FERC Proposed Study Plan Meeting

June 5, 2013

Northfield Mountain Pumped Storage Project (FERC No. 2485)

Turners Falls Hydroelectric Project (FERC No. 1889)

Agenda

June 5: 9 am to 4 pm

3.3.10 Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

3.3.16 Habitat Assessment, Surveys, and Modeling of Suitable Habitat for State-listed Mussel Species in the CT River below Cabot Station

3.3.11 Fish Assemblage Assessment

3.4.1 Baseline Study of Terrestrial Wildlife and Botanical Resources at the Turners Falls Impoundment, the Bypass Reach and below Cabot Station within the Project Boundary

3.4.2 Effects of Northfield Mountain Project-related Land Management Practices and Recreation Use on Terrestrial Habitats

3.5.1 Baseline Inventory of Wetland, Riparian and Littoral Habitat in the Turners Falls Impoundment, and Assessment of Operational Impacts on Special-Status Species

Study 3.3.10: Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

Objectives

- Determine the assemblage structure and emergence/eclosure behavior of odonates in the Project area. Use existing information and supplemental fieldwork.

- Evaluate potential effects of project operations on the assemblage structure and emergence/eclosure behavior of odonates in the Project area.

Geographic Scope

- Turners Falls impoundment downstream to Sunderland, MA.

Timing

- Proposed for 2014

Study 3.3.10: Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

Task 1: Review Existing Information

- Turners Falls Impoundment studies
- Other published information on the life history and ecology of target species

Task 2: Finalize Study Plan and Acquire NHESP Permit

Task 3: Qualitative Surveys

- Surveys for larvae, exuviae, and tenerals at four sites to establish a qualitative baseline on species composition and relative abundance
- Collect larvae while wading, snorkeling, or SCUBA diving, and collect emerging larvae, exuviae, and tenerals while walking riverbank.
- Concurrently record aquatic, riparian, and upland habitat parameters at each survey site

Study 3.3.10: Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

Task 4: Quantitative Surveys

- Monument 6 transects at each of 4 study reaches (2 in impoundment, 2 downstream)
- Collect exuviae and tenerals at each transect every two weeks from June to August. Record distance traveled and height attained, along with substrate preference.
- Record and photo-document habitat parameters for each transect
- Use water level data to determine areas of low, medium, and high inundation frequency along each transect, and compare exuviae abundance, density, and species composition along this gradient.

Task 5: Water Level Fluctuation Analysis

Use field data and existing data, along with an independently derived hydraulic model, to assess which species are most vulnerable to water level fluctuations and under what conditions they are most susceptible.

