Diadromous Fish Updates - 2022

Brad Chase, Mass. Div. of Marine Fisheries, Oct. 25, 2022

River Herring Network

Diadromous Fish Restoration Activities

- **Large Watershed Restoration Projects** Several long-developing projects were advanced in 2021/2022
- **DMF Fishway Crew** – Coming off a slow 2021 with 6 jobs in 2022
- **Herring Stocking –** Increased activity in 2022 with 5 sites receiving fish
- **Taunton River Shad Stocking** Cooperative USFWS effort results in stocking over 5 million shad

Bourne Pond, Falmouth

Diadromous Fish Management Activities

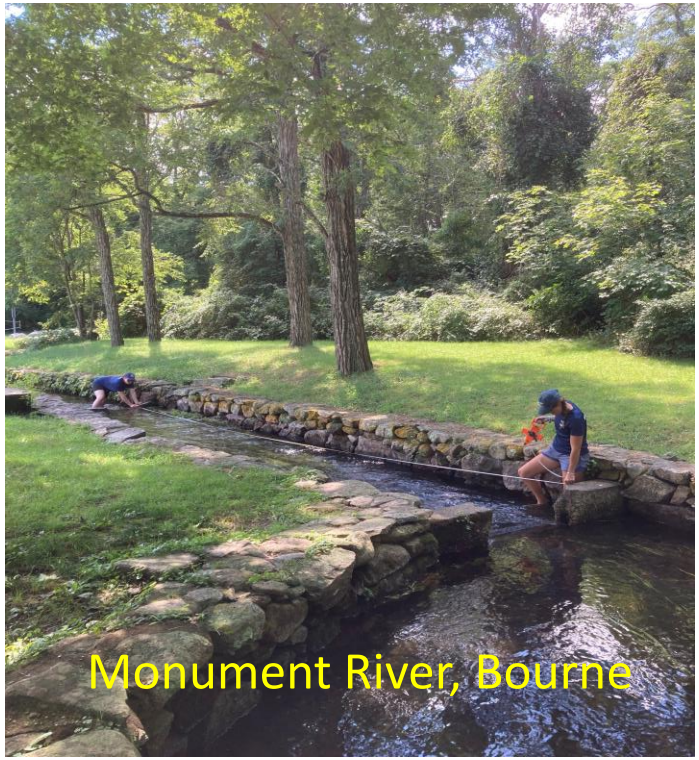
Stream Maintenance Policy – Large DMF crew effort during pandemic and new DMF/DEP policy for stream work and small fishways

GIS Datalayer – Complete GIS datalayer that integrates fish passage survey and DMF Diadromous Fish Restoration Priority List

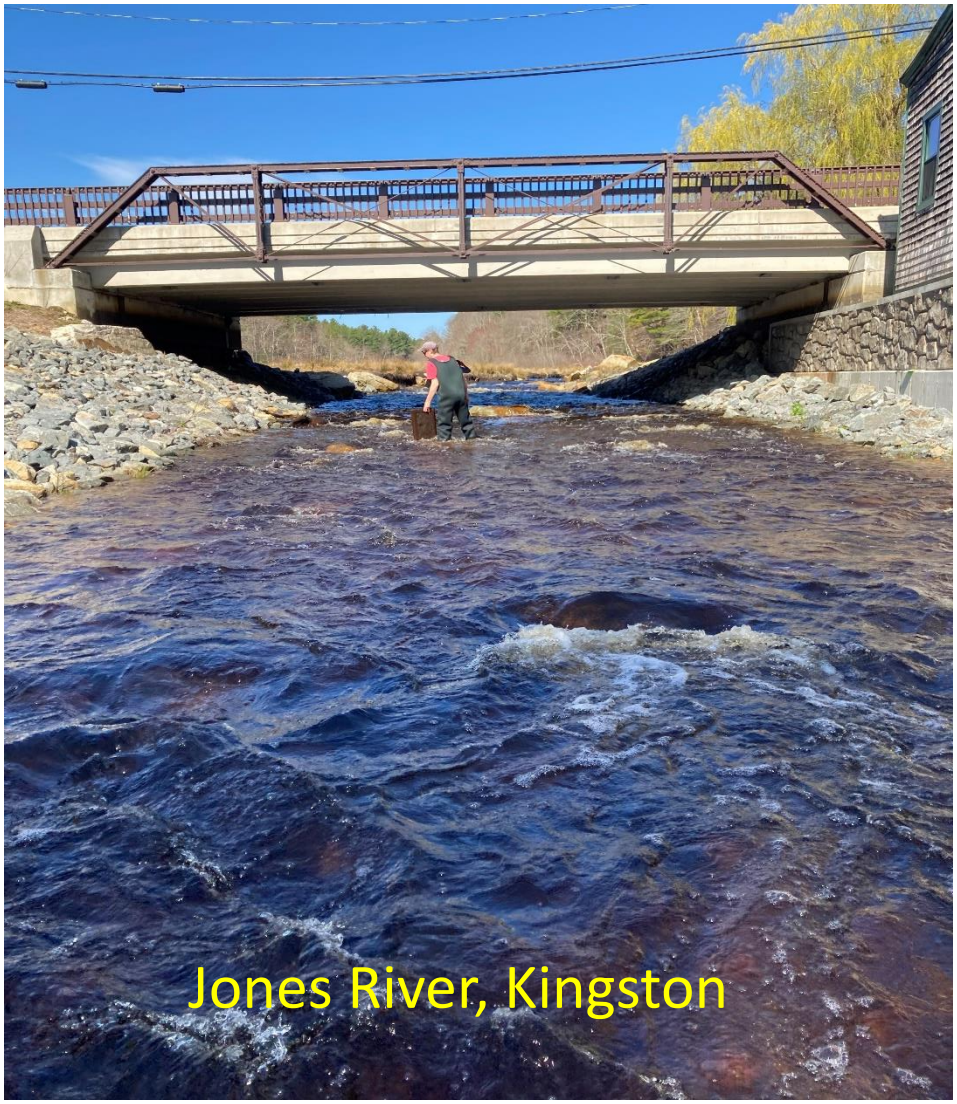
Fish Passage Survey - Updating coast-wide survey last done in 2000-2002

