear stress associated with each boat passage within the appropriate hourly time step. As waves and the associated shear stress oscillate, a sinusoidal pattern was utilized to develop a root-mean-square (rms) value of shear stress associated with boat waves for each boat passage. Each boat record is represented with an rms shear stress and duration for which the rms shear stress is applied. The total shear stress for boat waves within the hourly time step is the vector combination of rms shear for each boat passage in the time step and the shear stress due to the flow. The combination of boat wave shear and flow shear was then utilized in BSTEM along with the critical shear stress of the riverbank materials to compute erosion due to shear stress for the portion of the time step when boats were passing. After the boat waves are analyzed for each boat within each time step, the amount of erosion is calculated for the remaining part of the hour using only the flow shear stress. Total erosion caused by shear stress is the sum of erosion during boat passage with combined flow and wave shear, and erosion due to flow alone during the non-boat part of the hour. Following computation of hydraulic erosion, an evaluation of bank stability was made based on the geo-technical characteristics of the riverbank and the bank stability algorithms within BSTEM. Thus, channel geometry is first adjusted due to erosion resulting from a combination of boat wave shear and flow shear during the boat passage portion of the time step; then it is adjusted due to erosion from flow shear for the remaining part of the hourly time step; and finally channel geometry is adjusted due to any geo-technical processes. (4) The boat wave data collected in 2015 documents boat traffic patterns based on the time of day, the day of the week (since boat traffic is greater on weekends and less on weekdays), the season of the year, and weather (since rainy weather depresses boat traffic). The number of boats passing during each hourly time step over the 14 year time period was based on patterns developed from the 2015 data in combination with regional and national boat traffic information showing trends over the last 14 year time period. The resulting distribution accounted for the time of day, day of the week, season of the year, year and the historic pattern of rainfall. The boat wave input was based on best available data and considered appropriate factors affecting the temporal and spatial distribution of boats. This set of information was used as input during the model calibration process. The effect of boat waves on erosion, i.e., sensitivity to waves, was tested by running BSTEM with and without boat waves. A full discussion of the actual data, development of the 14 year set of input, sensitivity, and results will be provided in the final report. (5) This is the first application of boat waves in BSTEM. Those conducting BSTEM modeling for this relicensing work are the developers of BSTEM. Thus, no citations for peer reviewed literature or scholarly articles yet exist on this topic. The first write up of this component of BSTEM will be included in the final report. (6) Three locations were selected for boat wave monitoring based on several criteria: 1) longitudinal distribution through the TFI, 2) camera position from bridge to capture boat traffic, and 3) boat wave data collection equipment (loggers) placed in the vicinity of the cameras. Fixed riverbank transects do not exist close enough to the French King or Schell Bridges that the wave loggers could be installed in close enough proximity to the cameras. At the Route 10 Bridge the wave logger was placed between two sets of fixed transects and in the vicinity of transect 5C. The boat wave data were collected on a sub-second time step because waves occur at a frequency on the order of seconds. Hourly data were available for development and calibration of HEC-RAS.

Commenter	Comment	Responses
CRSEC-10	Task 5c: Spatial Analysis - …the study [Study 3.1.1 Full River Reconnaissance] did not use the Study Plan's and the QAPP's definition of "stable" in making study conclusions. Using FirstLight's data and assessment of each segment from the 2013 FRR, we conclude that only 43.3% of the banks meet their definition of stable, in that it does not have a "type" or an "indicator" of erosion associated with that segment. In other words, over 50% of the banks exhibit types or indicators of erosion, a startling finding.	FERC has concluded that FL completed the 2013 Full River Reconnaissance (FRR) survey as required, and that it provides the information necessary to inform FERC's licensing decision. FL conduced the FRR in accordance with the FERC approved study plan including using the correct definitions of the various riverbank features, characteristics, and erosion processes. The riverbank statistics developed during the FRR were consistent with the definitions contained in the FERC and MADEP approved RSP and SPDL (including the finding that 83.5% of the Impoundment riverbanks were "Stable"). As stated in the RSP (footnote 13, page 3-15): *"Riverbanks consist of an irregular surface and include a range of natural materials (silt/sand, gravel, cobbles, boulders, rocks, clay), above ground vegetation (from grasses to trees), and below ground roots of different densities and sizes. Due to these characteristics, there are small areas of disturbance which often occur at interfaces between materials, particularly in the vicinity of the water surface. These small disturbed areas can be considered as erosion, or sometimes can result from deposition, or even eroded deposition. No natural riverbank exists which does not have at least some relatively small degree of disturbance or erosion associated with the natural combination of sediment types/sizes and vegetation. As such, the extent for generally stable riverbanks that include these relatively small disturbed areas is characterized as little/none."* This principle is directly applicable to both the stage and extent of erosion; that is, no natural riverbank exists which does not have some degree of disturbance. It was with this principle in mind, combined with the definitions provided in the RSP, that FL classified the stage and extent of erosion for each riverbank segment. This is further explained in the final FRR report (page 6-5) when it is stated that: *"…it is observed in the Appendix figures and summary statistics that along a considerable length of the river erosional features such as undercuts, notching, exposed roots, and creep/leaning trees were observed and noted but were not considered sufficient to elevate segments from one Stage or Extent classification to another. Such segments were well below any reasonable threshold of being considered for stabilization or preventative maintenance efforts."*
Study No. 3.2.2 Hydraulic Study of Turners Falls Impoundment, Bypass Reach and below Cabot		
USFWS-1	According to the RSP (and noted in the Executive Summary of the Study), one of the goals of this effort was to provide channel velocity information. However the study provides no information on velocity, only water surface elevation (WSE). Perhaps this is not an issue if it is FL's intent that the velocity information will be presented in the seven other studies associated with this one. For us to understand the quality of the study and get a general understanding of river conditions, the velocity information (as well as Froude numbers), would be useful and informative and should be provided.	As an addendum to the report, FL will provide mean channel velocities at locations in the TFI and at transects in the "below Cabot" hydraulic model. Keep in mind that these are mean channel velocities for the entire transect.
