

U.S. Fish and Wildlife Service

Connecticut River Coordinator's Office

Adult River Herring Population Assessment Survey Protocols for the Connecticut River Basin

December 2014

Goal

Obtain fishery independent population data for blueback and alewife and evaluate population status and trends.

Objectives:

- 1) Collect adult alewife and blueback from target sample areas for laboratory processing, extraction of otoliths and scale samples;
- 2) Target of 50 fish total sample (combined species) for each sample date;
- 3) Sample between two to three target areas weekly from early April through late June;
- 4) Use standardized gear and effort to conduct surveys, principally boat electrofishing;
- 5) Complete otolith age determination – following MA Division of Marine Fisheries Aging Protocols;
- 6) Describe age structure data for both species, by sex, among areas, among years, and other combinations; and
- 7) Examine data for relative abundance, by area, over time (within/among years), and other combinations, and describe length and weight data by species, sex, area, over time, and in other combinations.

Methods

A Smith Root (SR18) electrofishing boat, with a 5,000 watt generator (5GPP model) and boat hull rigged as cathode, using two eight dropper anode arrays off bow booms, is the primary sampling platform. Boat electrofisher settings are dependent on encountered water conditions and subsequent fish responses, which may vary, but are generally set to fish at approximately 6 amps output, in either low to high range, generally fishing at 400-500 volts, in pulse DC mode. All boat party members are instructed on boat operations, boat features, safety, safety features, and will wear knee high rubber boots, pants (no shorts), polarized glasses as needed, and high voltage lineman gloves.

Sampling effort is standardized for two dip netters, using long handled, fiberglass, soft mesh nets off the bow deck. Fish sampling is conducted from an upstream to downstream direction at a rate of approximately 3 mph, or a rate of speed as necessary with increased currents or eddies. Timed runs, of 500 seconds, based on electrofisher "on time" are used as a sampling unit with replicates, often 4-7 runs per date and location is completed. Netters apply power in bursts using foot pedals at the bow, for approximately 3 seconds, and then go "off" for a similar time to prevent the pushing of fish ahead of the boat to the extent possible.

River herring are the priority target species and all possible stunned individuals in the boat's field are attempted for capture by the two netters. Fish are placed in the live well until the 500 second sample period is completed. The boat is then directed and run back upstream, several hundred meters to

process that run's catch. Each data sheet identifies sampling site and equipment data settings and other data. Fish are clearly assigned to each sample "run" on the data sheets. Species, sex, total length and fork length, and weight are recorded, along with noting other species observed. Depending on catch rate, such as in early season, all fish will be retained to ensure a 50 fish sample to the laboratory. Fish are individually placed in ziplock baggies that are numbered and correspond to individual measurements on data sheets, that are identified by the same number.

In the event fish catch rates are high, as in obtaining well over 75 fish in under 300 seconds of effort, subsampling may occur. Efishing may be ended prior to reaching 500 seconds of "on-time" in the interest of distributing the sample among multiple run locations, with batches of fish bagged and retained by run (i.e., 15 per run) in an attempt address cluster sampling concerns. In the event of high catch rates, the number of reduced seconds fished will be noted on the data sheet for later data entry. The objective of describing species size structure for a sample area does not require many hundreds of adult fish be measured. As a result, subsampling can be used to obtain a measurement sample of at least 50 fish per species for a run, with any fish/species over that being simply counted and released – BOLDLY noting the number for each run the number counted and released (by species) so the relative abundance measures (catch rates – fish per minute – can accurately be derived). This adaptive sampling approach will often result in a sample of up to several hundred measured fish and will allow more runs to be conducted than would otherwise be possible at peak run times.

All bagged/numbered fish are placed in a cooler for holding until arriving back at the office. Bagged fish should be iced in warmer conditions. At the hatchery, the laboratory refrigerator can hold the cooler which can be propped open inside. Data sheets for the sampling date should be placed in the cooler. Processing of lab samples typically occur the following day. All bagged fish will be checked with field sheet data to confirm accurate species assignment. Otolith extraction procedures follow Massachusetts Division of Marine Fisheries (MADMF), Aging Laboratory guidance, and includes placement in 5ml vials, with unique number assignments, with lids off until next day to allow for air drying. Scales are removed (MADMF procedures) and placed in scale envelopes that also identify back to individual fish record, and lists length and weight data.

Field data sheet are entered into an ACCESS database that identified sampling areas by codes, date, run, and each fish captured that are either taken to the lab or processed on the boat for data (sex, lengths, etc.). Unique ID code for all fish that were sampled for age structures are assigned and identified in the database and on otolith vial labels. Later age determinations will be entered in this file, with reader initials and level of confidence. Fish that are identified by species, counted and released (high volume sampling) are noted in a separate EXCEL file that is used for relative abundance measures, reported as fish per minute, based on total fish captured, not only what was measured on board vessel.