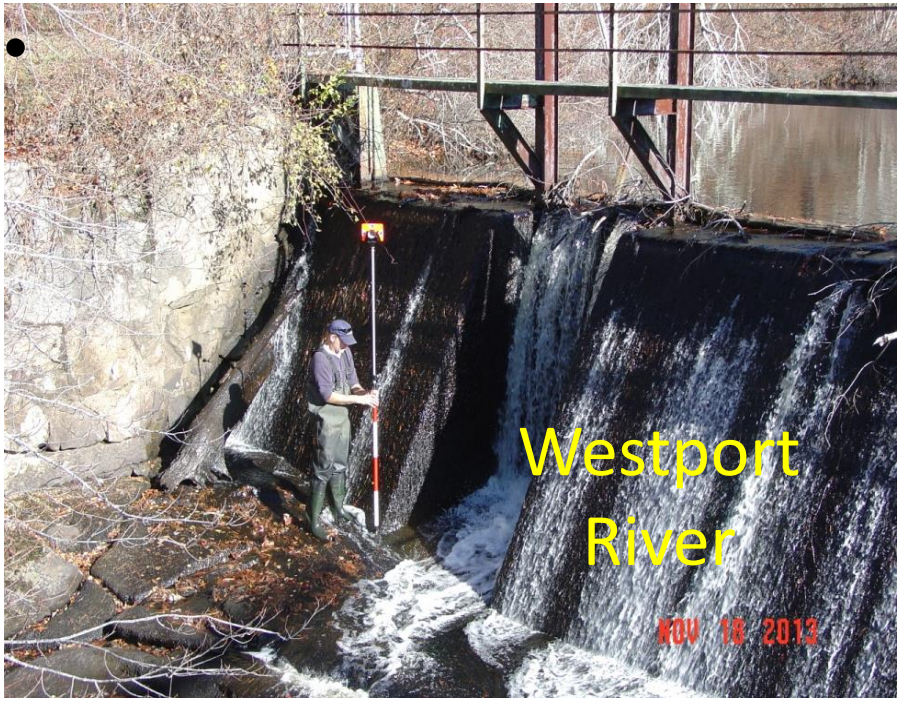
River Herring SFMP – Update ASMFC river herring SFMP; one renewal, one new river