CRWC-1	One of the goals of the study per the revised study plan (RSP) was to provide water surface elevation (WSEL) data and mean channel velocity information at the model transects to inform other studies. No information on mean channel velocity was included in the report – no discussion of the data, findings under a range of flow and project operating conditions, or implications for use in other models and other studies. This information should have been included in the 3.2.2 Study Report.	See response to comment USFWS-1 above. Relative to the comment "*no discussion of the data, findings under a range of flow and project operating conditions, or implications for use in other models and other studies*" the report includes the evaluation and assessment of 15 steady-state operating scenarios in the TFI and 8 steady-state and operating scenarios below Cabot Station that were approved by FERC in its SPDL. The simulations include a range of operating conditions- Northfield idle, Northfield pumping at max capacity, Northfield generating at max capacity, Vernon passing its min flow, Vernon generating a max capacity and under different TFI water elevations. A similar range of alternatives was evaluated for the below Cabot reach. In addition to the steady-state operating scenarios, 11 unsteady-state operating scenarios in the TFI with daily variation in the Vernon discharge, Northfield daily maximum pumping and generation, and different water elevations at the TF Dam were modeled. For the below Cabot reach, 20 unsteady-state operating scenarios were modeled and included variations in the length of peak generation from the Turners Falls and Deerfield River Projects and different water elevations at the Holyoke Dam. Relative to "*implications for use in other models and other studies*", FL has made it clear that several studies will (see page 3-75 of the RSP) utilize information from the hydraulic models. However, many of these studies are incomplete.

Commenter	Comment	Responses
Study No. 3.3.3 Evaluate Downstream Passage of Juvenile American Shad		
USFWS-1	To assess the entrainment of juvenile American shad into the NMPS Project during pumping, and the migratory routes used by juvenile shad on their downstream migration past NMPS, a range of NMPS pumping operations were contemplated, including the various operational conditions of one to four units pumping. However, at the USR meeting, it was announced by FL that one of the generator units at NMPS was offline and not operable for this study. As a result, FL could only release test fish with one, two or three units pumping, which precludes evaluation of passage and entrainment under the worst-case, four-units generating condition. While no results from this study have yet been provided, and it is possible that data on fish movements and entrainment with one, two or three units will be sufficient to determine project effects and/or preclude the need for a four-unit test, we believe it is likely that an evaluation of entrainment and routing with four units pumping will be needed in the fall of 2016.	FL recognizes that not evaluating the 4 unit pumping scenario is a variance from the study plan. However, FL would like to review the findings of this study to determine if a 4 unit pumping scenario is warranted.
CRWC-1	During the USR meetings, we learned that one of the units for Northfield Mountain is out for service until February. This should be noted as a study variance. We aren't sure why this wasn't mentioned in any of the USR reports.	See response to USFWS-1.
TNC-1	At the Updated Study Report Meeting on September 29, 2015, FirstLight noted that only 3 units will be operational at Northfield Mountain until mid-February, 2016. This will inevitably impact the results of any studies conducted while the single unit is out of service. Because the operation of 4 units is within the normal range of operation, FirstLight should at minimum report this modification as a variance to any impacted study and make suggestions regarding whether and how this variance should be accommodated to meet the stated study objectives. Impacted studies likely include 3.3.3 Evaluate Downstream Passage of Juvenile American Shad, 3.3.5 Evaluate Downstream Passage of American Eel, and 3.3.7 Fish Entrainment and Turbine Passage Mortality Study. [NOTE: this comment is shown once in this table, but the response applies to Study Nos. 3.3.5 and 3.3.7 as well]	See response to USFWS-1.
Study No. 3.3.5 Evaluate Downstream Passage of American Eel		
USFWS-1	To assess the entrainment of juvenile American shad into the NMPS Project during pumping, and the migratory routes used by juvenile shad on their downstream migration past NMPS, a range of NMPS pumping operations were contemplated, including the various operational conditions of one to four units pumping. However, at the USR meeting, it was announced by FL that one of the generator units at NMPS was offline and not operable for this study. As a result, FL could only release test fish with one, two or three units pumping, which precludes evaluation of passage and entrainment under the worst-case, four-units generating condition. While no results from this study have yet been provided, and it is possible that data on fish movements and entrainment with one, two or three units will be sufficient to determine project effects and/or preclude the need for a four-unit test, we believe it is likely that an evaluation of entrainment and routing with four units pumping will be needed in the fall of 2016.	See response to USFWS-1.
CRWC-1	During the USR meetings, we learned that one of the units for Northfield Mountain is out for service until February. This should be noted as a study variance. We aren't sure why this wasn't mentioned in any of the USR reports.	See response to USFWS-1.
Study No. 3.3.7 Fish Entrainment and Turbine Passage Mortality Study		
NMFS-1	At the September 29, 2015, Update Study Meeting, FirstLight stated that Unit 1 will be out of service until mid-February. This will result in the inability to test fish entrainment under a four pump scenario. At a minimum this should be reported as a variance. We will not be able to determine the facts about fish entrainment and mortality when all four units are pumping water to the upper reservoir which is an operational condition that many migrating fish will encounter. At this preliminary stage, we think it likely that we will need to request and the Commission will need to order another year of study whereby entrainment under a 4 unit pumping scenario is tested. We will, however, wait until the future final report is prepared and reviewed before making such a determination and request	See response to USFWS-1.
CRWC-1	During the USR meetings, we learned that one of the units for Northfield Mountain is out for service until February. This should be noted as a study variance.	See response to USFWS-1.

