



Connecticut River Atlantic Salmon Commission
 Technical Subcommittee for River Herring
River Herring Restoration Status and Plans in the Connecticut River Basin
February 10, 2015

This document is intended to identify current and future target areas for river herring (alewife and blueback) restoration in the Connecticut River basin states of Connecticut and Massachusetts. Persistent low blueback herring passage at Holyoke Dam and existing fish passage concerns at Turners Falls Dam fishways restricts the short-term focus (2015-2017) to areas downstream of Turners Falls Dam (Figures 1 and 2). This working document is designed to provide short-term guidance for three management topics that are subject to change, as determined by the member agencies of the Connecticut River Atlantic Salmon Commission (CRASC). The three management topics to be covered in this document include: 1) Passage, 2) Transplantation, and 3) Evaluation. The CRASC has an existing “Management Plan for River Herring in the Connecticut River Basin” that provides more background, the management goal, and seven management objectives that include the elements presented here (CRASC 2004).

PASSAGE

Current fish passage for river herring is provided by technical fishways at 15 barriers listed in Table 1 and also shown in Figures 1, 2, and 3. Discussion of alewife passage is limited to Connecticut because the small Raspberry Brook just over the line in East Longmeadow, MA is the only known alewife run in the basin upstream of the Connecticut State line.

Table 1. Information on existing fish passage facilities that are located in historic river herring habitat in the Connecticut River basin.

State	Tributary name or reach location	RKM ^A to barrier	Dam Name	Town/State	upstream RKM accessible	Type of fish passage
CT	Mill Brook	5	Mary Steube	Old Lyme, CT	2	steepass
CT	Mill Brook	7	Upper Millpond	Old Lyme, CT	2	steepass
CT	Mill Brook	9	Rogers Lake	Old Lyme, CT	lake	steepass
CT	Falls River	1	Tiley-Pratt	Essex, CT	2	
CT	Eightmile River	5	Moulson Pond	Lyme, CT	5	steepass
CT	E. Branch Eightmile R.	10	Ed Bills Pond	Lyme, CT	5	steepass
CT	Salmon River	4	Leesville	East Haddam, CT	11	Denil
CT	Mattabesset	11	StanChem	Berlin, CT	50	Denil
CT	Farmington River	13	Rainbow ^B	Windsor, CT	24	vertical slot
MA	Westfield River	7	West Springfield ^B	West Springfield, MA	23	Denil
MA	CT River main stem	139	Holyoke ^B	Holyoke, MA	59	fish lift
MA	Manhan River	5	Easthampton Manhan	Easthampton, MA	18	Denil

Table 1. continued

State	Tributary name or reach location	RKM ^A to barrier	Dam Name	Town/State	upstream RKM accessible	Type of fish passage
MA	CT River main stem	198	Turners Falls ^C	Montague, MA	30	Modified Ice Harbor and vertical slot
NH	Ashuelot River	3	Fisk Mill ^B	Hinsdale, NH	5	Fish lift
VT	CT River main stem	228	Vernon ^B	Vernon, VT	52	Modified Ice Harbor and modified vertical slot

^A river kilometers from the mouth of either the listed tributary or the main stem

^B hydropower

^C Turners Falls Dam project has three distinct fishways; Cabot Station, Spillway, and Gatehouse

Planned fish passage projects, at various phases, that will benefit river herring are listed for nine barriers in Table 2. Funding for these projects include State, Federal, and non-governmental funding sources.

Table 2. Planned fish passage measures that are in various phases of development.

State	Tributary	RKM* to barrier	Name	Town/State	Passage Plan	upstream RKM accessible
CT	Falls River	3	Dolan Dam	Essex, CT	remove/ladder	<1
CT	Falls River	<4	Mill Pond Dam	Essex, CT	ladder	2
CT	Jeremy River (tributary to the Salmon R)	2	Norton Mill	Colchester, CT	remove	27
CT	Farmington	37	Winchell-Smith	Farmington, CT	remove/ladder	13
CT	Farmington	50	Lower Collinsville	Avon, CT	remove/ladder	1
CT	Farmington	51	Upper Collinsville	Canton, CT	ladder	20
CT	Pequabuck (tributary to Farmington R)	12.5	Bristol Brass	Bristol, CT	removal	13.5
CT	Stony Brook	2	Karp Family Dam	Suffield, CT	removal	3
CT	Scantic River	12	Springborn Dam	Enfield, CT	removal	3

*river kilometers from the mouth of the listed tributary

Possible future fish passage projects to support river herring restoration but without a defined plan at this time are listed below in Table 3, and shown in Figures 1 and 2.

