



FERC Proposed Study Plan Meeting

May 22, 2013

*Northfield Mountain Pumped
Storage Project (FERC No. 2485)*

*Turners Falls Hydroelectric
Project (FERC No. 1889)*



May 22: 9 am to 4 pm

3.3.14 Aquatic Habitat Mapping of Turners Falls Impoundment

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

3.3.13 Impacts of the Turners Falls Project and Northfield Mountain Project on Littoral Zone Fish Habitat and Spawning Habitat

3.3.15 Assessment of Adult Sea Lamprey Spawning within the Turners Falls Project and Northfield Mountain Project Area

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

Study 3.3.14: Aquatic Habitat Mapping of Turners Falls Impoundment

Objectives:

- Map the distribution and abundance of aquatic habitat within the Turners Falls impoundment.
- Habitat mapping and characterization of aquatic mesohabitat will provide information regarding the character and extent of aquatic habitat that may potentially be affected by project operations.

Geographic Scope:

- TF Impoundment.

Study 3.3.14: Aquatic Habitat Mapping of Turners Falls Impoundment

Task 1a: Habitat Type Delineation

- Habitat delineation of impoundment by boat.
 - Substrate
 - Cover Type
 - Depth

Task 1b: Microhabitat Data Collection

- Transect data will be gathered in representative littoral areas. Verticals will run from top of bank to elevation 6-ft below normal pool elevation.

Task 2: Data Analysis and Reporting

- Geospatial data will be transferred to GIS format to develop visual maps and tabular information.
- Summary report will be developed.

Study 3.3.6: Impact of Project Operations on Shad Spawning, Habitat and Egg Deposition

Objectives:

- Determine if project operations affect shad spawning site use, availability, spawning habitat quantity and quality and spawning activities downstream by conducting night-time visual observations below Turners Falls Dam and in the Turners Falls Impoundment.

Geographic Scope:

- Sunderland, MA to upstream of Northfield Mountain.

Study 3.3.6: Impact of Project Operations on Shad Spawning, Habitat and Egg Deposition