Target Sample Areas

Population sampling is conducted within the defined primary areas shown in Figure 1 but may also include additional areas.

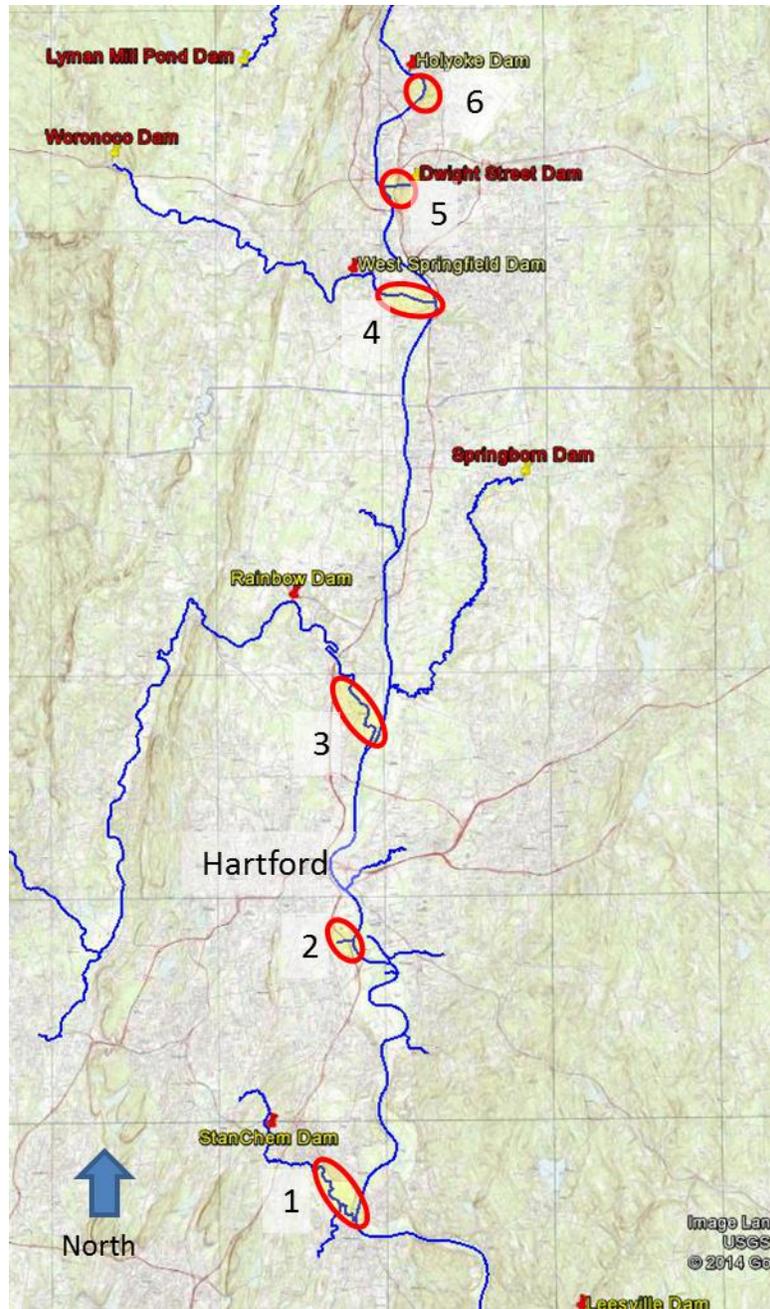


Figure 1. Adult river herring population assessment field sampling locations:
 1) Mattabesset River; 2) Wethersfield Cove; 3) Farmington River;
 4) Westfield River; 5) Chicopee River; 6) Downstream of Holyoke Dam
 (Images from/using Google Earth)

Additional Connecticut River Main Stem Sample Areas

- 1) River left, main stem shoreline Glastonbury, Keeney Cove and further downstream, CT
- 2) Shallow gravel area off of Salmon Brook, Glastonbury, CT
- 3) Vicinity of Dexter Coffin Bridge, near outlet of Windsor Locks Canal, CT
- 4) Shallows upstream of old Enfield Dam, CT

Sampling Summaries

Overall USFWS river herring population assessment effort was increased in 2014 from 2013, with disproportionate increases in bluebacks and alewives sampled (Table 1).

Table 1. Selected sampling statistics comparing USFWS river herring population assessments in 2014 and 2013.

	2014	2013
Number of sampling dates	21	18
Total sample runs	124	81
Total Efishing seconds	55,736	41,177
Total bluebacks captured	2,593	714
Total alewives captured	220	107
Blueback herring oto/scale - lab	655	501
Alewife oto/scale - lab	188	103

Some provisional summary data and results are provided in the Annual Report for F-100-R (Sport Fish Restoration Grant) on the Coordinator's website <http://www.fws.gov/r5crc/>. A stand-alone report for this study will be developed as the age structures are more completely and thoroughly examined.