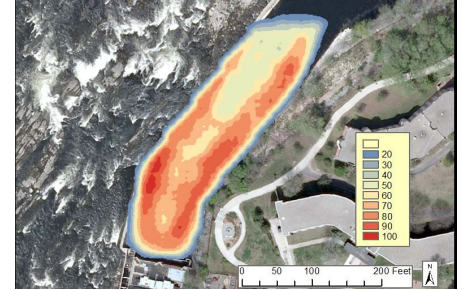
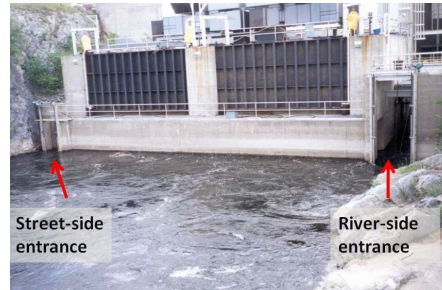


# Shad Upstream Passage Assessment at the Lowell Hydroelectric Project (Boott Station, FERC NO 2790)



## Project Summary

Alden was contracted by Boott Hydropower, Inc. to evaluate adult shad passage success or impediments, and overall fish migration patterns from the Lawrence Hydroelectric Project tailrace and into the project's fish lift hopper.

## Client

Boott Hydropower, Inc.

Subsidiary of Enel Green Power North America, Inc.

One Tech Drive, Suite 220

Andover, MA 01810

## Location

Lowell, MA

## Year

2011

## FOR MORE INFORMATION,

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## Project Overview

The objective of this study was to further evaluate American shad behavior in the Lowell Hydroelectric Project tailrace as they approach the entrances to the fish lift system as well as the behavior of shad once they pass the entrance and are moving toward the fish lift hopper. Boott was interested in collecting qualitative and quantitative data that would be useful for determining any impediments to upstream passage through the fish lift system. Using the results of this evaluation, Boott is seeking solutions to improve shad passage success at Lowell.

## Work Performed

Alden performed a filed study of the upstream passage of American shad through the use of three-dimensional acoustic telemetry to provide high resolution data about fish behavior. Fish to be tested were collected from the fish lift at the Lawrence Hydroelectric Project, implanted with the acoustic tags, and then released on the upstream side. Hydrophones at both the Lawrence and Lowell projects gave travel times for fish moving upstream between the two dams. Upon reaching the Lowell tailrace, the fish entered into the hydroacoustic telemetry array installed in the tailrace. The system recorded their movements in three dimensions to show where the fish were swimming after they entered the tailrace. The hydroacoustic data collected illustrated the swimming patterns of fish in the tailrace which provide information on the problem areas in the fishway. Hydroacoustic data were used to make recommendations on the operation of the components of the fishway and potential modifications to effect an increase in the potential for upstream passage success.

## Project Highlights

- Alden used 3D acoustic telemetry tags to accurately evaluate the movement patterns of American shad movement upstream.
- Alden also provided analysis and guidance on improvements on the existing fish passage system at Lowell.