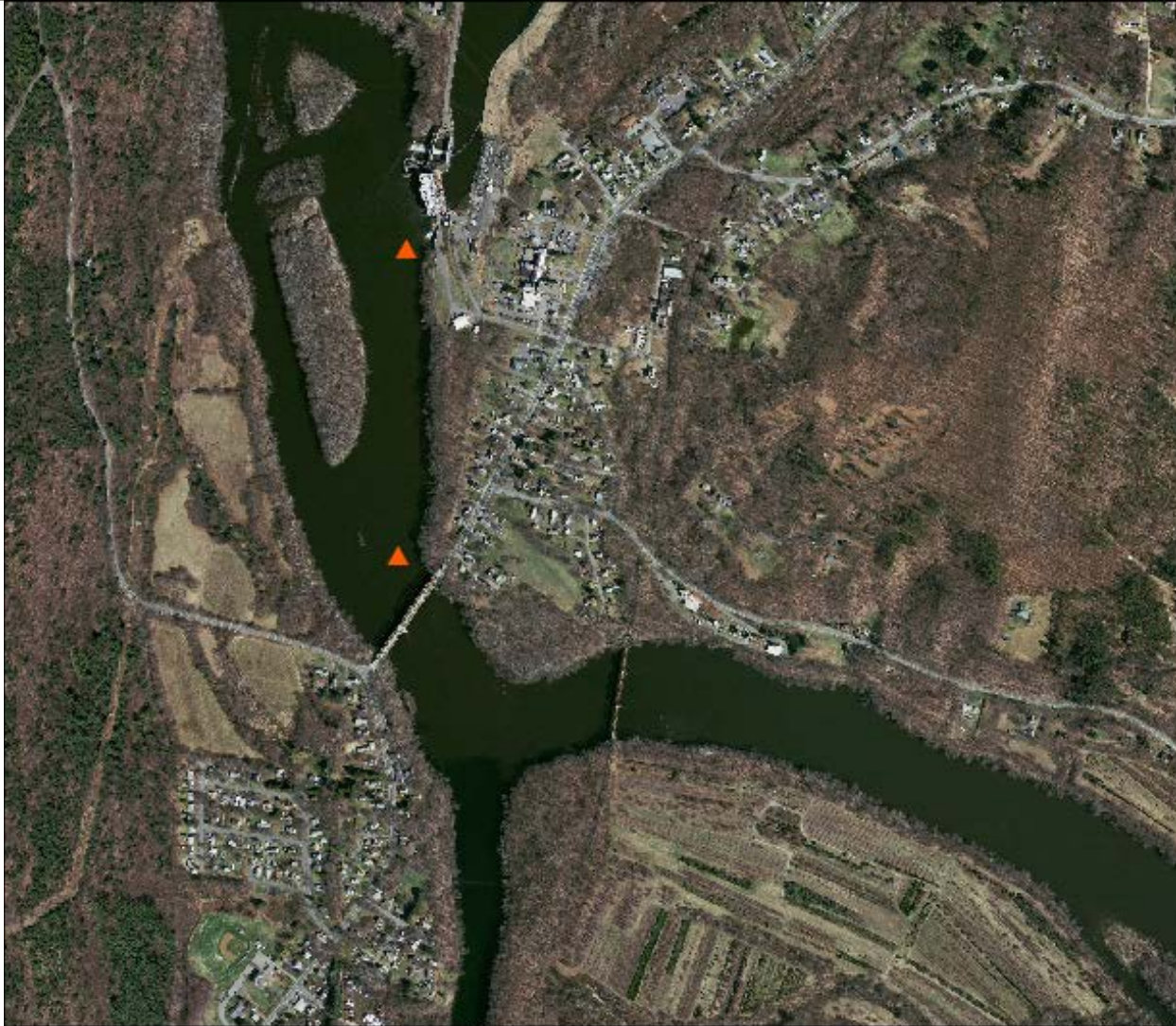
Task 1: Develop detailed study plan

- Review of existing information.
- Hydraulic model will further inform study.

Task 2: Examination of known spawning areas downstream of TF Dam

- Night time field survey during spawning period after 5,000 shad have passed Holyoke.
- Determine if changes in spawning occurs under changing project operations.

Study 3.3.6: Impact of Project Operations on Shad Spawning, Habitat and Egg Deposition



Legend
▲ Shad Spawning Site

American Shad Spawning Sites
from Layzer (1972) & Kuzmeskus (1975)

Path: W:\gib\maps\Shad Spawning\Shadspawn Cabot.mxd

Study 3.3.6: Impact of Project Operations on Shad Spawning, Habitat and Egg Deposition

Task 3: Identification of spawning areas upstream of Turners Falls Dam

- Determine areas of suitable spawning habitat
- Splash surveys

Task 4: Examination of identified spawning areas upstream of Turners Falls Dam

- Determine if changes in spawning occurs under changing project operations.

Task 5: Data Analysis and Reporting

Study 3.3.13: Impacts of TF & NM on Littoral Zone Fish Habitat and Spawning Habitat

Objectives:

- Assess timing and location of fish spawning in the littoral zone. Delineate and map shallow water habitats subject to inundation and exposure due to project operations and evaluate potential impoundment fluctuation impacts on nest abandonment, displacement and egg dewatering.

Geographic Scope:

- Turners Falls impoundment.

Study 3.3.13: Impacts of TF & NM on Littoral Zone Fish Habitat and Spawning Habitat

Task 1: Literature Review

- Determine timing of spawning and use of typical habitat-types by resident fish

Task 2: Field Surveys

- Conduct survey as close as practical to minimum water levels
- Area from edge of water to 6 ft will be examined
- Visual assessment performed by boat and wading to identify fish nests, egg masses/deposits, or spawning habitat.