Study 3.3.10: Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

Task 6: Reporting

- Full written report plus appendices
- NHESP Rare Species Observation Forms

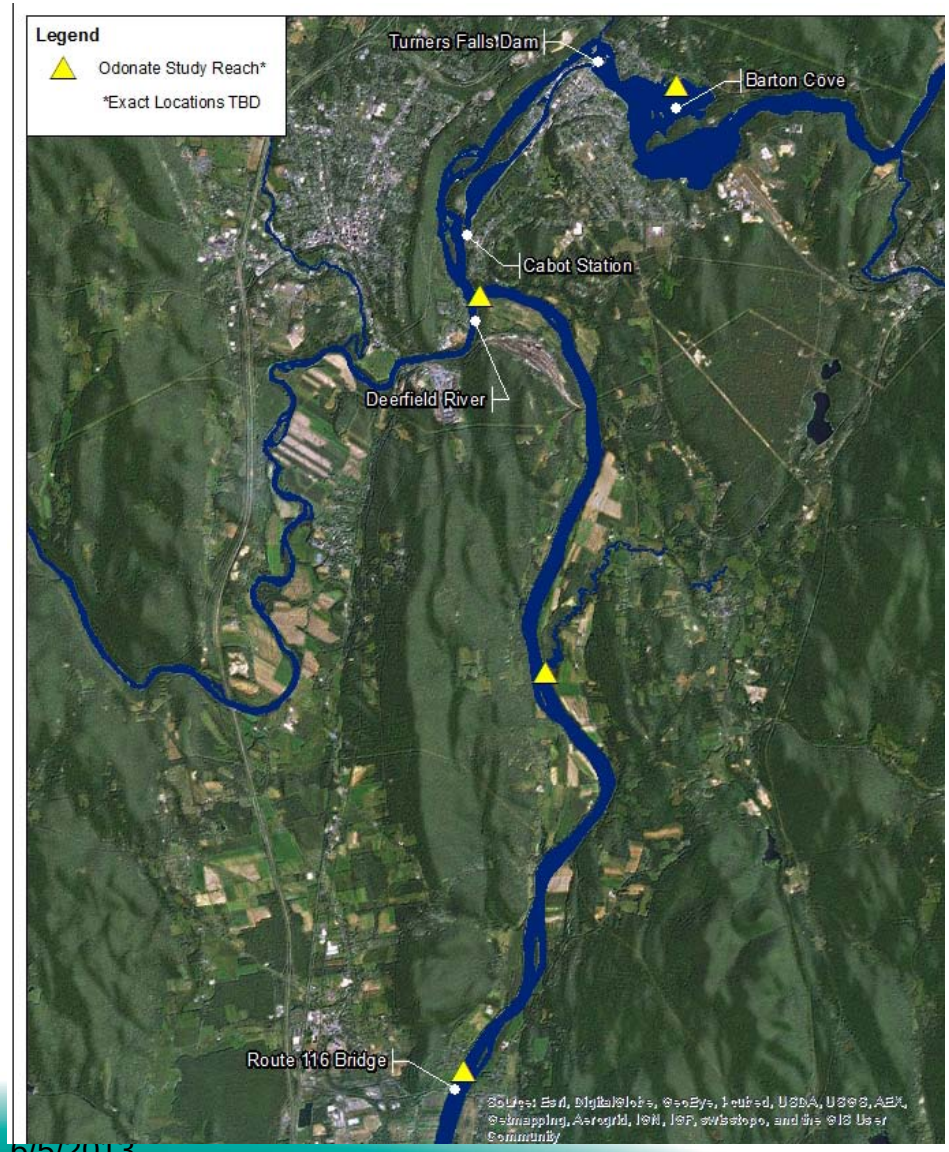
Study 3.3.10: Assess Operational Impacts on Emergence of State-Listed Odonates in the Connecticut River

Study Reaches

Focus of fieldwork:

- Unsurveyed reaches downstream of Turners Falls Dam
- Undersurveyed habitats in the Turners Falls impoundment (e.g., Barton Cove)

Use existing field data for most of the impoundment



Study 3.3.16: State-listed Mussel Species in the CT River below Cabot Station

Objectives

- Determine the distribution, abundance, demographics, and habitat use of state-listed mussels, and availability of suitable habitat, downstream from Cabot Station.
- Evaluate the potential effects of flow regimes on state-listed mussels and their habitat using population and habitat data, hydraulic modeling, and IFIM.

Geographic Scope

- Cabot Station downstream to Sunderland, MA.

Timing

- Proposed to begin in Fall 2013, possibly extending to 2014

Study 3.3.16: State-listed Mussel Species in the CT River below Cabot Station

Task 1: Finalize Study Plan and Acquire NHESP Collection Permit

Task 2: PHASE 1 Mussel Survey and Habitat Assessment

- Conduct semi-quantitative (timed searches) snorkel/SCUBA surveys in a minimum of 13 locations in the 13-mile reach from Cabot Station to Route 116 Bridge in Sunderland.
- Record species counts, shell length and condition data for each species, habitat parameters, and location data.

Study 3.3.16: State-listed Mussel Species in the CT River below Cabot Station

Task 3: PHASE 2 Mussel Survey and Habitat Assessment

- Collect more specific population and habitat data in areas where state-listed species are found.
- Collect quantitative mussel population data (e.g., use transects or quadrats to estimate population size, spatial distribution, habitat use, and demographics). Delineate mussel beds with GPS.
- Collect depth, velocity, and substrate data along cross-channel transects within a mussel bed to provide data for a hydraulic model and IFIM.