Table 3. A list of barriers blocking potential river herring habitat that are under consideration for fish passage measures.

State	Tributary	RKM* to barrier	Name	Town	Passage Plan	upstream RKM accessible
CT	Roaring Brook	1	Roaring Brook Dam	Lyme, CT	ladder	10
CT	Moodus River	1	Johnsonville Dam	East Haddam, CT	ladder	1
CT	Coginchaug River	5	Starr-Mill Dam	Middletown, CT	ladder	1
MA	Mill	5	Advocate Dam	Hatfield, MA	removal/ladder	>20
MA	Mill	1	Lake Warner	N. Hadley, MA	ladder	>10
MA	Green River	2	Wiley Russell	Greenfield, MA	possible ladder	< 1

*river kilometers from the mouth of the listed tributary

Passage Priorities

CRASC priorities for fish passage include: 1) resolving known passage problems at existing fishways where river herring passage is ineffective; 2) providing fish passage at barrier(s) where there are no fishways but fish are present; 3) working to provide future fish passage in identified habitats absent of fish; and 4) working to provide future fish passage at barriers upstream of existing ones, in targeted habitat. Additional factors that must be considered regarding priorities include the quality and quantity of habitat upstream of barriers among the priority groups listed and the expected degree of potential population response/impact. Downstream passage for both spent adults and juveniles is an important consideration that may require additional measures and similar to upstream passage measures should be safe, timely and effective. Actions to address passage priorities may be impacted by: 1) lack of information on cause(s) of fish passage issues; and 2) lack of information on causes of run contraction in distribution (extent and magnitude) in the basin and future population responses to management measures. Other factors that may impact actions include project readiness (e.g., extent of known issues, permits), cost, and funding sources. Passage prioritization will be used by the CRASC to rank restoration projects. Priorities will be revisited on an annual basis to reflect changes in river herring distribution and passage needs.

TRANSPLANTATION

CRASC member fishery agencies have utilized trapping at fishways or capture from field collections of wild pre-spawn alewife and blueback herring as a restoration strategy for many years. The goal of this strategy is to produce juveniles in targeted but underseeded habitat (for both spawning and nursery), accelerating the rate of natural run restoration or recovery. This strategy results in an immediate addition of adults to sub-basins or tributaries where these

species are excluded. Following successful spawning by the transplants, juveniles may occur in relatively high densities, making ongoing ecological contributions in these restoration areas until their outmigration, and later in the marine environment. Advances in fish population genetics have led to a preferred strategy of using “in-basin” sources of fish for transfers to protect against negatively impacting any unique heritable genetic traits. Priorities for transplantation activities will be determined by the CRASC before each spring season. Coordination among the lead regulatory agencies for capture and transfers (e.g., MA Division of Marine Fisheries, MA Division of Fisheries and Wildlife, and CT Department of Energy and Environmental Protection) will occur and include any permits, direction or guidance as specified by those agencies. The MA Division of Marine Fisheries has a River Herring Stocking Protocol that was recently developed and is designed to minimize “out-of-basin” and provide an opportunity for natural recolonization (MADMF 2013). The U. S. Fish and Wildlife Service (USFWS) Connecticut River Coordinator’s Office has a planning document that outlines objectives, methods, and planning approach and provides results of activities in the 2014 Annual Report (Sprankle 2014).

In Connecticut and Massachusetts, the following waters have been identified for blueback restoration stockings by prioritized tiers. The Tier 1 group includes primarily accessible spawning and nursery habitat but for a variety of reasons is under-utilized or unutilized by river herring. The Tier 2 group is comprised of primarily inaccessible habitat for river herring.