Study 3.3.13: Impacts of TF & NM on Littoral Zone Fish Habitat and Spawning Habitat

Field Surveys

- Equipment and data collection will include:
 - Digital camera to document nests, egg deposits and habitat
 - Underwater camera to identify deeper nests, egg deposits and habitat
 - GPS to geo-reference locations
 - Flow meter to measure velocity
 - Water quality meter to measure temperature
 - Secchi disc to measure water clarity
 - Stadia rod and/or depth meter to record depth
 - Descriptive information: sediment/grain sizes, diameter of nests, presence/absence of fish, presence of aquatic vegetation.
- Additional information relevant to this study will be obtained from other proposed studies, including the fish assemblage (Section 3.3.11), habitat mapping (Section 3.3.14), and tributary access (Section 3.3.17) studies.

Study 3.3.15: Assessment of Adult Sea Lamprey Spawning within the Project Area

Objectives:

- Identify areas of suitable spawning habitat, conduct spawning surveys, describe spawning mound characteristics, determine if Project operations are affecting spawning areas.

Study 3.3.15: Assessment of Adult Sea Lamprey Spawning within the Project Area

Investigation Area

- Suitable habitat within the Connecticut River mainstem from Cabot Station downstream to Sunderland Bridge
- Turners Falls bypassed reach
- Riverine portion of the upper Turners Falls Impoundment
 - a. The Connecticut River mainstem within close proximity of the Vernon Dam (habitat adjacent to Stebbins Island, both sides of island).
 - b. Mainstem gravel bar and shallow water habitats within the Turners Falls Impoundment (*e.g., at or near the Massachusetts State Line*).
- Tributary confluence areas that are or may be affected by the current operational protocols, including:
 - a. The Deerfield River confluence with the Connecticut River.
 - b. The Millers River confluence with the Connecticut River.
 - c. The Ashuelot River confluence with the Connecticut River.

Study Timing: May-June

Study 3.3.15: Assessment of Adult Sea Lamprey Spawning within the Project Area

Task 1: Field Data Collection

- Spawning activity will be determined via visual surveys. Suitable habitat (shallow, gravel, or cobble riffles) will be determined.
- Active and inactive nests will be measured and enumerated
- Photo document, geo-reference, and mark active and inactive nests.
- Sub-sample 30 randomly distributed nests following a high flow event to assess effects on spawning habitat and nests.

Task 2: Data Analysis

- Tabular and Graphic summaries and map of spatial distribution of suitable habitat will be developed

Task 3: Reporting

- Summary report will be developed.

Study 3.3.17: Assess Project Operations on Tributary and Backwater Area Access and Habitat

Objectives:

- Identify potential barriers to fish access to tributaries and backwater areas resulting from water level fluctuations and measure changes to available habitat and water quality in these areas.

Geographic Scope:

- Turners Falls Impoundment to Sunderland, MA.

Study 3.3.17: Assess Project Operations on Tributary and Backwater Area Access and Habitat

Task 1: Field Data Collection

- Tributary confluence and backwater areas will be located during full pond and will be photo documented, geo-referenced, Water temp, DO, turbidity and pH will be compared at confluence versus in the CT River.
- Tributary confluence and backwater areas will be re-visited during lower flows to determine intermittency and constrictions and sampled as described above.