Fore River, Braintree


Monument River, Bourne

Large Watershed Projects

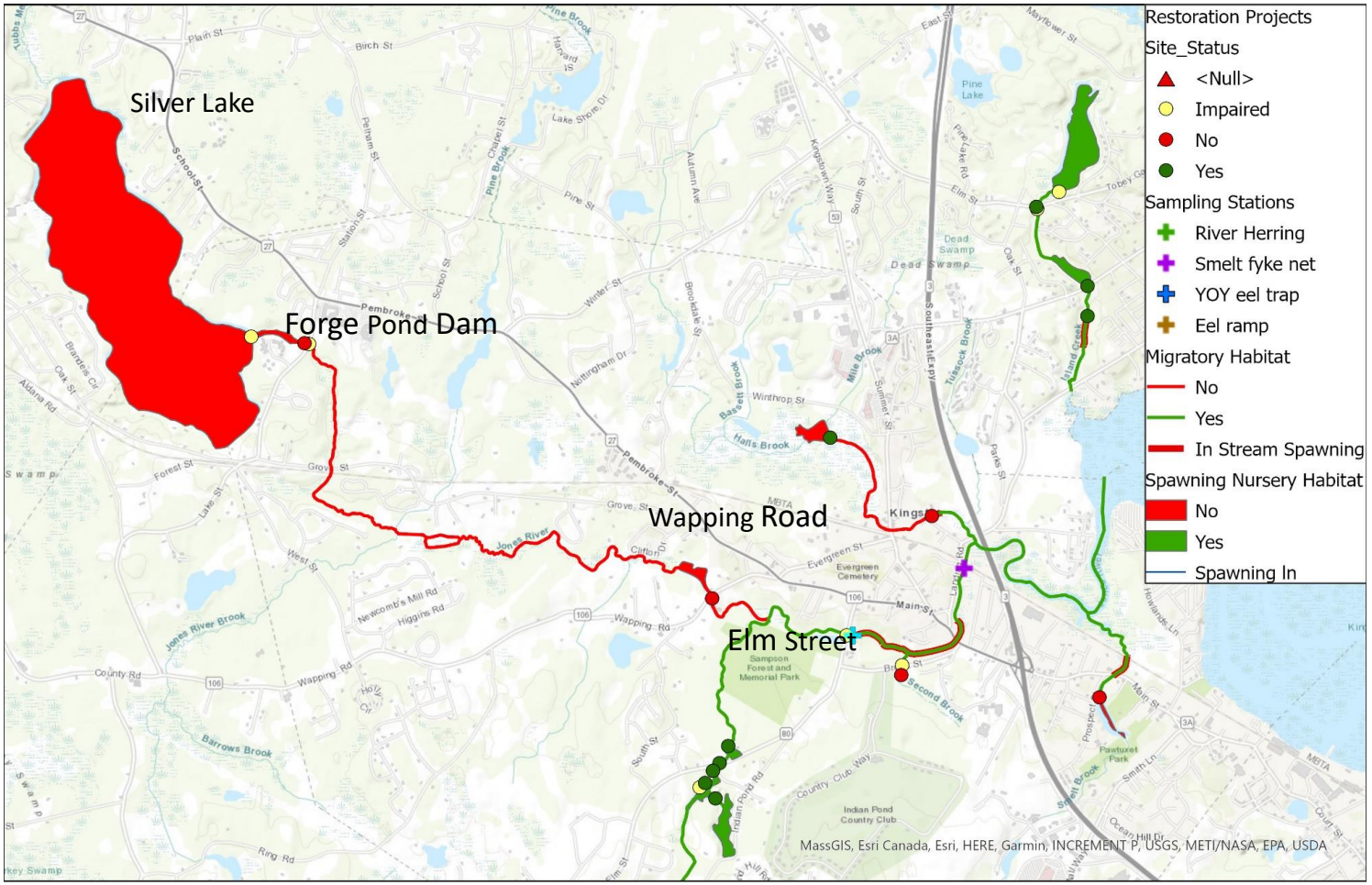




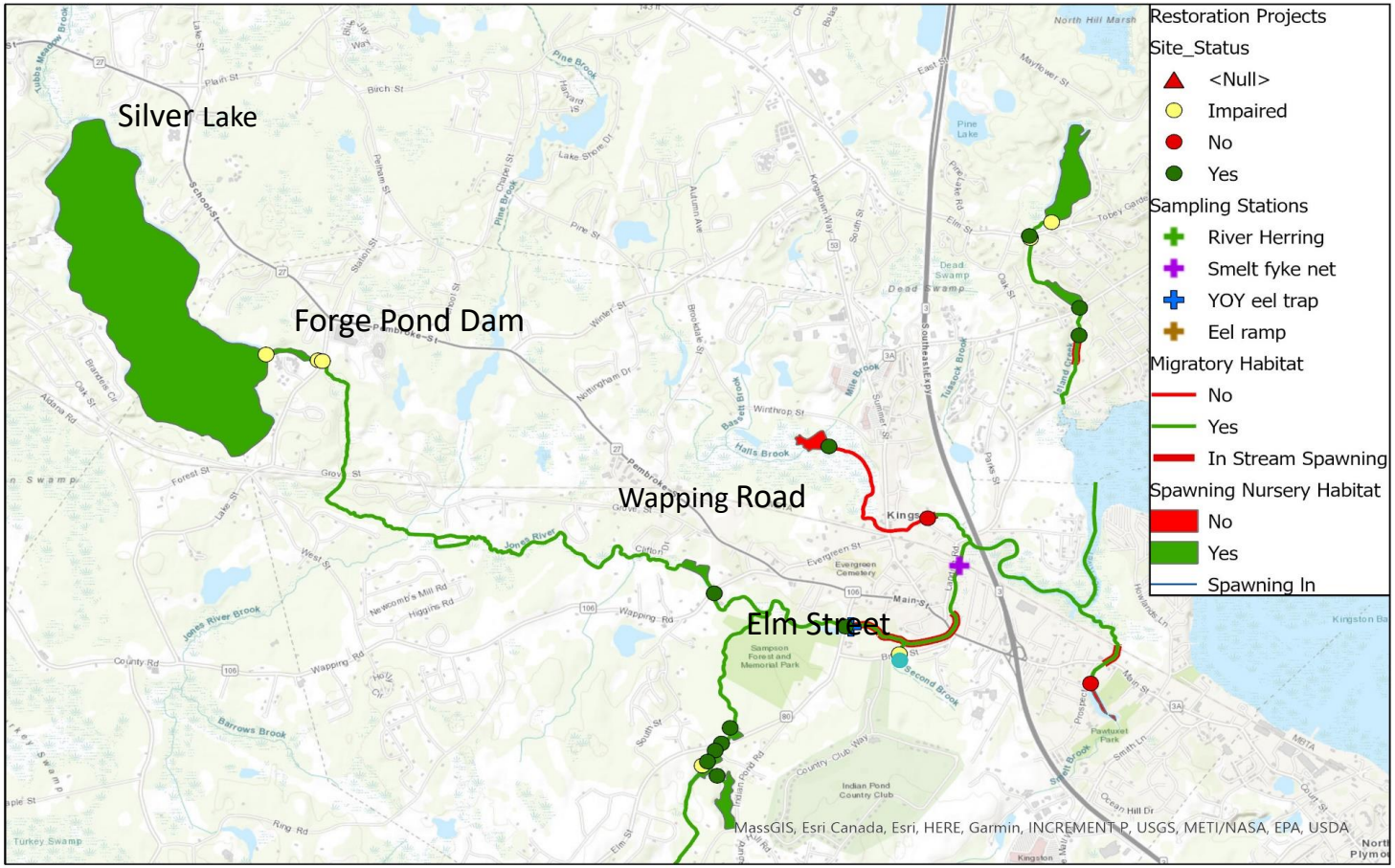
Large Watershed Restoration Projects

- NRCS Cape Cod Watershed Restoration Plan
- Herring River Restoration, Wellfleet
- Talbot Mills Dam removal, Concord River,
- High Street Dam removal, Town River, Bridgewater
- War Memorial Park, fishway, Town River, West Bridgewater
- South River nature-like fishway, Marshfield
- Third Herring Brook fishway, Norwell
- Horn Pond fishway, Aberjona River, Woburn
- Ipswich River, Ipswich (multiple sites)
- Stump Brook fish passage improvement, East Bridgewater

