



# United States Department of the Interior

FISH AND WILDLIFE SERVICE

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<http://www.fws.gov/newengland>



April 19, 2019

Mr. Robert Kubit, P.E.  
Massachusetts Department of Environmental Protection  
Division of Watershed Management  
8 New Bond Street  
Worcester, MA 01606

**RE: COMMENTS**  
**Application for Water Quality Certification**  
**Bear Swamp Hydroelectric Project, FERC No. 2669-085**  
**Deerfield River, Berkshire and Franklin Counties, MA**

Dear Mr. Kubit:

The U.S. Fish and Wildlife Service (Service) is in receipt of Bear Swamp Power Company's (BSPC) March 25, 2019, notification of filing an application for a Section 401 Clean Water Act Water Quality Certificate (WQC) for the Bear Swamp Project (Project), located on the Deerfield River in Berkshire and Franklin Counties, Massachusetts. For your consideration, we offer the following comments on the proposed Instream Flow Study Plan submitted with the WQC application.

In addition to the comments and recommendations provided below, we request that the Massachusetts Department of Environmental Protection also consider correspondence previously submitted by the Service in the Federal relicense proceeding of the Project for which the WQC is being sought.<sup>1</sup>

## **PROPOSAL**

### Study Area

The proposed study area extends from Fife Brook Dam downstream to the Route 2 bridge.

***FWS Recommendation:*** BSPC's proposed study area is approximately half of the project-affected reach. We recommend extending the study area to the upstream extent of the

<sup>1</sup> FERC Accession Nos. 20150417-5110, 20150902-5203, 20151015-5309, 20180205-5076, 20190327-5197; <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> (accessed April 2019).

Deerfield River Project No. 4 development's headpond. BSPC states that the proposed area is appropriate, because it encompasses areas of trout spawning identified by the Deerfield River Chapter of Trout Unlimited's (DRTU) trout spawning studies in 2017 and 2018. In 2017, DRTU attempted to survey for redds downstream of the Route 2 bridge, but had difficulty due to a high flow event effectively "cleaning" the substrate, making it harder to identify redds. In 2018, DRTU only surveyed up to 5 miles downstream of Fife Brook Dam. Therefore, there is insufficient information to make a determination that trout are not attempting to spawn in the lower riverine section of the Fife Brook Development affected reach. Absent empirical evidence, we recommend including the entire riverine reach below Fife Brook Dam in the flow study. This is the same geographic area the Federal Energy Regulatory Commission supported for the Instream Flow Assessment in its Study Plan Determination, issued on October 30, 2015.

### Methodology

#### *Bathymetric Survey*

BSPC proposes to collect field data sufficient to conduct two dimensional (2-D) hydraulic and habitat modeling. Topographic data will be collected using Light Detection and Ranging (LiDAR) data and aerial imagery. Green wavelength LiDAR will be used to collect topography of unsubmerged land and bathymetry of submerged land (i.e., land under water). Near infrared wavelength LiDAR will be collected simultaneously for quality control. Standard survey data will be collected to supplement data voids.

***FWS Recommendation:*** We are aware of LiDAR's increasing use; however, we have not seen it used in habitat modeling before. We recommend that BSPC provide some examples of projects that utilized the technology for the proposed application.

#### *Substrate Mapping*

BSPC proposes to use existing substrate mapping information to develop Manning's N roughness coefficients for hydraulic modeling and assess habitat suitability in the habitat model. The newly collected aerial imagery will be compared to the existing substrate polygons and if significant differences are observed, field teams will ground-truth at least 10 percent of the mapped polygons. If more than 50 percent of those polygons significantly differ in one or more metrics (e.g., size, location, composition, and grain size), new substrate mapping will be conducted.

***FWS Recommendation:*** The substrate mapping previously conducted by BSPC underestimated the amount of suitable trout spawning habitat, and it is unclear how the proposed methodology overcomes this deficiency. We recommend using the DRTU data (i.e., trout redd locations) to identify additional transect sites where detailed substrate, depth, and velocity data should be collected at selected calibration flows. Because there is a data gap relative to potential redd locations from the Route 2 bridge downstream to the head of the No. 4 impoundment, BSPC should work in consultation with DRTU to select transect locations based on visual observation of trout redds or apparent suitable habitat.