Tier 1

1. Westfield River, Westfield, MA, upstream of the West Springfield Dam,
2. Farmington River, Farmington, CT, upstream of Rainbow Dam, CT
3. Manahan River, Southampton, MA, upstream of Easthampton Town Dam
4. Oxbow, Easthampton/Northampton, MA, at the Oxbow Marina
5. Stony Brook, Suffield, CT, upstream of Schwartz Dam, CT

Tier 2

1. Mill River, Hatfield, MA, upstream of Advocate Dam
2. Green River, Greenfield, MA, upstream of swimming area seasonal dam
3. Fort River, Amherst, MA
4. Scantic River, Enfield, CT, upstream of Springborn Dam
5. Falls River, Essex, CT, upstream of Mill Pond Dam

EVALUATION

Adults – The USFWS conducts annual spring surveys for both alewife and blueback herring with the goal of obtaining fishery independent population data to evaluate population status and trends. Assessment study details are provided in “Adult River Herring Population Assessment Survey Protocols for the Connecticut River Basin” by the Connecticut River Coordinator’s Office with some preliminary results provided in the 2014 Annual Report (Sprankle 2014). A suite of

data are gathered using standardized gears and methods to characterize species composition, run timing, relative abundance, demographics (lengths and weights), and age structures, for later use in age and spawning history determinations. Fish counts for river herring are also determined at fishways in the basin using live, electronic, and digital/video counts. Fish counts are provided weekly during the spring season by the CTDEEP Diadromous Fish Program basin-wide and include smaller tributaries within Connecticut. Main stem and the larger tributary (e.g., Farmington River, Westfield River) fishway counts may be provided on a week-day daily basis, pending availability, by the USFWS Connecticut River Coordinator's Office on the office web site (Figure 4).

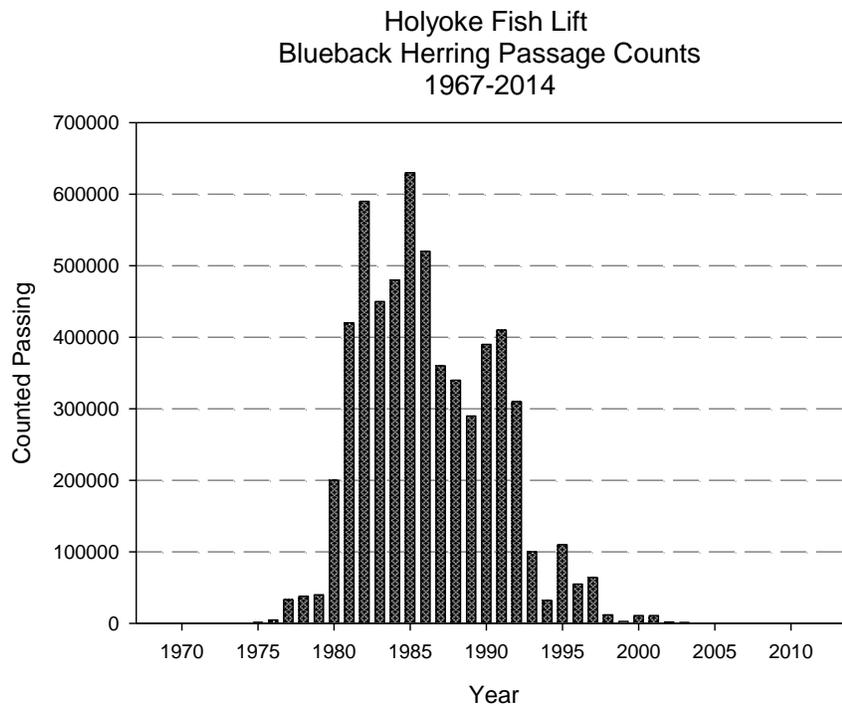


Figure 4. Annual blueback herring fish counts at Holyoke Fish Lift, 1967 to 2014.