Jones River Watershed Restoration



Jones River Watershed Restoration



2011 - Wapping Road Dam Removal

2019 – Elm Street Dam Removal

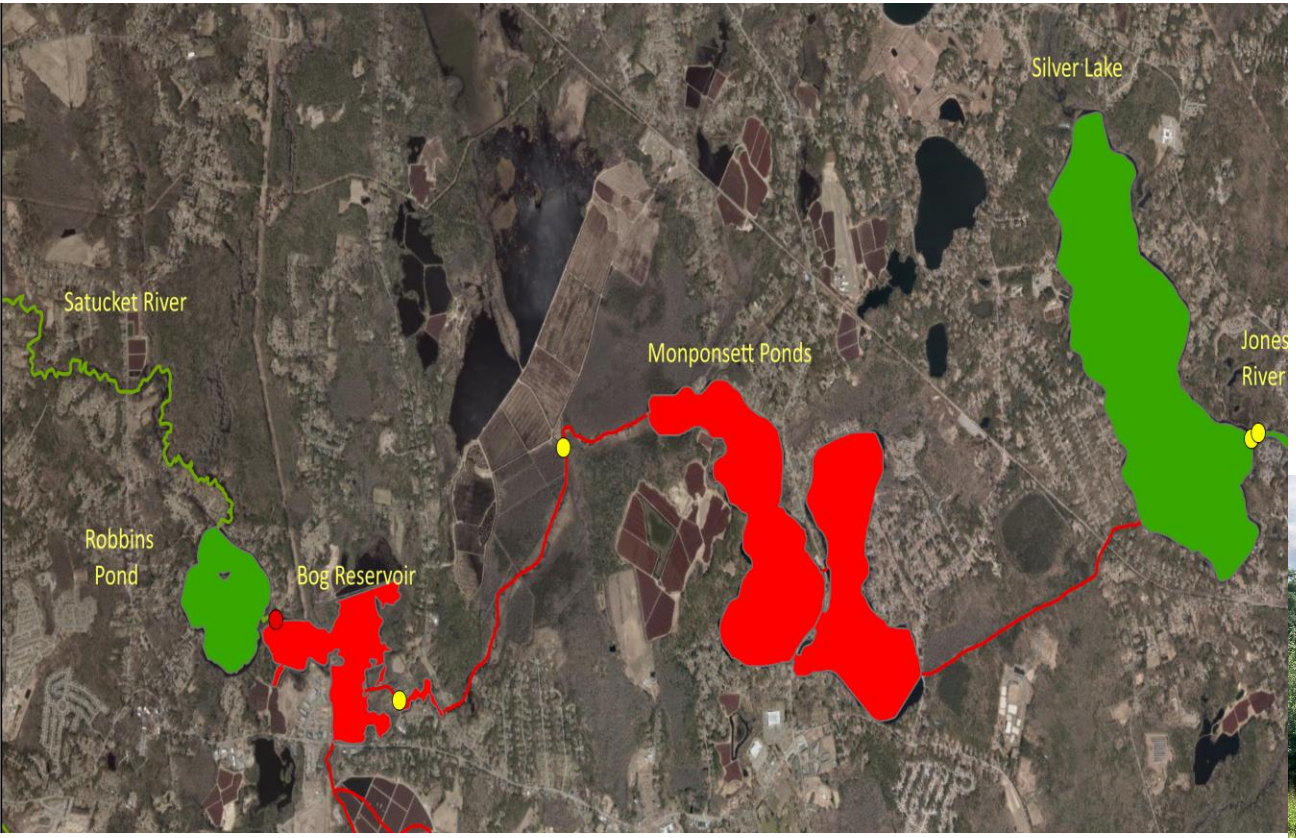
2019 – Forge Pond Dam Fishway

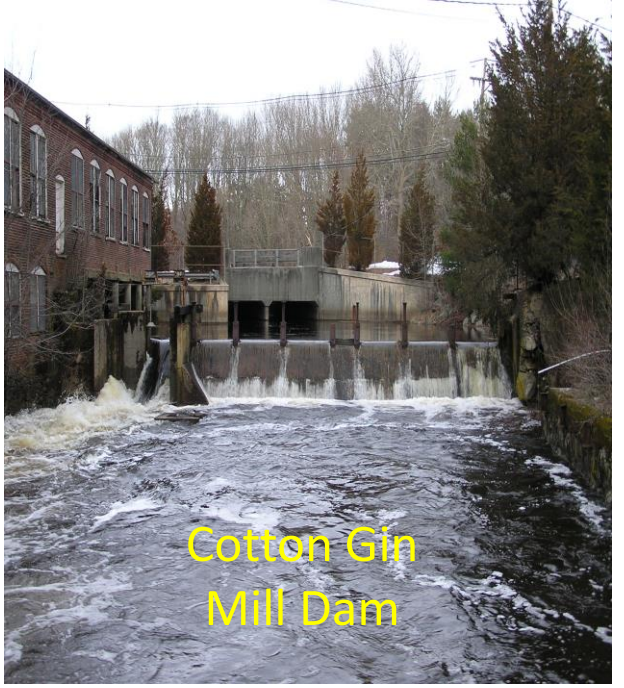
Forge Pond Dam - Jones River, Kingston Fishway and Dredging Design/Permitting

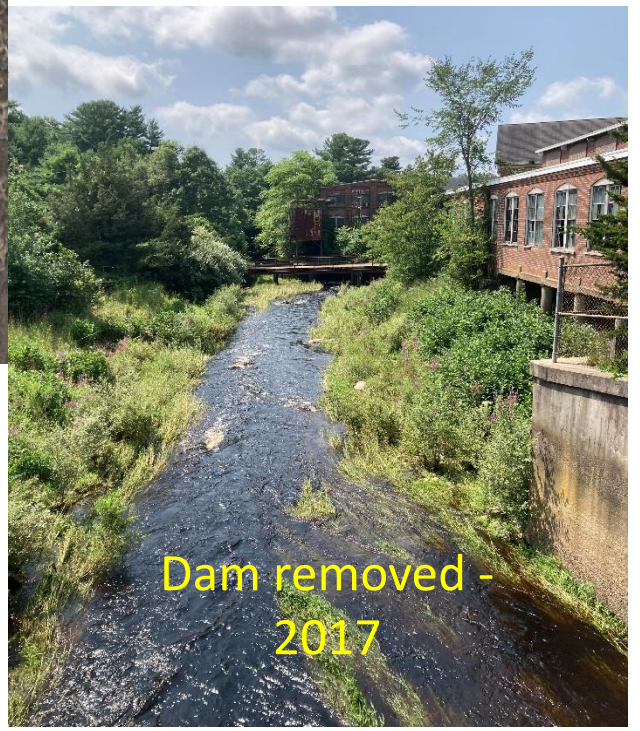
- USFWS Scoping Design for new fishway
- Funding from USFWS/JRWA/DMF
- Contract underway for Design/Permitting

U-Mass Dartmouth MS project on silver eels at Forge Pond Dam

Stump Brook Bog Reservoir Dam, East Bridgewater







Cotton Gin Mill Dam removal in 2017 allowed fish passage to 124 acre Robbins Pond

Passage at bog dam gains passage to 168 acre Reservoir and the 528 acre Monponsett Ponds

Stump Brook Bog Reservoir Dam, East Bridgewater

- DMF survey and scoping design 2019-2021
- Taunton River Stewardship Council – SRPEDD grant
- DMF contract with GZA for final design and permitting
- Conservation Commission hearing last night

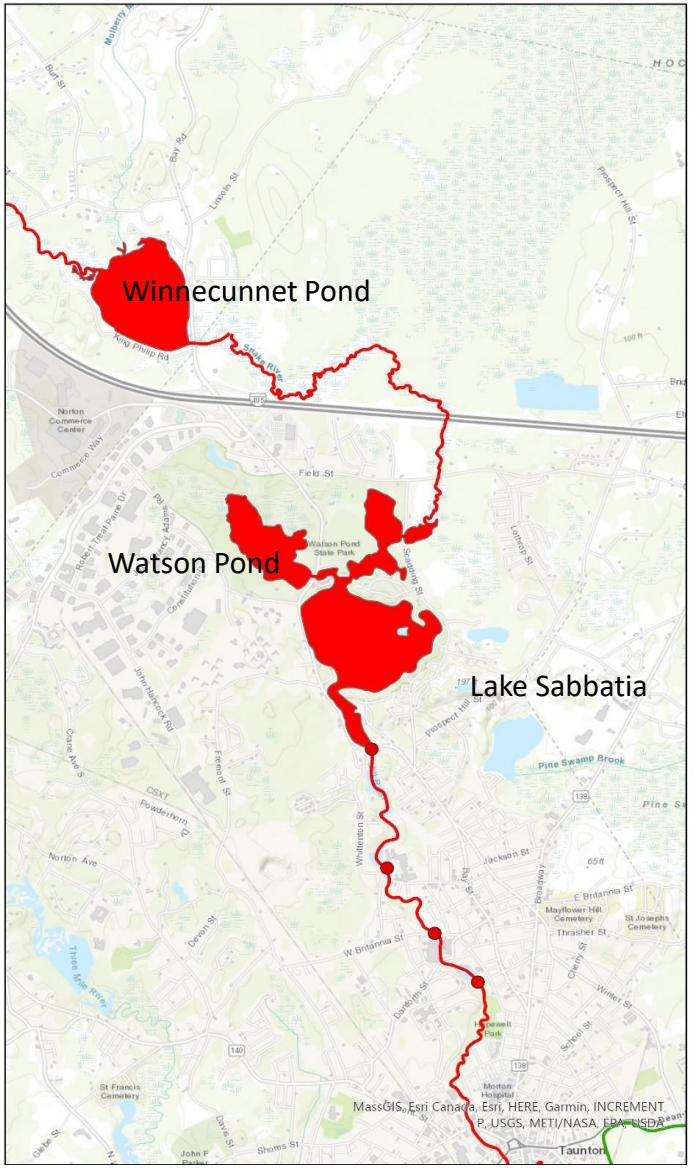
Mill River Watershed Restoration

- Four dams without fish passage, limited migratory fish to <10% of historical habitat
- MA Division of Ecological Restoration began restoration effort soon after 2005 flood