Task 4: Flow Regime Analysis

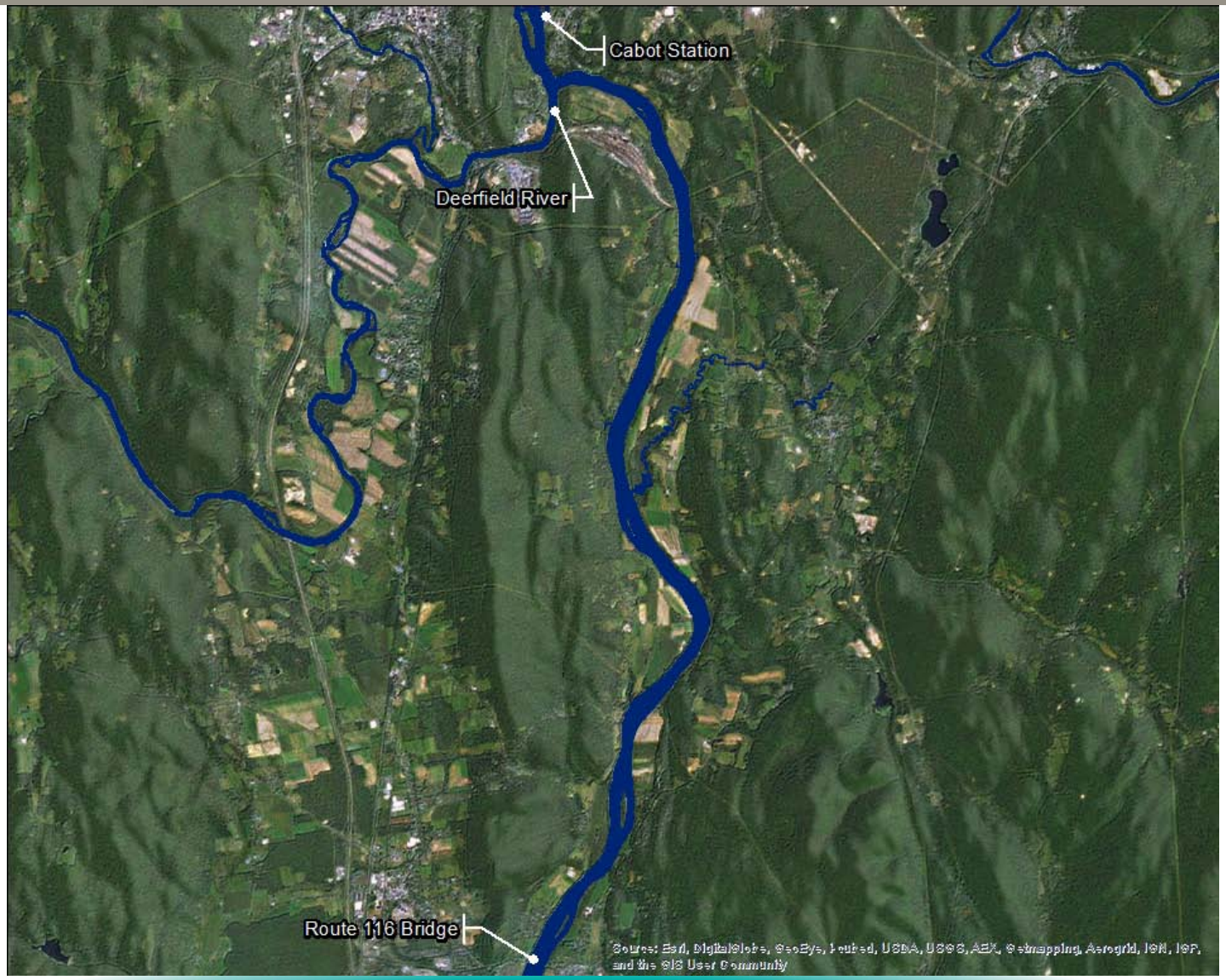
- A hydraulic model and IFIM are separate studies that can help to assess the potential effect of flow fluctuations on mussels and their habitat.
- IF state-listed mussels are encountered and a Phase 2 mussel study is completed, these data will be integrated into the hydraulic model and IFIM to provide a more specific and robust analysis.

Study 3.3.16: State-listed Mussel Species in the CT River below Cabot Station

Task 5: Reporting

- Full written report plus appendices
- NHESP Rare Species Observation Forms

Study 3.3.16: State-listed Mussel Species in the CT River below Cabot Station



Study 3.3.11: Fish Assemblage Assessment

Objectives:

- Document species occurrence, distribution and relative abundance of resident and diadromous fish within the project area along spatial and temporal gradients.
- Compare results with historical records.
- Use data to inform habitat mapping studies.

Geographic Scope:

- Turners Falls Impoundment downstream to Sunderland, MA.