Commenter	Comment	Responses
Study No. 3.3.11 Fish Assemblage Assessment		
USFWS-1	Pursuant to the Study Plan Determination (SPD), beach seining was one of three identified gear types to be used in the study. FL has provided conflicting information regarding the use of beach seining; the USR indicates that beach seining was conducted in the lower two strata of the Turners Falls impoundment, but during the USR meetings, stakeholders were informed that no beach seining was conducted. The final report should clarify where beach seining was used and if it was not used, the report should discuss the reasons why. The decision to omit this gear type is concerning to the U.S. Fish and Wildlife Service (Service) and this deviation to the SPD may warrant additional sampling in 2016.	As noted in the USR meeting, beach seining methods as described in the study plan are only feasible in littoral areas devoid of obstructions such as logs, snags, etc., for a contiguous linear shoreline distance of 200 ft with suitable safe wading conditions. The plan was written under the assumption that there is an abundance of shoreline areas of sufficient unobstructed length with acceptable wading conditions to support such sampling. Although some locations were found that partially met the requirements, most such locations were limited in linear distance to less than the required 200 ft. called for in the study plan. (One such location was indeed located and sampled with a seine). As a consequence, FL had to improvise an alternative; the options were to: 1. Employ seining, but reduce the spatial footprint of each sample to conform to existing field limitations (*a deviation from the study plan*), or 2. sample such sites with same spatial effort identified in the study plan as best as possible using other reasonable means. FL determined that boat electrofishing had proven to be highly efficient for sampling, and the boat was capable of operating in shallow enough nearshore areas that met general beach seining conditions. Therefore, FL elected to sample such sites using boat electrofishing as an alternate method possessing equal if not greater sampling efficiency. In doing so, locations were scouted and selected independently of other standard electrofishing sites. The selected sites were similar overall in habitat to open littoral zones generally practical for beach seining that were minimally cluttered by snags and debris. These were sampled using boat electrofishing for at least 500 seconds which provided a sampling effort of a comparable length of shoreline (i.e. at least 200 ft of shoreline).
	In the USR summary report sampling plan, it states that there are 17 candidate rich-habitat electrofishing stations; however, in the table only 16 stations are listed.	The study report text correctly cites a total of 17 candidate rich-habitat sites. The associated table inadvertently omitted a site at rivermile 68.8 located in the downstream end of the Turners Falls impoundment. This site is described as "*Cobble and woody debris in Barton Cove*".
Study No. 3.3.17 Assess the Impacts of Project Operations of the Turners Falls Project and Northfield Mountain Project on Tributary and Backwater Area Access and Habitat		
USFWS-1	The RSP defines a depth of 1 foot or less in tributaries as a potential barrier to fish movement. The SPD approved the RSP without modifications. However, in developing the USR, FL changed this criterion to 0.5 feet, given the small size of the tributaries surveyed in the study area and the body depth of the riverine fish that inhabit the Connecticut River. We maintain that FL's analysis should be based on the 1-foot depth criterion. The tributary sizes and fish body depths were known at the time the RSP was developed. Therefore, they should not be used as a basis for changing the criterion. Furthermore, FL based its minimum clearance requirement for fish on Bovee (1982) but that study and others (R2 Resource Consultants Inc. 2014; Bjornn & Reiser 1991) mention the use of physical habitat parameters such as substrate, velocity and length of river reach, as well as the issue of predation potential as considerations in determining minimum depth thresholds for fish species. The Service recommends that FL re-analyze the data using the agreed-upon 1-foot-depth criterion and include the results in a revised report. The USR provides a list of resident fish species in Table 4.0-2, but does not include body depth sizes. The revised study report should include average body depths for the listed species, particularly if FL continues to use the body depth criterion in its analysis.	The initial depth criterion proposed by FL for a potential barrier to resident fish movement was 4" as described in the proposed study plan (PSP). This depth criterion was based on previous work conducted in the Northeast on the Kennebec River in ME in 2013 during similar study efforts. A request was made by stakeholders to increase the depth criterion to 1ft to be consistent with similar efforts being conducted at the TransCanada projects. FL adopted the criterion in the updated proposed study plans (UPSP) and RSP, and FERC concurred in its study plan determination letter (SPDL). At the time of the criterion development no survey work had been conducted in the tributary confluences and no information was available by which to characterize the tributaries or their confluences with the Connecticut River, which was the objective of this study. As such, there was no way in which to evaluate if a 1ft depth was an appropriate criterion. For example, if the tributary did not exceed a depth of 1ft, a depth of 1ft in the confluence could not be deemed a barrier. Subsequent field surveys revealed that many of the tributaries were small and very shallow (<1ft) and therefore the 1ft criterion was inappropriate as described in the study report. The Bovee (1982) criterion was adopted and barriers were assessed based on a fish with a body depth less than or equal to 6", which is representative of a large species that may use the habitat such as an adult white sucker. Smith (1985) cites the body depth to TL ration of white sucker as: 22.6:122 (depth ~ 18% of total length). According to the 2015 fish assemblage study data, the largest white sucker found in the TF impoundment was 502mm (19.75 inches). Thus, the body depth ratio indicates that this fish is 3.55 inches deep and is therefore capable of passing through depths as shallow as 2.3" based on Bovee's (1982) depth criterion. As such, FL maintains that the criterion selected and described in the report is appropriate for evaluating barriers in the tributary confluences. The TransCanada projects ultimately used a 6" depth criterion, which was agreed to by the agencies. Smith, C.L. 1985. The inland fishes of New York State. NYS Dept. of Env. Cons., Albany, NY. 522 pp.