Lake Sabbatia – 265 acres

Winnecunnet Pond - 152 acres

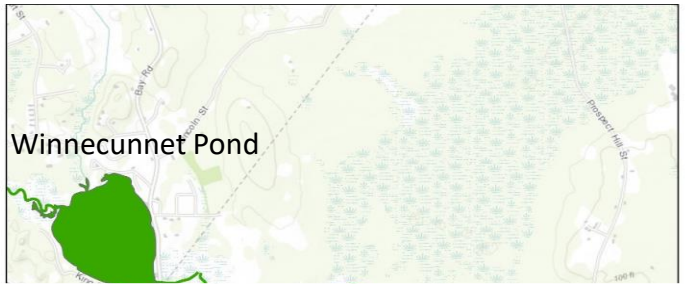
Watson Pond - 78 acres

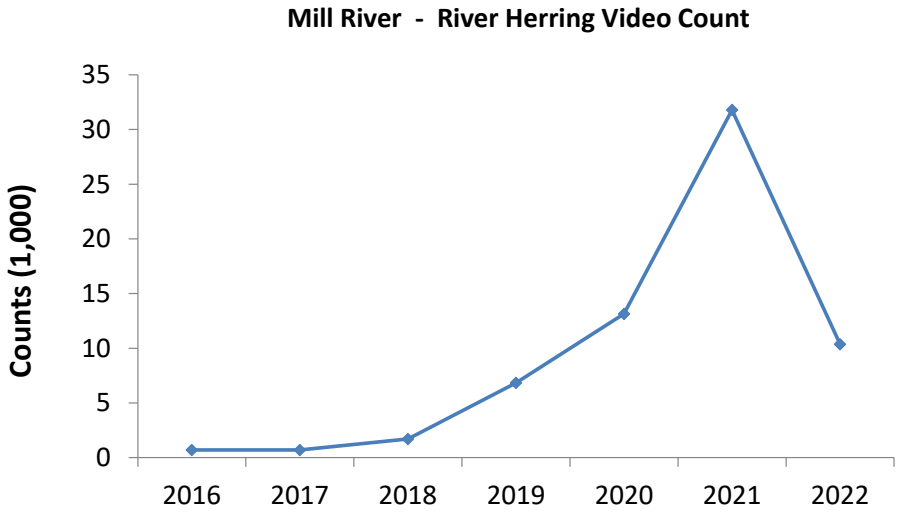


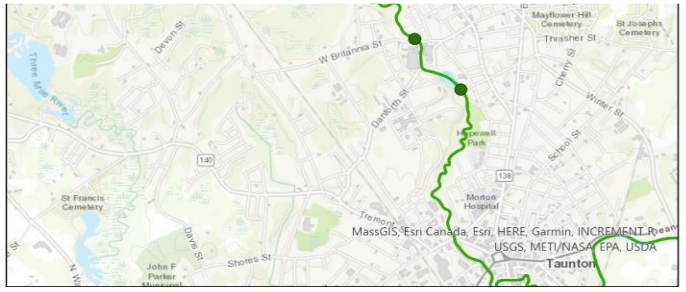
2011

Mill River Watershed Restoration

- Hopewell Mills Dam – 2012 removed
- Morey's Bridge Dam – 2012 fishway and eel ramp
- Whittenton Mills Dam – 2013 removed
- West Britannia Dam – 2018 removed
- Provided access over 18 miles of river and 417 acres of spawning and nursery habitat







2018

Fish Passage Improvements - 2022

Red Brook, Bourne

Indian Head River Dam, Pembroke/Hanover

Weldon rubble dam, Acushnet River

Monument River, Cape Cod Canal, Bourne

Cooperative project with U.S. Army Corps of Engineers

Black Pond Fishway, Long Pond - Harwich

Cooperative project involving two property owners and the Towns of Harwich and Brewster

River Herring Stocking

- Three Mile River, Dighton
- Bourne Pond, Falmouth
- Little Sandy Pond, Yarmouth
- Mill Pond, Barnstable
- Island Creek Pond, Duxbury

Taunton River Shad Stocking

- USFWS / DMF agreement for 5-years of shad stocking in the Taunton River
- Over 5 million shad larvae stocked in 2022
- DMF / DFW cooperative monitoring

MASSWILDLIFE

Taunton River Shad Stocking

- Five years of pre-stocking monitoring: electrofishing and beach seining
- A few adult and juvenile shad caught electrofishing. None were caught with seining
- Juvenile shad caught during 2022 seining
- Drafted Taunton River Shad Habitat Plan and Monitoring Plan in 2022

Stream Channel Maintenance

- Growing problem with declining local interest to address increasing problem of low-flow plant encroachment in addition to natural debris jams
- DMF prepared guidelines in 2016
- MassDEP/DMF policy in 2022 (BWR/WP 22-1) to guide actions under Wetlands Protection Act
- 12 Town maintenance plans have been approved
- https://www.mass.gov/service-details/diadromous-fisheries-project