Task 2: Evaluation of Fluctuation Range

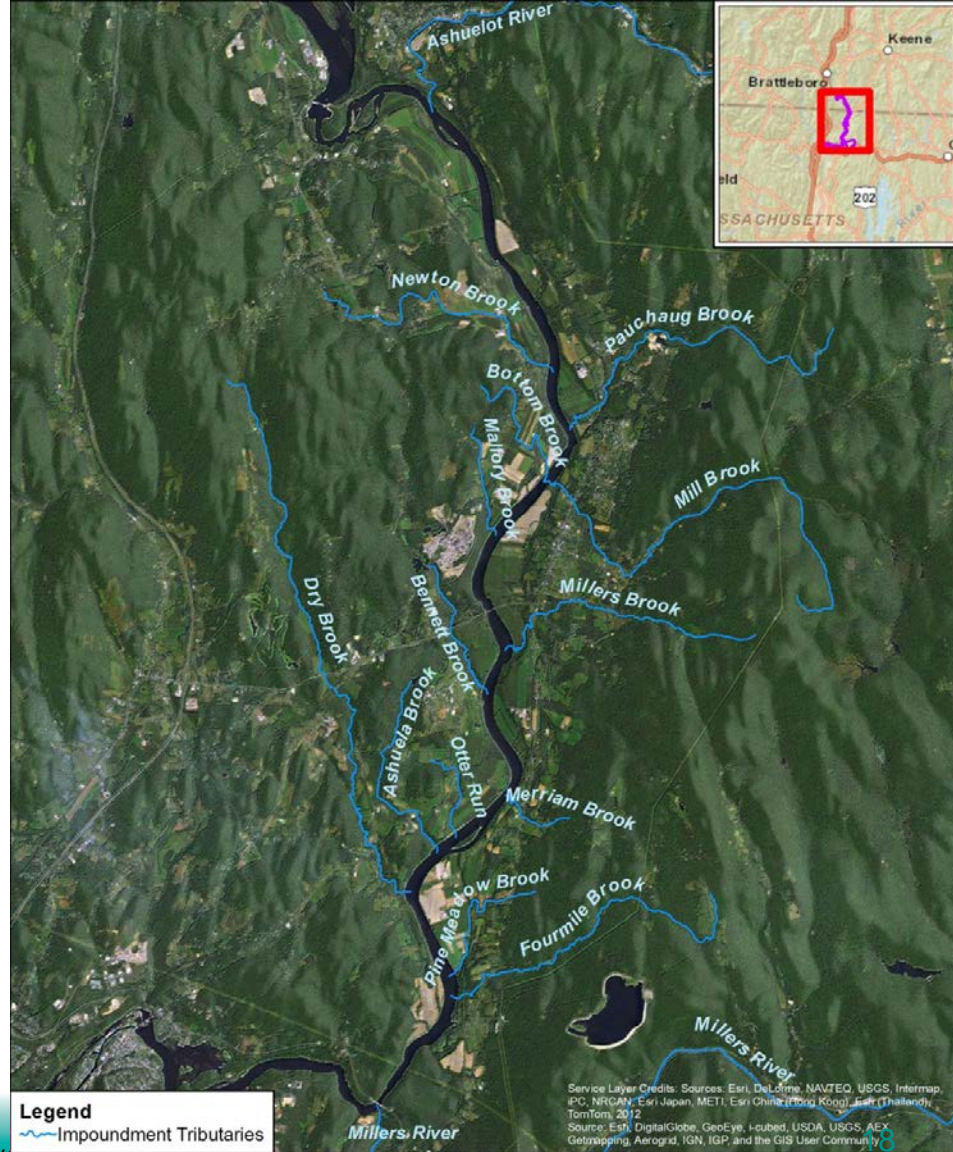
- Modeling studies (HEC-RAS or River 2D) will be used to evaluate if changes in water level fluctuation range creates barriers to fish movement.