Commenter	Comment	Responses
CRWC-1	CRWC could not see how the study objective of measuring changes in available habitat and water quality in lower tributaries resulting from Project-related water level fluctuations was achieved in this report. In no way could we discern how the habitat in each tributary varies with the sub-daily fluctuations from Project-operations, during each season, and what that would mean for aquatic organisms. The RSP considered low water conditions to be 176.0 feet msl or as close as is practical at the time of the study in the Turners Falls impoundment. The study report says that the data collected on August 12, 2014 are representative of an "abnormally low" impoundment level (178.3 ft at the TF Dam), coupled with a low Vernon discharge of 1,536 cfs, created by conditions that were manipulated by an upstream TransCanada study. We aren't sure why the study plan set a low flow level that was impossible to achieve. The locations measured on August 5 and August 11, 2014 had impoundment levels that were 2- 5 ft higher, so results are not quite consistent with one another. In looking at Table 5.1-1 of the report, some of the water surface elevations (WSELs) did not vary much from season to season, however. For example, at Mill Brook, the spring measurement was taken at WSEL 182.67, the summer at 181.06, and the fall at 182.03 ft. At Pine Meadow Brook, located close to the Northfield Mountain tailrace and presumably susceptible to project operation fluctuations from Northfield, the spring measurement was taken at WSEL 180.53, the summer at 179.15, and the fall at 182.13. We had expected field surveys to represent a range between high water conditions to low water conditions. And how the tributary conditions vary under a subdaily fluctuation of 4 feet or so, we don't know. The summer field days also do not represent "low flow" tributary conditions. August and early September of 2014 was characterized by flows in nearby tributaries as being higher than the median flows for those dates. See below for USGS gage data for Priest Brook (in the Millers basin) in Winchendon, MA and the Ashuelot River in Hinsdale, NH. CRWC request: FirstLight create an analysis that shows habitat impacts from Project operations at each of the study sites during the three seasons that were studied. New data may need to be collected to gather seasonally-representative flow conditions and site-specific changes under Project operations.	FL conducted the study as specified in the RSP except as modified due to field constraints documented in the USR. The water surface elevation of 176 feet msl is the minimum water surface elevation (WSEL) allowed by the current license but is rarely achieved as demonstrated in the WSEL duration curves presented in the PAD and report. As was specified in the RSP, FL conducted surveys of the tributary confluence area on a seasonal basis during the spring, summer, and fall, which was generally reflective of tributary conditions during high, medium and low flow periods, respectively. Data collected during these surveys reflected variations of fish access and habitat characteristics within the confluences over a range of expected conditions resulting from operations at the Turners Falls and NMPS Projects, tributary inflow and flow manipulations by other hydroelectric facilities located upstream within the mainstem Connecticut River as well as those located within major tributaries such as the Ashuelot, Millers and Deerfield Rivers. The study plan contemplated that the seasonal timing of the surveys would be representative of high, low, and medium impoundment levels and flow from the tributaries. This was the case relative to tributary flows and to a lesser degree within the impoundment. Thus seasonally represented conditions have been documented. Changes in available wetted habitat were documented during each condition and presented in Appendix B of the report. Specifically, FL performed three surveys covering different seasons and flows: May 21 through June 11, 2014 *(spring)*, August 5 through September 2, 2014 (*summer*), and October 13 through October 15, 2014 (*fall)*. Each survey included depth and habitat parameters within the confluence area associated with WSEL's within the mainstem river under those prevailing seasonal conditions. Additionally WSEL data throughout the Turners Falls Impoundment were concurrently collected with In-Situ Water Level Loggers on a 15-minute time step from approximately March 25, 2014 to November 7, 2014, to account for how project operations inundate or expose tributary channels independently of stream flow variation.
Study No. 3.3.18 Impacts of the Turners Falls Canal Drawdown on Fish Migration and Aquatic Organisms		
USFWS-1	This report addresses study objectives #2 and #3, with additional results from juvenile American shad route selection and outmigration timing (radio tag and hydro acoustics) and studies designed for out-migration of silver American eels yet to be examined in relation to the Turners Falls power canal drawdown (objective #1 and #4). In the Methods section, it states that "between sampling pools and quadrats, crews took observations of any stranding, noting species and estimating abundance" (pg. 3-1). The report should explain how this was done. Regarding the pool electrofishing sampling, the report states that "in addition, any stranded fish observed in proximity to the wetted perimeter were identified and enumerated." These data should be included in the report. Lastly, for quadrat sampling, the method for selecting plot locations in each zone should be described.	Stranding was documented via photographs in Appendix A, photographs 21-24. FL will submit an addendum to the report to more clearly document the location of the stranded fish. Section 3.2 of the report describes how quadrats were selected. As requested by stakeholders at least 10 quadrats were located along the each side of the canal and 10 were located in the thalweg. The quadrats were stratified by bank and channel, with two quadrats located at each of the banks and two in the center channel/thalwag area of each zone.
USFWS-2	In the Results section, data analyses includes summary statistics, such as measurements of variability/error that are not consistent in representation (Table 4.1.1-1 and Figure 4.1.1-1). There are catch-per unit effort (CPUE) estimates provided by species without measurements of variability, such as the overall (all species) standard error shown in Figure 4.1.1-1. A fairly consistent approach to the analyses of the data includes either lumping by sample type "pool" or by species. In order to best reflect the study design and intent, we recommend first examining measures of CPUE by species in each defined canal study area. These data would precede the summary statistics that were presented, describing mean values and variability by sample zone (1 through 6) as well as by longitudinal zone (right shore to thalweg, thalweg area, and left shore to thalweg; more for quadrat obtained data and analyses). An example of this would include a breakout of species data shown in Table 4.1.1-2 that may provide insights into whether differences exist among zones or in the longitudinal zone over time. These data may inform potential mitigation measures.	The report included information on the CPUE by species and the CPUE by each pool sampled. This method of reporting was chosen to provide enough data to produce robust statistics such as variability. FL will submit an addendum to the report to clarify the number of fish collected by species, zone, and pool.

Commenter	Comment	Responses
USFWS-3	The report also notes that electrofishing effort was skewed, therefore log transformation of the data was done. It would be useful to see the untransformed data. Sampling mortality by family group is shown in Table 4.1.2-2 as an aggregate. These data should first be described by zone as noted earlier before aggregating the data. On page 4-10, the second paragraph states "...sampling mortality is dependent upon day and whether the fishes reside in a hydrologically connected pool." This is an important finding that is not mentioned in the Discussion Section and has implications for potential mitigation measures. This statement, therefore, should be more fully discussed and considered for potential mitigation measures in the Discussion Section. It is possible that the requested additional break-out data summaries among zones may provide further insight on this observation.	The report included the number of fish by family and the CPUE by species. In addition, the number of organisms by pool is also provided. Information provided by pool is more specific than number of fish by selected zones. Providing pool specific information provides more insight to the statement, "...sampling mortality is dependent upon day and whether the fishes reside in a hydrologically connected pool" than separating by larger zones. FL will include a map in an addendum to the study report that identifies isolated and connected pools within the zones.
USFWS-4	The second paragraph of the Discussion section states "...no dead fish observed on the surface," which may infer that mortality was negligible. In many cases, fish that die do not float to the surface until or unless conditions result in tissue breakdown, with gas byproduct. The canal drawdown was done under relatively cool conditions which would not be favorable for the short-term build-up of gas. It is important to consider that when enumerating fish kills, surface- observed fish are often only a very small proportion of the total dead fish.	This statement was included in a discussion of the pool fish sampling as an observation of actual conditions during the sampling effort. It referred to pools that were sampled so any dead fish that did not float to the surface would have been sampled via electrofishing, seining and netting.