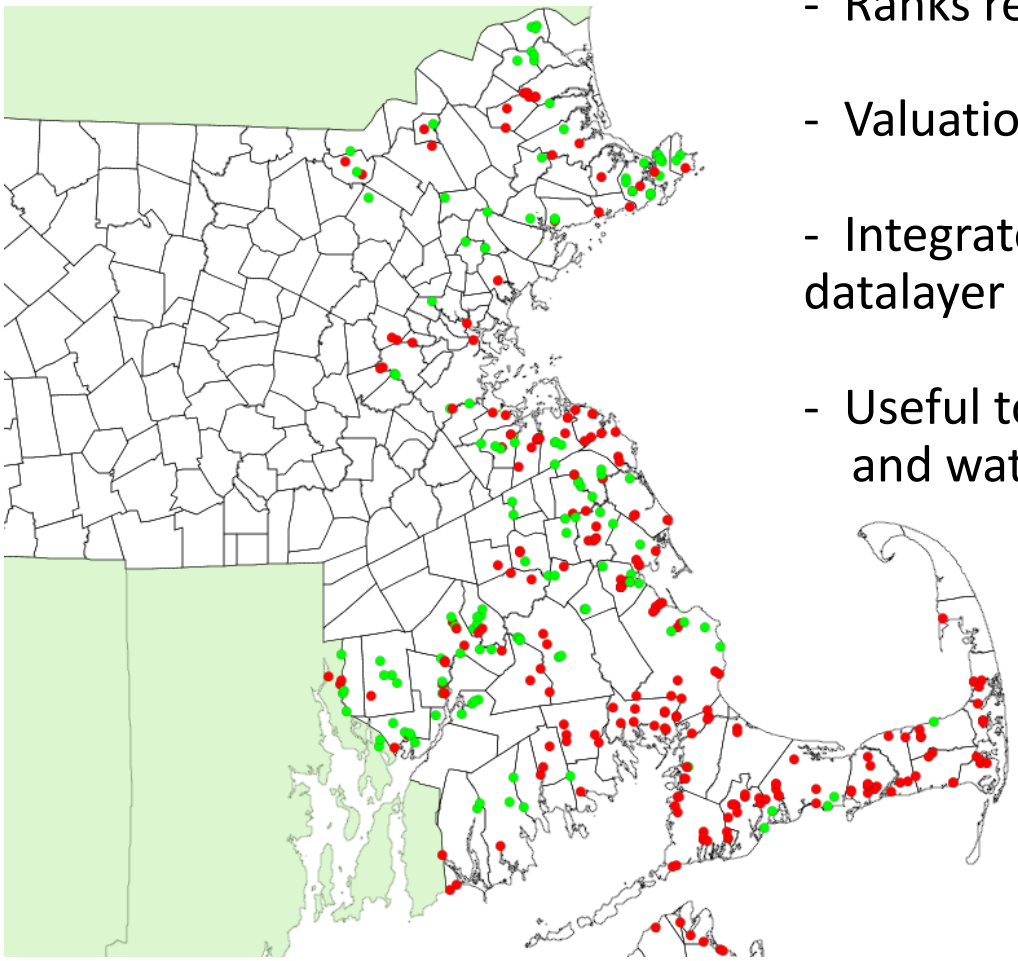
Native and Invasive Plant Encroachment

Swamp Loosestrife
Herring River, Harwich

Water Willow
Weir River, Hingham

Phragmites
Island Creek, Duxbury

DMF Diadromous Fish Restoration Priority List and GIS Datalayer



- Ranks restoration priorities at over 475 sites

- Valuations on *Fish Passage* used by DEP

- Integrated with Diadromous Fish GIS datalayer with species presence and TOY data

- Useful tool for restoration, transportation and watershed assessment planning

Due to be published as MassGIS Datalayer soon

Diadromous Fish Passage Survey

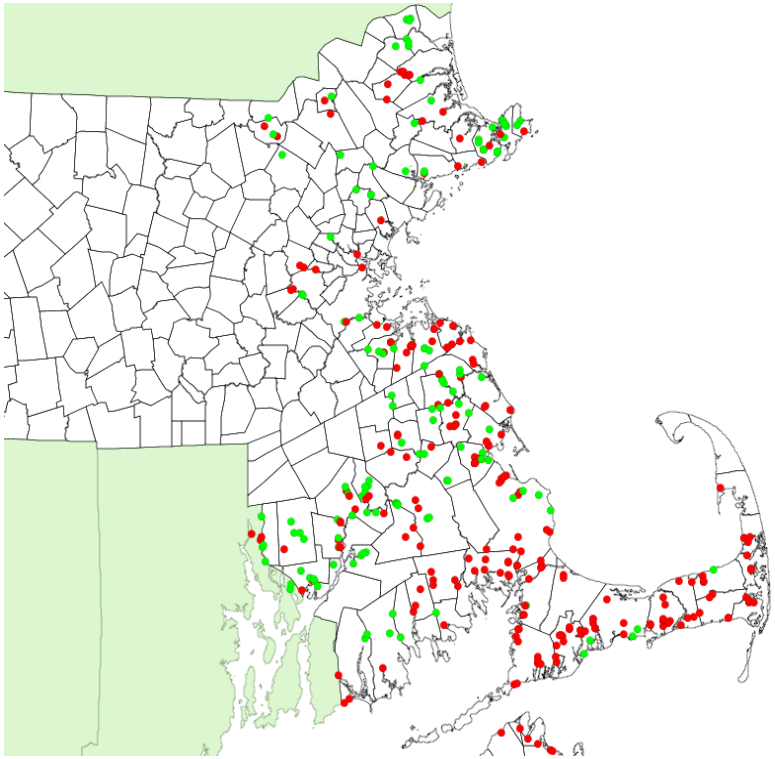
- Coastwide surveys reported in 1921 (Belding), 1972 (Reback and DiCarlo), and 2004 (Reback et al.)
- Many changes in past 20 years
- Present survey expanded to include more diadromous species, broader restoration goals, and integrate with other restoration tools