The Connecticut Department of Energy and Environmental Protection (CTDEEP) and Massachusetts Division of Fisheries and Wildlife maintain tributary fishway facilities and count data. The USFWS maintains main stem fishway count data.

Juveniles – The CTDEEP conducts juvenile American shad and river herring surveys annually. The survey deploys beach seines at seven established main stem sites from downstream of Holyoke Dam (Holyoke MA) to the lower river (Essex, CT) during the summer and fall. The survey has been conducted since 1978 and is a monitoring requirement to the Atlantic States Marine Fisheries Commission (Figure 5).

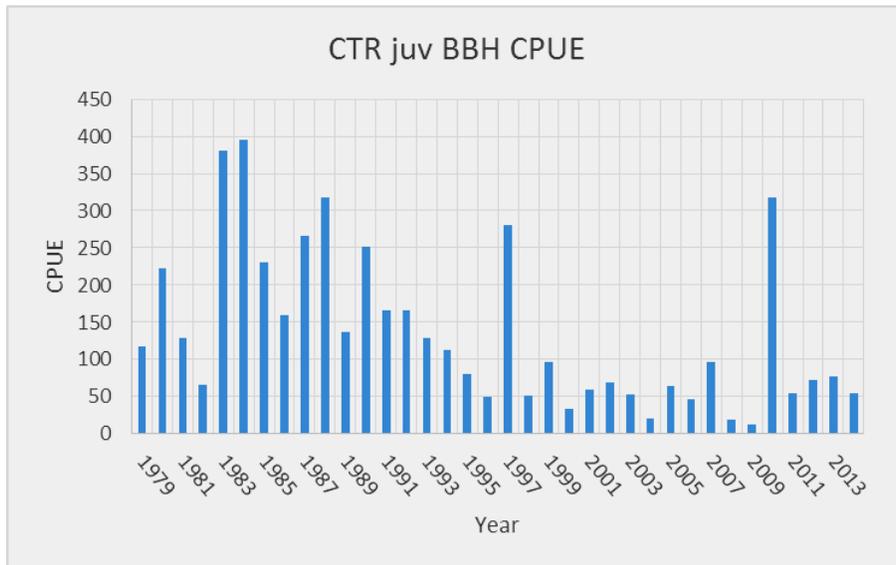


Figure 5. CTDEEP Juvenile Index for blueback herring, arithmetic mean value, 1979 to 2014.

The CTDEEP also has survey protocols to qualitatively assess juvenile alosine production in areas immediately upstream of dams based on early evening popping behavior at the surface. The goal of this approach is to obtain observations that document successful reproduction of river herring and or shad. This activity may also be coupled with netting surveys. Recent limited juvenile assessment work by USFWS has employed boat electrofishing at dusk and early evening as fish move to the surface in low light. Relative abundance measures can be obtained along with data on lengths and species composition that can be compared among areas (wild/natural vs. targeted stocked restoration).

References

CRASC. 2004. Connecticut River Atlantic Salmon Commission, Management Plan for River Herring in the Connecticut River Basin. Sunderland, Massachusetts (accessed at: <http://www.fws.gov/r5crc/>)

MADMF. 2013. Marine Fisheries River Herring Stocking Protocols. New Bedford, Massachusetts (accessed at: <http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/marinefisheries-herring-stocking-protocol-final-2013.pdf>)

Sprankle, K. 2014. Connecticut River basin Anadromous Fish Restoration: Coordination and Technical Assistance. F-100-R-31. Sunderland, Massachusetts (accessed at: <http://www.fws.gov/r5crc/>)