USFWS-5	It is stated that "stranding events were observed consisting of a few hundred individuals each." This statement is not clearly supported in the results section with empirical data. It would be important to understand how stranding data were obtained and those data should be reported in the Results section, by species, first presented by sample zone and then aggregated (spatially and temporally) to consider any possible trends. This measurement also requires a more detailed narrative in the Methods Section.	Any fish stranded was captured in a photograph and documented in Appendix A of the report. FL will submit an addendum to the report to more clearly document the location of the stranded fish.
USFWS-6	USFWS summarized observations Dr. Boyd Kynard made relative to the 2014 drawdown and impacts on juvenile shad (those observations are not repeated herein). Based on our review of the study results and Dr. Kynard's observations, it does not appear that the 2014 study methods were appropriate to assess lamprey stranding and there are no studies to support a statement that desiccation rates/survival rate for juvenile sea lamprey in the canal substrate "...promotes survival for the duration of the draw down event until re-watering occurs." Therefore, we believe it is necessary to conduct a modified study in 2016 on juvenile sea lamprey abundance and response to the drawdown to adequately assess the impacts of drawdowns on sea lamprey.	This study was conducted as described in Study Plan 3.3.18 which was finalized in consultation with the stakeholders. FL originally proposed 10 quadrats to sample sea lamprey and stakeholders requested 30 quadrats and a total 32 quadrats were sampled. In an attempt to minimize stranding of sea lamprey larvae and fish, FL conducted a slow drawdown of the canal in 2014. The canal was not dewatered until 1300 on Monday September 29, 2014. Boyd Kynard entered the canal about 5 hours before the drawdown was completed. As noted in the USFWS comment letter, he removed sea lamprey larvae and juveniles at that time. Although he indicated that he observed thousands of exposed sea lamprey ammocoetes, when FL and USGS Conte Lab sampling crews entered the canal after the canal was dewatered and flow shut off about 5 hours later at 1300, few ammocoetes were observed on the sediment surface. Recently the U.S. Geological Survey (USGS) conducted a laboratory study funded by the Army Corps of Engineers to evaluate the effects of dewatering on larval lamprey movement and survival (Liedtke et al. 2015). The authors indicated that to the best of their knowledge, this topic has not been addressed before. Study results indicated that a fast dewatering rate stranded more ammocoetes than a slow rate. Lamprey ammocoetes did not respond to the changing head pressure during dewatering, and they emerged and began moving some time after their habitat is exposed. Results suggest that even a small amount of water over the sediment is protective and fish stay burrowed as if they were covered with deeper water. Ammocoetes that burrowed in the sediment during the study were more than 4 times more likely to survive than those on the surface of the sediment (Liedtke et al. 2015). Throughout the study, about one-half of the ammocoetes emerged from the sediment following exposure to dewatering conditions and about one-half stayed burrowed. Temperature influences ammocoete survival with higher mortality at higher air temperatures. The USFWS comment letter states that Boyd Kynard indicated that 100 percent of the ammocoetes emerged from the sediment within two hours, although the USGS study indicates that half the ammocoetes in the study stayed burrowed (Liedtke et al. 2015). FL crews found live burrowed ammocoetes in the quadrat sediments both on Day 1 (September 29) and 4 days later (October 3, 2014). The results of the Liedtke et al. 2015 study described above and the results of this drawdown study support our conclusions that ammocoetes buried in the sediment can survive. Considering that the results from the drawdown study are supported by recently published literature and that FL conducted the study as required, FL does not intend to conduct any additional studies. Liedtke, T.L., Weiland, L.K., and Mesa, M.G., 2015, Vulnerability of larval lamprey to Columbia River hydropower system operations—Effects of dewatering on larval lamprey movements and survival: U.S. Geological Survey Open-File Report 2015-1157, 28 p.

Commenter	Comment	Responses
CRWC-2	**Comments on Goal 3: Fish and organism survey.** According to Table 4.1.2-2, the surveys identified 703 dead fish on "Day 1" and 1,590 dead fish on "Day 2." This is a 126% increase in mortality over the course of the drawdown. As shown on Table 4.1.2-1, there were high numbers of dead fish on the first day of sampling for Cyprinidae (carp, shiners, and fallfish) and Clupeidae (shad). By Day 2, mortalities in those families increased and mortalities for the Centrarchidae (bass, bluegill, crappy, Pumpkinseed) and Percidae (perch, walleye, darter) families exceeded 100 individuals. The Discussion section on page 5-1 describes some stranding events. Though photos were included in the appendix, no data about numbers and species that died in stranding events were included in the report. Again, we are not sure if meander surveys were done, and if so, what observations were made other than the photos of the strandings. CRWC notes that the dissolved oxygen (DO) levels fell below the state water quality standard for Class B warm waters (314 CMR 4.00) of 5.0 mg/l at two sites each sampling day: sites 11 and 13 on day 1 and sites 11 and 12 on day 2. Based on the information provided in the report, we cannot tell if mortalities in these pools were higher than in other pools because pool-specific numbers of alive vs. dead fish were not provided. CRWC request: FirstLight should provide stakeholders with numerical and species data on stranding events, and data related to meander surveys, if they occurred. FirstLight should extrapolate mortalities of fish species and/or families to the entire canal drawdown event based on the pool surveys. CRWC overall study request: After completing additional lamprey field work and after supplying stakeholders with additional fish survey information, CRWC recommends that FirstLight work with stakeholders to address Objective 4 of the study.	Every pool was surveyed to the specifications in the study request. Extrapolating rates of mortality to understand impacts to the population within the canal is not possible considering the population of fish residing within the canal is unknown. Extrapolating by area is improper as well because fish congregate into the pools as the canal dewaters, thus artificially increasing population densities. Assuming these population densities (fish/m^2) are constant over the total canal area would result in a gross overestimation of the population. FL does not intend to conduct additional field sampling for sea lamprey as its observations are supported by recently published literature (see response above to comment USFWS-6). FL included recommendations for Objective 4 in the final report and instituted these recommendations during the 2015 drawdown.