Diadromous Fish Passage Survey

- Over 450 sites to visit in coastal Massachusetts

- Covered most of Cape Cod and SE Mass

DMF Diadromous Fish GIS Datalayer

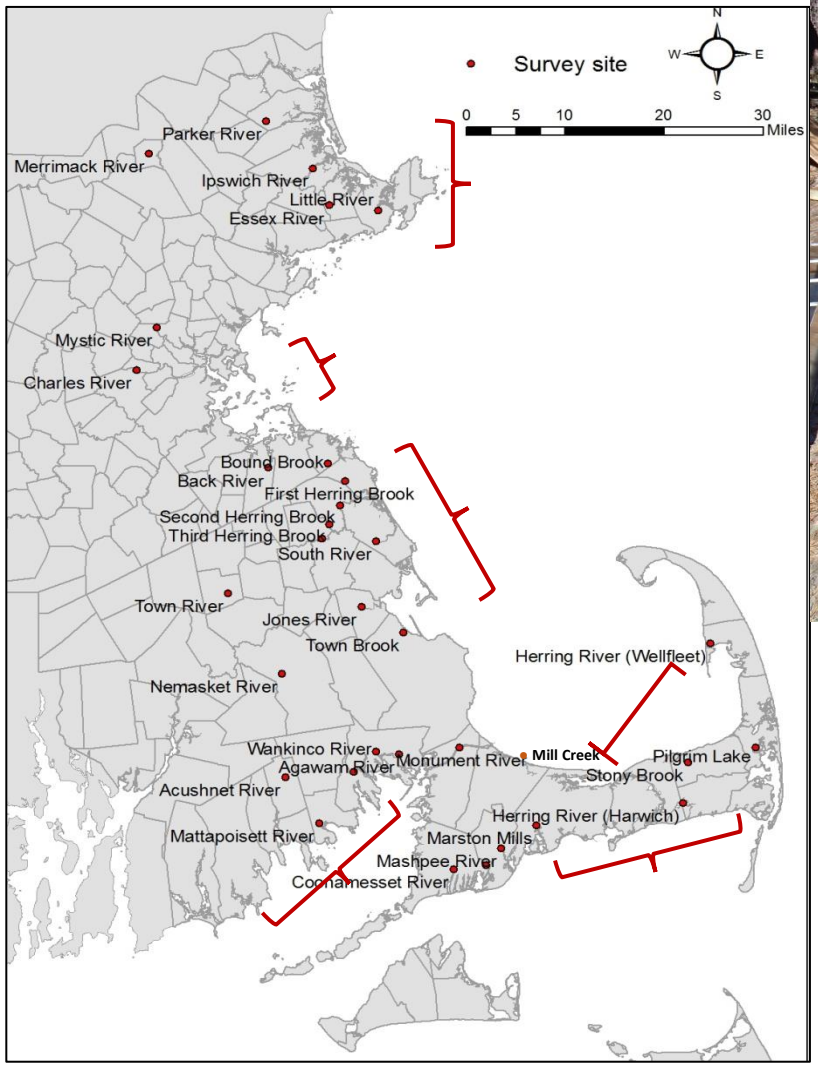


- Survey will be integrated with GIS data layer and DMF Diadromous Fish Restoration Priority List

Diadromous Fish Monitoring

1. **River herring** - counting and biological sampling
2. **American shad** - tagging, lift counts, electrofishing
3. **Rainbow smelt** - fyke net stations
4. **American eel** - trap and ramp stations

River Herring Counting Locations

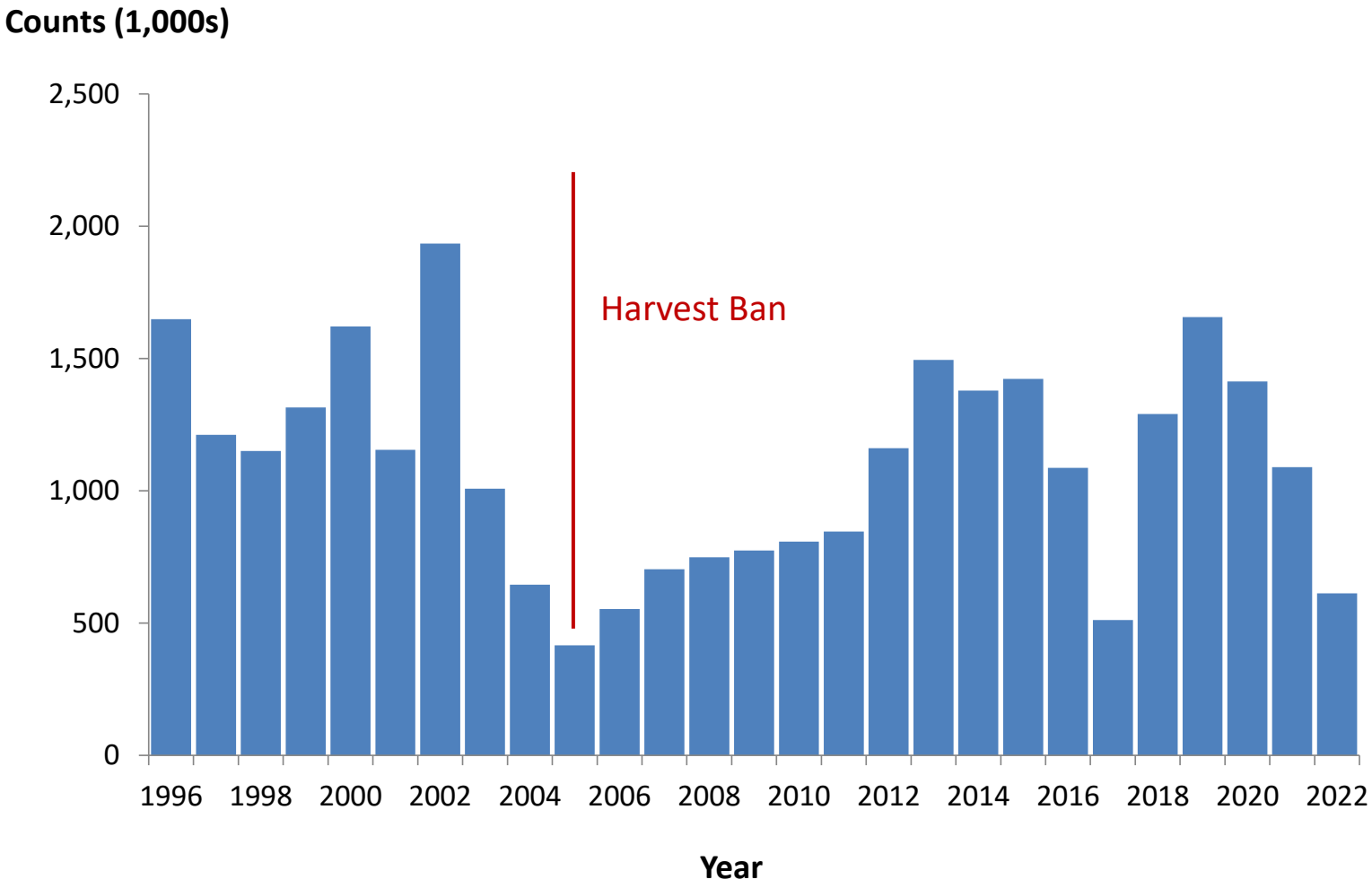


- 40 river herring counting stations
- 14 with ‘census’ level quality
- 8 stations sample biological data