Study 3.3.11: Fish Assemblage Assessment

Task 1: Sampling Location Selection

- Shorelines within all strata will be delineated into 500 meter segments using Arc GIS
- Random stations will be selected within each stratum

Task 2: Fish Collection

- A minimum of 3 locations within each stratum will be sampled in the spring and fall by:
  - Boat electrofishing
  - Trap nets

Task 3: Data Analysis and Reporting

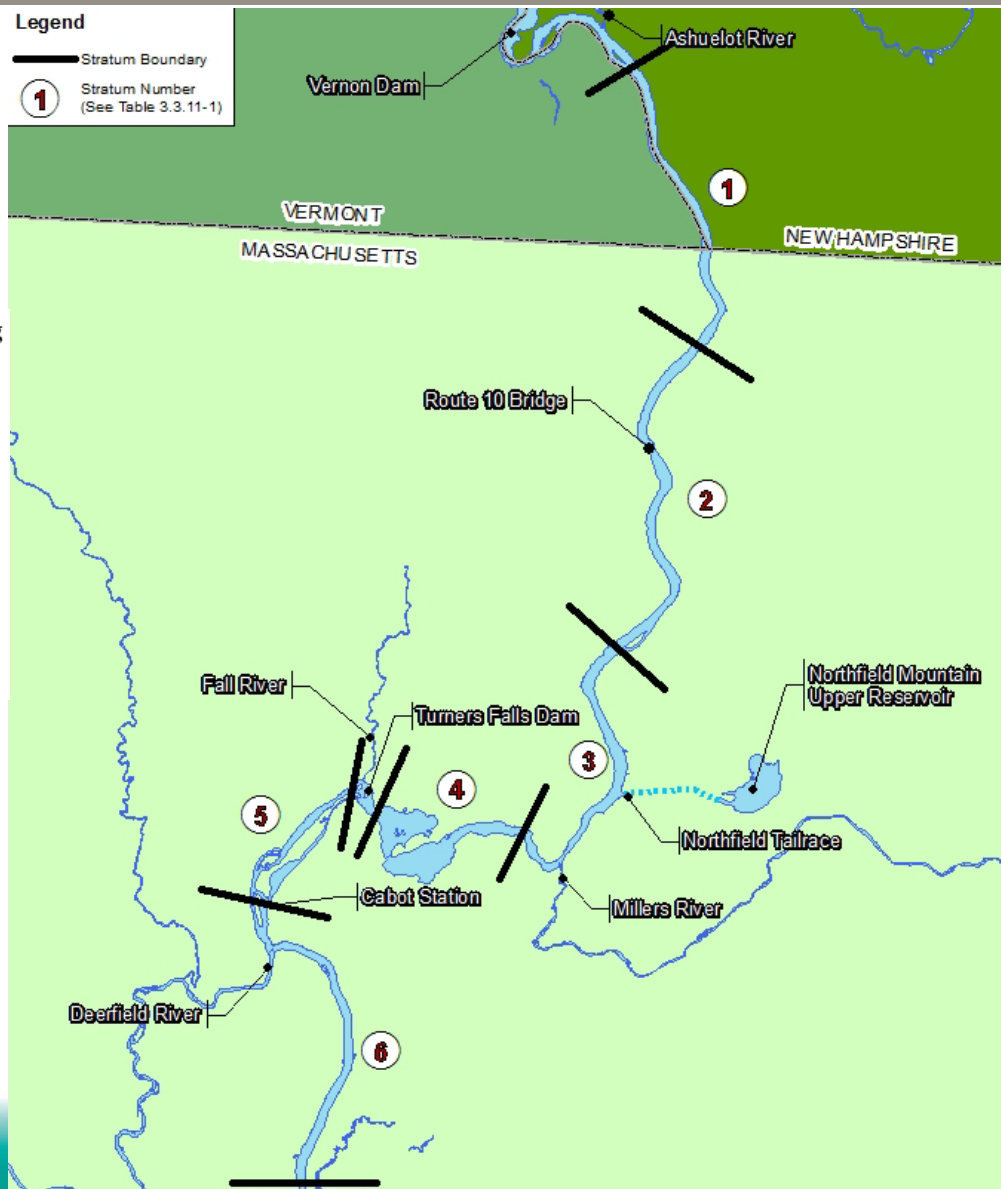
- Catch Per Unit Effort (CPUE) will be calculated
- Report will include map depicting locations of sampling sites and occurrence, distribution and relative abundance and compared to historic records.