Meyer-1	Needed information from this study: This study needs to be extended for another year. On October 5, 2015, I took a 20-minute walk through a small segment of the canal at 7:00 a.m. on the morning the canal had drained. On the flats far--from the thalweg where most of the 2014 assessment appears to have taken place, thousands of fish lay struggling, stranded, and dead in the drying pools. These included juvenile American shad, yellow perch, juvenile and "transformer" sea lamprey, one 8-inch chain pickerel, one crayfish, and thousands of tiny, unidentified YOY fish in drying pools and rills that led to nowhere. These observations were made crossing just a few—out of the many acres, of silt and muck "shoulder habitat" that occurs away from the main channel on both the east and west sides of the TF Canal. A more thorough mortality assessment needs to be made across these habitats to have a full understanding of the impacts of the canal drawdown migrating and resident fish.	Please see response above to comment USFWS-6. The drawdown study was conducted in September-October 2014. However as in 2014, in 2015 the canal dewatering was intentionally slow to give fish and aquatic organisms a chance to egress the canal and the canal was not completely dewatered at 7am. Canal dewatering was completed at 11am. At this time, staff working for FL entered the canal to place cones in areas where heavy machinery travels and directed equipment operators to stay within these established boundaries. These staff did not observe stranded fish as described in the comment. FL conducted a mortality assessment as described in Study Plan 3.3.18 and incorporated stakeholder comments during the 2014 study. While the absolute numbers of aquatic organisms may vary somewhat annually, FL believes that the 2014 study accurately characterized annual drawdown effects to inform measures implemented to minimize canal drawdown impacts in 2015 and subsequent years.
Request for New Study: Tagging and Spawning Study of the Connecticut River Shortnose Sturgeon at the Rock Dam Pool in Turners Falls.		
Meyer-1	REQUEST for New Study: Tagging and Spawning Study of the Connecticut River Shortnose Sturgeon at the Rock Dam Pool in Turners Falls. The USFWS's fish passage and dam specialist John Warner reports that both downstream and upstream modifications for fish passage at Holyoke Dam will be completed this winter. New entrances and exits allowing CT River SNS to move upstream beyond that site will be working in spring 2016. In light of the construction at Holyoke and the 2016 continuation of test flows evaluations on spring migrants in the By-Pass Reach at Turners Falls, testing of spawning success for SNS should be done at their documented natural spawning site--the Rock Dam in Turners Falls, in spring 2016. Regardless of any fine tuning needed at the Holyoke facility, some SNS will return to the Rock Dam pool by the last week of April, and the chance to study their spawning success in light of regulated test flows presents a unique opportunity for the only federally endangered migratory fish on the Connecticut River.	Shortnose sturgeon spawning studies were conducted for 17 years in the 2 spawning areas (Rock Dam and below Cabot Station) in the project area. During this long time series of studies, spawning success was sampled during a wide range of flows including high and low flow water years. This information has been summarized in Kynard et al. 2012 and was used to inform the IFIM study. There is currently enough site specific information available based on this long term database to complete NEPA/ESA analysis. Kynard, B, P. Bronzi and H Rosenthal (2012). Life History and Behaviour of Connecticut River Shortnose and Other Sturgeons. World Sturgeon Conservation Society: Special Publication No. 4.

Commenter	Comment	Responses
Study No. 3.4.1 Baseline Study of Terrestrial Wildlife and Botanical Resources		
USFWS-1	The RSP stated that one of the purposes of this study was to "Survey and evaluate the presence of targeted RTE [rare, threatened, endangered] species or associated habitats." On April 2, 2015, the Service issued a final 12-month finding on the northern long-eared bat (Myotis septentrionalis) (NLEB) and listed it as threatened under the Endangered Species Act (ESA). At the USR meeting, Mr. John Warner of this office reported that the NLEB was now listed. FL's consultants indicated that no surveys for NLEB or its habitat were conducted as part of this study. Land management activities by FL on its properties could affect NLEB. We note, however, that coupled with the listing determination, the Service developed an interim rule specific to the northern long-eared bat under section 4(d) of the ESA. Under this interim rule, incidental take is not prohibited when it is associated with limited tree removal projects, provided these activities protect known roosts and hibernacula, when carried out in accordance with the conservation measures provided in the 4(d) rule. A final 4(d) rule is anticipated to be issued by early 2016, but it is uncertain what land management practices will be addressed in the final rule. Depending upon the scope of the final 4(d) rule and assessment and consultation requirements established by the rule, it may be necessary for FL to undertake a survey for NLEB and characterize the availability of roosting habitat on project lands, most notably in the NMPS recreation area. However, we will defer requesting such a survey at this time pending publication of the final 4(d) rule.	FL has not conducted specific surveys for the NLEB or NLEB habitat within the Turners Falls or Northfield Mountain study areas, but did not observe the species in the Project area during the 2014 and 2015 fieldwork. FL will coordinate with the USFWS as needed moving forward.
Study No. 3.6.3 Whitewater Boating Evaluation		
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 1	Objective 5: Availability of sufficient whitewater boating flows at Turners Falls The Licensee studied the frequency of whitewater boating flows under the current mode of operation and found that in 2014, between April and November, there were 45 days in which sufficient flows are available for a minimum acceptable whitewater boating experience and 40 days for an optimal boating experience. Most of these dates occur in the early spring and late fall. Sufficient flows for a minimum acceptable or optimal boating experience were available on only 4 days between Memorial Day and Labor Day according to the Licensee's analysis. The Licensee makes no attempt to study the availability of flows under any alternate mode of operation, making the study incomplete. Essentially, the Licensee has studied the frequency of boating available only during uncontrolled spillage, making no attempt to study alternative modes of operation until other studies related to flow-related resources, project operations, and flows are completed. The Licensee should be required to revise this study and provide additional opportunity for public comment once those studies are completed.	The FERC-approved study plan states that FL will analyze historic dates to determine the number of days per month spring and summer flows for whitewater boating, as determined by the results of the controlled flow analysis, would be available under the Turners Falls Project's current mode of operation. An analysis will also be conducted to determine the number and timing of boatable flows for any proposed mode of operation of the Turners Falls Project. As reflected in the study report, FL analyzed the availability of the flow releases tested in July 2014 under the Project's current mode of operation. FL is not proposing a different mode of operation at this time. If FL proposes a different mode of operation of the Turners Falls Project as part of its licensing proposal, then FL will evaluate the number and timing of boatable flows under the alternative mode of operation at that time as part of the licensing proposal.