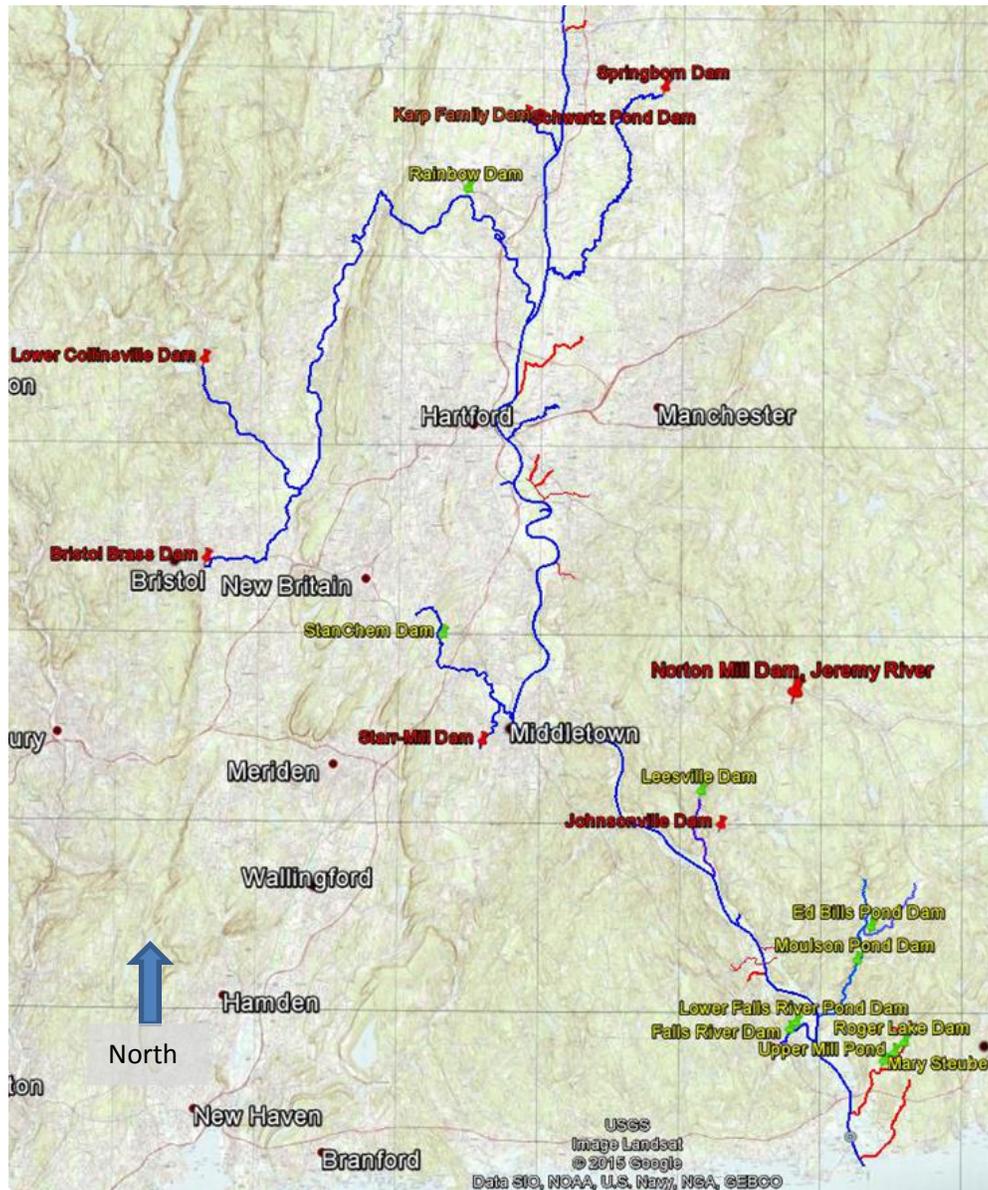


Figure 1. Blue lines represents accessible blueback herring habitat that largely overlaps with accessible alewife habitat within the State of Connecticut, in the Connecticut River basin. Red lines represent alewife accessible habitat. Yellow labeled dams with green location pins have fishways that provide passage while red labeled dams (red location pins) do not. The single red line, top of figure, just above the Massachusetts/Connecticut State Line is Raspberry Brook, the most upstream documented occurrence of alewife in the basin. *All topographic map figures from Google Earth.*