Study 3.3.11: Fish Assemblage Assessment

Proposed Sampling Strata Boundaries

Table 3.3.11-2: Numbers and descriptions of strata for fish assemblage sampling

Stratum	Description
1	Upper End of Turners Falls Impoundment
2	Middle of Turners Falls Impoundment
3	Northfield Vicinity
4	Lower End of Turners Falls Impoundment
5	Bypass Reach
6	Downstream of Projects



Study 3.4.1: Baseline Study of Terrestrial Wildlife & Botanical Resources

Objectives:

- Characterize the terrestrial wildlife and botanical resources
- Survey and inventory overall existing upland wildlife habitats
- Note the occurrence of wildlife sighting
- Survey and inventory vegetation cover classes and land use
- Survey and evaluate the presence of targeted RTE species
- Survey and inventory the nature and extent of invasive and exotic vegetation species

Geographic Scope:

- Turners Falls Impoundment and CT River downstream to Sunderland, MA.

Study 3.4.1: Baseline Study of Terrestrial Wildlife & Botanical Resources

Task 1: Review Existing Information

- Literature review
- Review GIS data &Development of preliminary base map

Task 2: Field Surveys

Wildlife and habitat type mapping

- Visual encounter surveys
- Randomly Placed Transects in Representative Habitats
- Documented locations with GPS and Geo-referenced Photos

Vegetation cover type mapping

- Habitat botanical species composition, structure and distribution
- Timed meander surveys
- Vegetation sample plots

Invasive plant survey

- MIPAG invasive plant species list
- Completed concurrently with botanical meander surveys
- Document infested areas with GPS & Geo-referenced photos

Task 3: Data Analysis and Reporting

Study 3.4.2: Effects of Northfield Mountain Land Management & Recreation Use on Terrestrial Habitats

Objectives:

- Identify and describe project-related land management practices and use of recreation areas
- Describe wildlife and botanical habitats
- Determine if land management practices has a potential to facilitate spread of invasive plant species
- Identify if land management practices and use of the recreation areas affect existing resources in the Northfield Mountain Project area.

Geographic Scope:

- Northfield Mountain Project area

Study 3.4.2: Effects of NM Land Management & Recreation Use on Terrestrial Habitats

Task 1: Literature Review

Task 2: Wildlife Habitat Type Mapping

- Overlap with study 3.4.1

Task 3: Vegetation Cover Type Mapping

- Overlap with study 3.4.1

Task 4: Invasive Plant Survey

- Overlap with study 3.4.1

Task 5: Land Management Practices and Recreation Uses

- Identify Project-related land management & maintenance practices
- Identify usage of Project-related recreation areas (Recreation Studies)
- Analyze relationship between Project Facilities, recreational uses & species
- Identify practices to minimize or avoid impacts

Task 6: Data Analysis and Reporting

Study 3.5.1: Baseline Inventory of Wetland, Riparian and Littoral Habitat in the TF Impoundment, and Assessment of Operational Impacts on Special-Status Species

Objectives:

- Describe and verify or map wetlands, shallow water aquatic habitat including SAV, EAV, substrate type, invasive species and associated wildlife up to 200 feet from the Turners Falls Impoundment shoreline.
- Collect baseline information on state-listed rare plant species
- Analyze how project operations potentially affect state-listed plant and beetle species

Geographic Scope:

- Turners Falls Impoundment and associated riparian areas, and CT River downstream to Rainbow Beach.

Study 3.5.1: Baseline Inventory of Wetland, Riparian and Littoral Habitat in the TF Impoundment, and Assessment of Operational Impacts on Special-Status Species

Task 1: Literature Review

Task 2: Riparian & Littoral Zone Botanical Survey

- Census list of all plants within each respective habitat
- SAV and EAV surveys by boat
- Timed meander surveys
- Vegetation sample plots

Task 3: Sensitive Plant Survey

- Focus field surveys on plant communities directly affected by water level fluctuations
- Identify and survey high probability areas that have suitable habitat –plant species associations

Task 4: Invasive Plant Survey

- Overlap with studies 3.4.1 & 3.4.2

Study 3.5.1: Baseline Inventory of Wetland, Riparian and Littoral Habitat in the TF Impoundment, and Assessment of Operational Impacts on Special-Status Species

Task 5: Mapping Wetlands and Waters of the United States

- Baseline mapping (GIS, NWI, Soil Surveys)
- Ground check and further define NWI
- Use standard criteria from USACE & USFWS to verify, classify and characterized
- Wetland functions and values evaluation using USACE method

Task 6: Project Water Level Fluctuation Assessment (Tiger Beetles)

- HEC-RAS hydraulic model from Study 3.2.2
- Cross-sections in known areas of Tiger Beetles
- Model output will provide info on water level changes in relation to CT river flows under a variety of test conditions

Task 7: Data Analysis

- GIS-based maps for wetlands, SAV's EVA's, Invasive Species, RTE's

Task 8: Reporting