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 2	Objective 6: Competing Recreational Uses and Resource Needs The Licensee concludes that whitewater releases will have negative impacts on aquatic resources (such as sturgeon spawning) and other recreational uses (with emphasis on motorized boating). However, the Licensee failed to conduct a study or provide any data regarding the impact of whitewater releases on these uses and resource needs. With regard to competing uses and resource needs, including sturgeon spawning and motorized boating in the impoundment, the Licensee's project operations, which have dewatered the river and caused major fluctuations in the reservoir pool elevation, are responsible for any adverse impacts. Whitewater releases into the natural river channel are fully consistent with other resource needs. The Licensee either should be required to conduct proper studies and provide data to support their assertions, or remove their unsupported claims.	As noted in the 3.6.3 study report, FL stated that there could be concerns about potential impacts to aquatic resources in the bypass reach and to motorized boating on the Turners Falls Impoundment. But FL also noted that it is conducting several flow related impact studies (study nos. 3.3.1, 3.3.6, 3.3.10, 3.3.12, and 3.8.1) to better understand the impact of Project operation and flows on various resources. None of these other studies is complete. When FL has completed all of these studies and FL has put forth a licensing proposal, FL will evaluate the potential effect of whitewater boating under FL's licensing proposal in the bypass reach on other resources as part of the licensing proposal.
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor – 3	Objective 7: Access to the natural river channel The Licensee's study of the adequacy of access to the natural river channel examined the suitability of current access point at the fishway put-in, Station 1, Cabot Woods Fishing Access (i.e., Rock Dam), and the Poplar Street take-out. Study participants, however, were only asked to evaluate the fishway and Poplar Street access points. With regard to Rock Dam, the study dismisses this obvious access point as unsuitable for whitewater boating. Given that there was a prior access trail at this location that was previously removed by the Licensee, this location should also be studied, as it would provide park-and-play access to the Rock Dam feature as well as access for emergency personnel. The focus of the Licensee's access study should not be limited to assessing the suitability of access locations under current conditions, but rather whether suitable access could be provided with appropriate improvements by the Licensee.	The objective of the FERC-approved study plan was to identify the need for and define adequate access points, if needed, that would provide trails and car-top parking at Great Falls Discovery Center [located near Unity Park], Station No. 1, and Cabot Station, and egress at the end of the 2.7 mile bypass reach at the confluence of the Deerfield River. Section 4.4 of the study report addresses this aspect of the study requirement: it assessed three access points into the bypass reach between Turners Falls Dam and the Poplar Street access, which is located downstream of the bypass reach. The report also discusses field investigation of two potential additional access sites. FL acknowledges that at one time there was a staircase at the Cabot Woods site, which may have provided access to Rock Dam, but it was removed a number of years ago due to continued vandalism. FL does not propose to conduct any further study of improved river access at this site due to serious in-water safety concerns.

Commenter	Comment	Responses
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 4	Objective 8: Regional whitewater boating opportunities In comparing regional whitewater boating opportunities with the Turners Falls natural river channel, the Licensee conflates scheduled releases with unscheduled opportunistic flows and makes the self-serving conclusions that 1) there are ample other whitewater boating opportunities, and 2) there is little demand for whitewater boating in the Turners Falls natural river channel. In terms of scheduled releases in the area, only the Fife Brook section of the Deerfield River is comparable to Turners Falls, where there are 106 scheduled releases on a Class II/III whitewater river, including releases throughout the summer months. While there are several scheduled weekend releases in the early spring and fall on the Millers, Farmington and Westfield Rivers, there are no scheduled releases on any regional river other than the Deerfield between Memorial Day and Labor Day. The Licensee makes no attempt to survey boaters utilizing the Deerfield on their interest in experiencing a less crowded, geographically closer river, or attempt to quantify the usage on the Fife Brook section that currently provides recreational opportunities to an estimated 50,000 visitors annually. The Licensee should revise its study after surveying boaters on the Deerfield River to determine their interest in boating at Turners Falls once scheduled and adequate flows, adequate access, and accurate and predictable flow information are provided.	The FERC-approved study plan specifically stated that an assessment of other regional whitewater boating opportunities would be conducted to assist in the determination of current and future demand for whitewater boating in the bypass reach, and that assessment was conducted. The study was not intended to assess whether boaters on other rivers desire scheduled releases or how scheduled releases at any site may change demand. That boaters may request scheduled releases, in and of itself, does not provide an assessment of current or future demand for whitewater boating opportunities. Surveying boaters on the Deerfield River will not yield significantly new information in addition to that already evaluated in the report, particularly because boating use of the Deerfield may or may not relate in any way to future demand for boating on the Project bypass reach. FL also notes that the request to survey boaters on the Deerfield River is not a new request. During development of the 3.6.3 whitewater study plan, American Whitewater and other organizations requested that FL survey boaters on the Deerfield River. See e.g., American Whitewater comments dated July 12, 2013. In addition, these organizations requested that, as part of 3.6.1 Recreation Use/User Contact Survey, FL survey users and abutters for the full length of the Connecticut River below Cabot Station to Sunderland Bridge. These organizations also requested that the 3.6.2 recreation inventory study include an assessment of all recreation facilities on the Connecticut River downstream of the Project to the confluence with the Deerfield River. In its SPDL, FERC rejected requests that FL survey recreationists below Poplar Street and requests to assess all recreation facilities downstream of the Project with the exception of the Poplar Street access. FERC also did not recommend that FL survey boaters on the Deerfield River.
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 5	While this access point (Take out downstream of Turners Falls Dam) is acceptable for most non-commercial users, access for commercial rafts and other large craft is very challenging due to the distance from parking areas to the put-in, and the Licensee should study improvements.	The objective of the FERC-approved study plan was to address adequate access points, if needed, that provide trails and car-top parking. The study did just that. An assessment of improvements to access for one type of watercraft is essentially a request for a protection, mitigation, and enhancement measure, presupposes need, and was not an objective of the study.