### *Calibration Flows, Water Surface Elevations, Depths, and Velocities*

Due to potential differences in bed elevations between the time initial calibration data were collected and current conditions, BSPC proposes to collect new calibration data under two flow releases ranging between 125 cfs and 1,300 cfs. BSPC will collect water surface elevation (WSE), depth, and velocity measurements throughout the study site during each calibration flow.

***FWS Recommendation:*** Relative to calibration flow releases, one flow should be near the existing minimum flow of 125 cfs and the other flow should be close to maximum generation at Fife Brook Dam.

BSPC does not specify the number or location of transects where these physical habitat parameters will be measured, beyond stating that the total number of measurements will depend on factors such as topographic heterogeneity, gradient breaks, velocity patterns, and professional judgement.

We recommend locating some of the calibration transects at known trout redd locations and/or apparent suitable spawning habitat (based on habitat at known spawning locations). In addition to collecting WSE, depth, and velocity measurements at these “redd” calibration transects, BSPC also should characterize substrate and deploy pressure transducers to monitor changes in stage. The substrate data can then be compared to the aerial imagery and previously developed substrate maps to determine if substrate characterization at the transect level differs from how it is characterized via larger scale methodologies.

### Hydraulic Modeling

BSPC will use the U.S. Army Corps of Engineers Hydrologic Engineering Centers River Analysis System program (HEC-RAS). BSPC states this platform allows for a robust two-dimensional flow model. In addition, BSPC will perform a sensitivity analysis to determine an appropriate cell size that balances level of detail, stability, and model run time.

***FWS Recommendation:*** We agree that it may be unnecessary to use a finer mesh in areas of homogeneous habitat and simple hydraulics. However, the decision of where different mesh sizes are needed should be determined in consultation with the resource agencies. For example, a finer mesh size may be warranted in a homogeneous area where trout redds have been documented.

## Habitat Modeling

BSPC proposes to use the target species and life stages evaluated in its Instream Flow Assessment.

***FWS Recommendation:*** We support the proposed species list, but recommend that the fry life stage be included for each species. The final study plan should include the actual habitat suitability curves in an appendix, not just reference where the binary criteria originated. We recommend adopting final curve sets derived in consultation with the fisheries resource agencies.

The field data will be imported into ArcGIS Model Builder and Python scripts to generate depth and velocity habitat suitability index rasters, which in turn will be used to create the final habitat suitability index raster for each flow rate by species. BSPC will develop maps of habitat suitability for each species as well as compute weighted usable area or other similar metric, by mesohabitat or other location of interest.

***FWS Recommendation:*** Final habitat suitability index rasters should be developed for each target species and life stage. The raw raster data set should be made available to the fisheries resource agencies. BSPC does not explicitly state which models will be used to analyze the data. In order to gain a full understanding of how project operations affect suitable habitat (spatially and temporally), we recommend BSPC conduct steady state, dual flow/persistence, and habitat time series modeling. We do not recommend analyzing habitat duration; experience at other projects that manage water on a daily volume basis has shown that habitat duration analyses effectively mask sub-daily impacts to aquatic habitat.

## Data Analysis and Reporting

BSPC will provide a report that will include elements such as an introduction and background, methodology, and results.

***FWS Recommendation:*** BSPC does not provide specifics on the types of tables, graphs or figures that would be included in the report. We recommend that BSPC prepare tables and figures similar to FirstLight Power Company's presentation of its instream flow study results for the relicensing of the Turners Falls Hydroelectric Project (FERC No. 1889), including habitat persistence maps and tables, steady state curves (habitat versus discharge) and tables (percentage of maximum weighted usable area by discharge), and habitat time series figures (habitat versus time).<sup>2</sup>

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<sup>2</sup> FERC Accession Nos. 20161017-5012 and 20170403-5617; <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> (accessed April 2019).

Mr. Robert Kubit, P.E.  
April 19, 2019

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Thank you for this opportunity to review and provide comments on the proposed Instream Flow Study Plan submitted with BSPC's WQC application. Should you have any questions regarding these comments, please contact Melissa Grader at 413-548-8002, extension 8124.

Sincerely yours

Handwritten signature of Eric L. Dettl in black ink.

Acting for  
Thomas R. Chapman  
Supervisor  
New England Field Office

Mr. Robert Kubit, P.E.  
April 19, 2019

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cc: Steven Murphy  
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ES: MGrader:4/19/19:413-548-8002