

Baird

Projects

Salmon Smolt Study *Narraguagus River*

Client

Northeast Fisheries Science Center

Project Scope

The Northeast Fisheries Science Center (NFSC) of NOAA has been studying the Atlantic Salmon population along the coast of Maine for many years, and trying to better understand its life cycle and causes of mortality. Efforts to understand the migration of smolts from the rivers into the open ocean have made use of acoustic telemetry systems for a number of years, resulting in large amounts of complex data. Initial review of the data provided limited information about the smolts' movement - a better understanding of the smolts' history was essential to better understand the processes.

Services Provided

Baird & Associates was retained by NFSC to develop a software system to aid in the visualization of the smolt telemetry data, and to carry out field work and numerical modeling of the migration region. The aim of this study is to provide a better understanding of the telemetry data through advanced visualization and analysis, while also providing a detailed description of the environment that the smolts are experiencing during their seaward migration.

The field study involved a hydrographic survey of a section of the Narraguagus River and the deployment of many CTD's and current meters. From these data, a numerical model of the water levels, currents, temperature and salinity was developed and calibrated, providing a description of the smolts' environment throughout any field season.

Telemetry databases were then processed and imported into Baird's SDA package, where each detection of a smolt could be reviewed in a time varying and spatial manner. Further processing of these detections resulted in an estimate of each smolt's path, which could be edited and adjusted by the user based on tools such as particle tracking (to understand the currents as the smolt passed through the study area). The smolt movement could then be animated concurrently with the numerical model results to provide a better understanding of the processes at play. A three-dimensional viewer with additional visualization capabilities was also developed for enhanced visualization and animation preparation.

Following completion of the tracks, shapefiles describing the passage of each smolt are created, with attributes such as time, position, speed, water currents, water depth, salinity and temperature. In addition to these, the interface allows for any other time series type of data to be assigned to the smolt tracks. These clear concise output files allow for further analysis outside the SDA package, such as in GIS or database programs.