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 6	Citing the need to await the results of other studies, the Licensee limited its flow analysis to the current mode of operation. Given the likelihood that the resource agencies will proscribe a minimum flow greater than the current minimum flow of nearly zero under the current license, the Licensee should expand its flow analysis to include alternate modes of operation. Specifically, the Licensee should study the operational impact of providing whitewater boating flows at all levels evaluated in this study with the assumption that minimum flows in the range of 0.2 (current Vernon minimum flow) to 0.5 mi2 (current Bear Swamp minimum flow) will be proscribed under the new license. Alternatively, FERC should regard the Whitewater Boating Study as an interim report and require appropriate revision to reflect alternate modes of operation pending the completion of other relevant studies.	See response to AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor – 1.
AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor - 7	Furthermore, the Licensee has not studied the extent to which current or alternative modes of operation would impact motorized boat usage in the reservoir. We encourage the Licensee to undertake such an analysis and modify the study repot accordingly. Based solely on inflows from 1250 cfs minimum flow from Vernon under the current license plus inflows from tributaries, we expect that the fluctuations from whitewater releases could be in the range of 2-5 inches during the driest month, and likely no pool lowering at other times, particularly if generation by TransCanada at Vernon was timed to coincide with scheduled releases, as in the case of the Deerfield River, or through utilization of the pumped storage to stabilize reservoir levels.	See response to AWA, AMC, NEFLOW, Crab Apple Whitewater and Zoar Outdoor – 1.
Study No. 3.6.4 Assessment of Day Use and Overnight Facilities Associated with Non-motorized Boats		
AMC - 1	<u>Portage around Turners Falls Dam</u> One of the purposes of the study was to evaluate “the feasibility of alternate walkable canoe portages.” The report on pages 4-26 through 4-27 describes a single option: a 3.08-mile walkable trail that uses the exact same take-out and put-in locations. This is not what we were asking for in our study request. We were looking for alternate take-out and put in locations that would just be around the dam. We do not feel that FirstLight has adequately identified an alternate take-out. A much shorter, safer portage should be feasible to establish on river left. We request that First Light explore this as an alternative. <u>Paddlers’ Trail request</u>: FirstLight do an actual evaluation of various options for a walkable (i.e., less than a mile) portage route.	The existing canoe portage at the Turners Falls Project consists of a portage take-out at the Barton Cove Canoe & Kayak Rental Area. Boaters wishing to proceed down river of Barton Cove are picked up by FL and driven downstream to Poplar Street in Montague, where they can put in and continue their trip. The FERC-approved study plan required that FL determine whether alternative walkable canoe portage trails are feasible, and FL evaluated those alternatives in the report. The first alternative utilized the Barton Cove Canoe and Kayak Rental Area as the take-out and the Poplar Street Access as the put-in (3.8 miles) i.e., a walkable route that uses the same take-out and put-in as the current vehicular portage. To minimize the distance on public roads and due to the nature of flows and boatability of the bypass reach, the 3.6.4 study report also assessed two additional walkable alternatives that allow for canoe portage that would take-out near Unity Park at the Red Suspension Bridge Site on river left, travel along either the Canalside Trail Bike Path or along public side streets, and put in at Poplar Street (3.08 miles). Providing a put-in just below the dam could potentially be hazardous and present serious safety concerns.

Commenter	Comment	Responses
AMC - 2	Paddlers Trail request: FirstLight complete the Task 1 and Task 2 work described in the RSP that has been omitted, including preparing a plan for site improvements. We also request that as part of this work, FirstLight connect with the private landowners who own the land adjacent to the Popular Street launch to determine if they are willing to sell, in fee or easement, rights for public access on their property, which is far superior in character, or identify an alternative launch location in this section that is better able to serve as an official access point for users seeking to paddle from below the Turner's Fall dam to Sunderland. The designated access point should have adequate parking, signage, and should be reasonably accessible.	The FERC-approved study plan does not require that a site plan be developed for improvements to the Poplar Street Access Site. The FERC-approved study plan provides for FL to develop potential improvements to the site, which may be implemented when and if it is determined that improvements are needed. As noted in 3.6.4 report and in AMC's comment letter, potential improvements were identified as part of the study. These potential improvements include reduced gradient, improved footing, and clearance to allow for portaging to improve conditions for non-motorized boat access. Preparing a site plan for implementing improvements at the Poplar Street Access Site is premature as it has not been determined whether improved access is needed. The remainder of AMC-2's request is a request for a protection, mitigation, and enhancement measure and will be addressed at the appropriate time in the ILP.
CRWC/AMC-1	CRWC-AMC request: FirstLight complete the Task 1 and Task 2 work described in the RSP that has been omitted.	See Response to AMC-2.
CRWC/AMC-2	Page 3-389 of the Revised Study Plan (RSP) for Study 3.6.4 stated, "Data from the Recreation Use/User Contact Survey will be reviewed to assess the need for new or improved facilities to accommodate non-motorized boating use at the Projects." This does not appear to have been done. CRWC-AMC request: FirstLight review the user surveys and incorporate any relevant information that might help inform the need for new or improved boating facilities.	At the time of the publication of the 3.6.4 report in March 2015, data from the Recreation Use/User survey (study 3.6.1) had not fully been analyzed due to the amount of data collected and the fact that field efforts had completed in December 2015. The report for the Recreation Use/User survey will be published in December 2015 and incorporates relevant data regarding recreational access at the Project for a variety of recreational activities.
NPS-1	The existing Poplar Street access site not an official access. It has minimal parking (the study notes 16 spaces, but these are not part of a dedicated lot and are often taken up by resident's vehicles), the bank is steep and challenging even without carrying a boat and adjacent landowners often are faced with boaters who use their land because of a more gradual slope. FirstLight, as part of this process, should contact adjacent landowners to determine if they are willing to donate or sell the fee or easement for rights for public access on and across their property. If this is not feasible based on input from those landowners, FirstLight should identify an alternative launch location in the area which could serve as an official access point for Turner's Falls dam to Sunderland.	See Response to AMC-2.