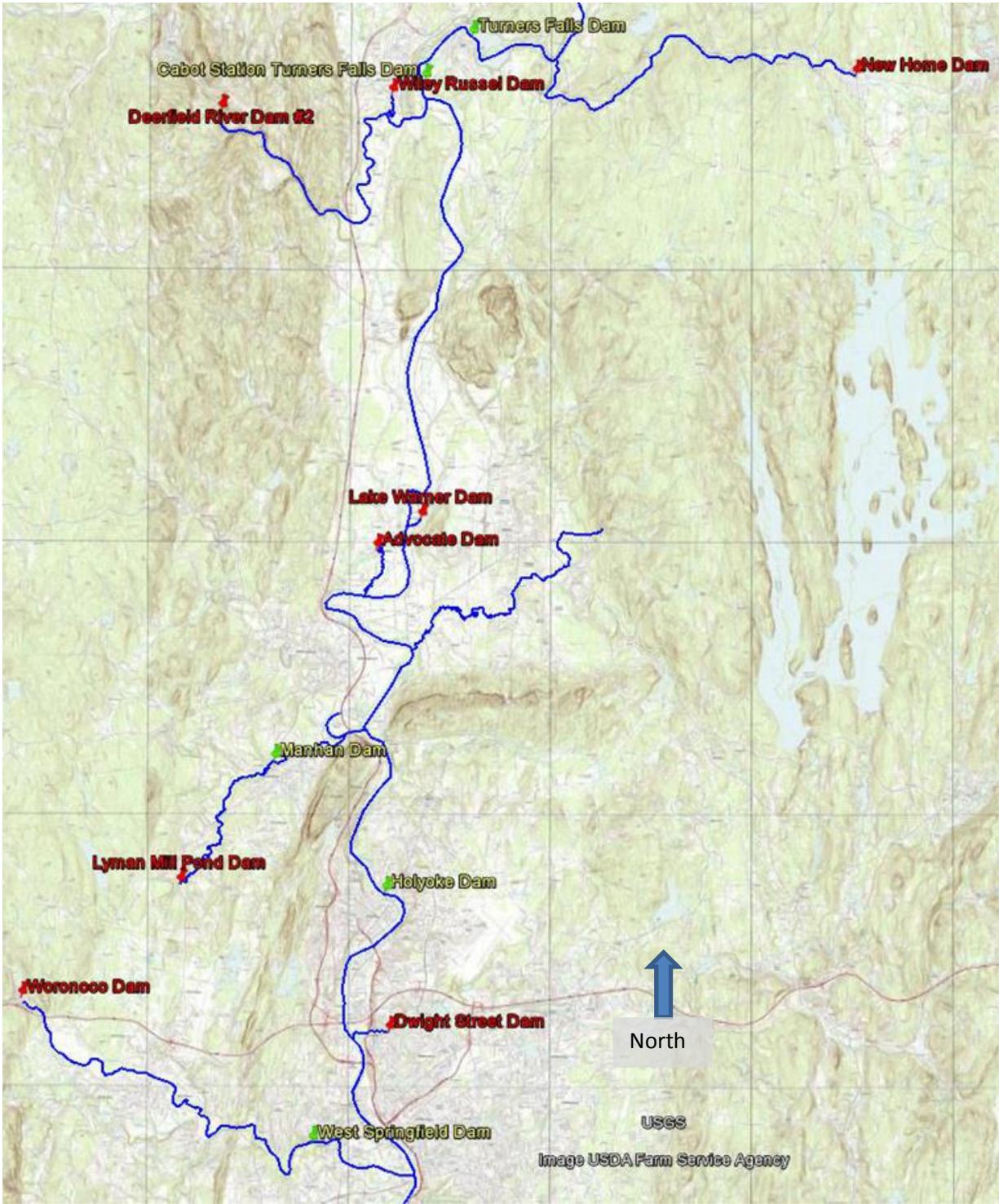


Figure 2. Blue lines represents accessible blueback herring habitat in Massachusetts. Yellow labeled dams with green location pins have fishways that provide passage while red labeled dams (red location pins) do not.



Figure 3. Blue lines represents accessible blueback herring habitat in Massachusetts, New Hampshire, and Vermont. Yellow labeled dams with green location pins have fishways that provide passage while red labeled dams (red location pins) do not.