Task 3: Data Analysis and Reporting

- Summary report will be developed

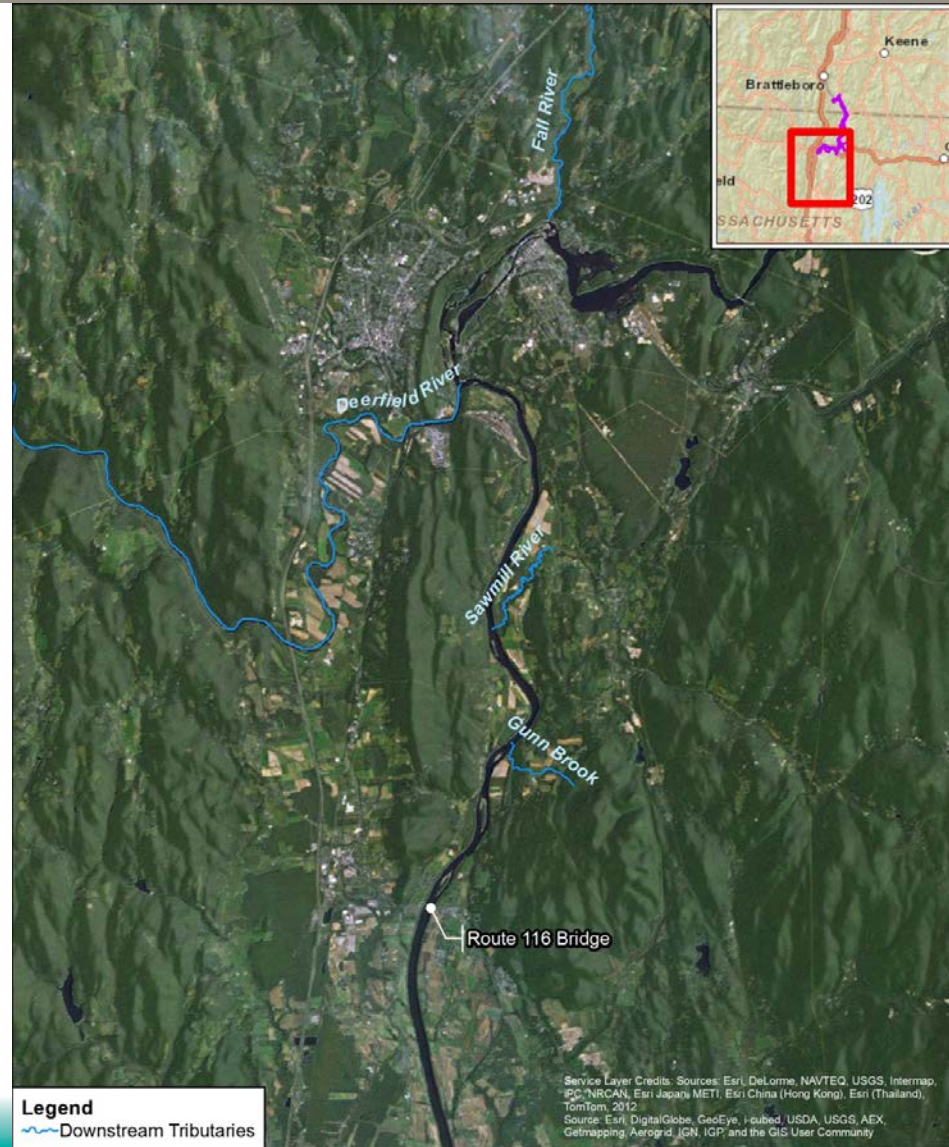
Study 3.3.17: Assess Project Operations on Tributary and Backwater Area Access and Habitat

Impoundment Tributary Locations



Study 3.3.17: Assess Project Operations on Tributary and Backwater Area Access and Habitat

Tributary
Locations
Downstream of
Turners Falls Dam



Study 3.3.18: Impacts of the TF Canal Drawdown on Fish Migration and Aquatic Organisms

Objectives:

- Identify and evaluate potential measures to reduce effects of dewatering for the annual canal drawdown.
- Design and implement identified measures and survey fish and aquatic organisms during canal drawdown after measures are implemented.

Geographic Scope:

- Cabot Station canal.

Study 3.3.18: Impacts of the TF Canal Drawdown on Fish Migration and Aquatic Organisms

Previous Survey Completed in September 2011



Study 3.3.18: Impacts of the TF Canal Drawdown on Fish Migration and Aquatic Organisms

Task 1: Identify and Assess Potential Measures

- Consult to identify potential measures that may reduce effects on fish during drawdown. These may include assessment of timing, weirs or baffles to create wetted areas. Assess measures and potential costs.

Task 2: Design Selected Measures(s)

- Upon agreement design of selected measure will be developed.

Task 3: Field-Test Selected Measures

- Measure selected in Task 2 will be tested in 2015 during drawdown to assess effectiveness. Effectiveness will be jointly determined through consultation.