Massachusetts River Herring Count Summary - 2022

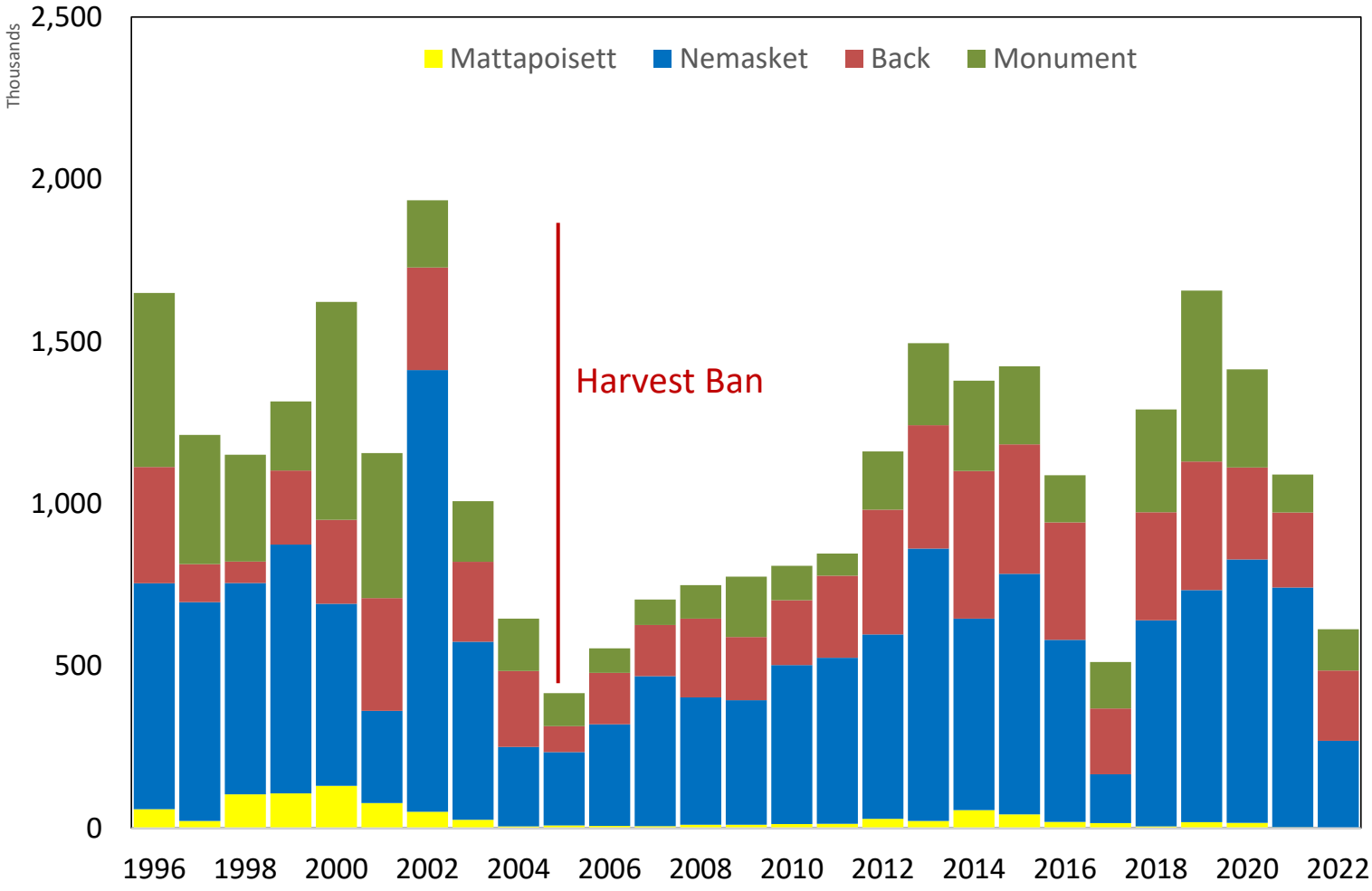
Watershed	Municipality	Stream	Counting Method	Count
Merrimack	Andover	Shawsheen	Visual	776
Merrimack	Lowell	Concord	Visual	23
North Coastal	Newbury	Parker	Video	57,514
North Coastal	Ipswich	Ipswich	Visual	1,245
North Coastal	Essex	Essex/Alewife B.	Electronic	31,661
North Coastal	Gloucester	Little	Visual	0
Boston Harbor	Woburn	Horn Pond	Visual	20,691
Boston Harbor	Medford	Mystic	Visual	436,387
Boston Harbor	Weymouth	Back	Electronic	216,663
South Coastal	Pembroke	Herring B.	Electronic	48,057
South Coastal	Kingston	Jones	Visual	0
South Coastal	Kingston	Furnace B.	Visual	48
South Coastal	Plymouth	Town B.	Visual	169,462
South Coastal	Plymouth	Beaver Dam B.	Visual	849
South Coastal	Bourne	Monument	Electronic	127,410
Cape Cod North	Brewster	Stony B.	Visual	39,839
Cape Cod North	Eastham	Herring R.	Visual	1,327
Cape Cod North	Eastham	Herring B.	Visual	823
Cape Cod North	Wellfleet	Herring R.	Visual	47,384
Cape Cod North	Barnstable	Boat Cove Creek	Visual	0
Cape Cod North	Yarmouth	Tom Matthews Pond	Visual	0
Cape Cod South	Orleans	Pilgrim Lake	Visual	10,987
Cape Cod South	Marstons Mills	Marstons Mills (Mill P.)	Visual	50,961
Cape Cod South	Marstons Mills	Marstons Mills (Middle P.)	Visual	26,492
Cape Cod South	Mashpee	Santuit River	Visual	42,507
Cape Cod South	Mashpee	Quashnet River	Visual	1,327
Cape Cod South	Mashpee	Mashpee	Visual	90,386
Cape Cod South	Falmouth	Trunk	Visual	13,092
Cape Cod South	Barnstable	Centerville	Visual	18,343
Cape Cod South	Barnstable	Red Lily Pond	Visual	50
Islands	Aquinnah	Herring Creek	Video	27,422
Buzzards Bay	Falmouth	Cedar Lake	Electronic	696
Buzzards Bay	Wareham	Agawam	Electronic	46,027
Buzzards Bay	Wareham	Wankinco	Electronic	6,482
Buzzards Bay	Wareham	Sippican	Electronic	37
Buzzards Bay	Mattapoisett	Mattapoisett	Electronic	2,332
Buzzards Bay	Acushnet	Acushnet	Electronic	3,816
Taunton	Bridgewater	Town R.	Electronic	4,598
Taunton	Middleborough	Nemasket	Visual	267,825
Connecticut	Holyoke	Connecticut	Lift	283

Massachusetts River Herring 20-Year Count Index
1996 - 2022

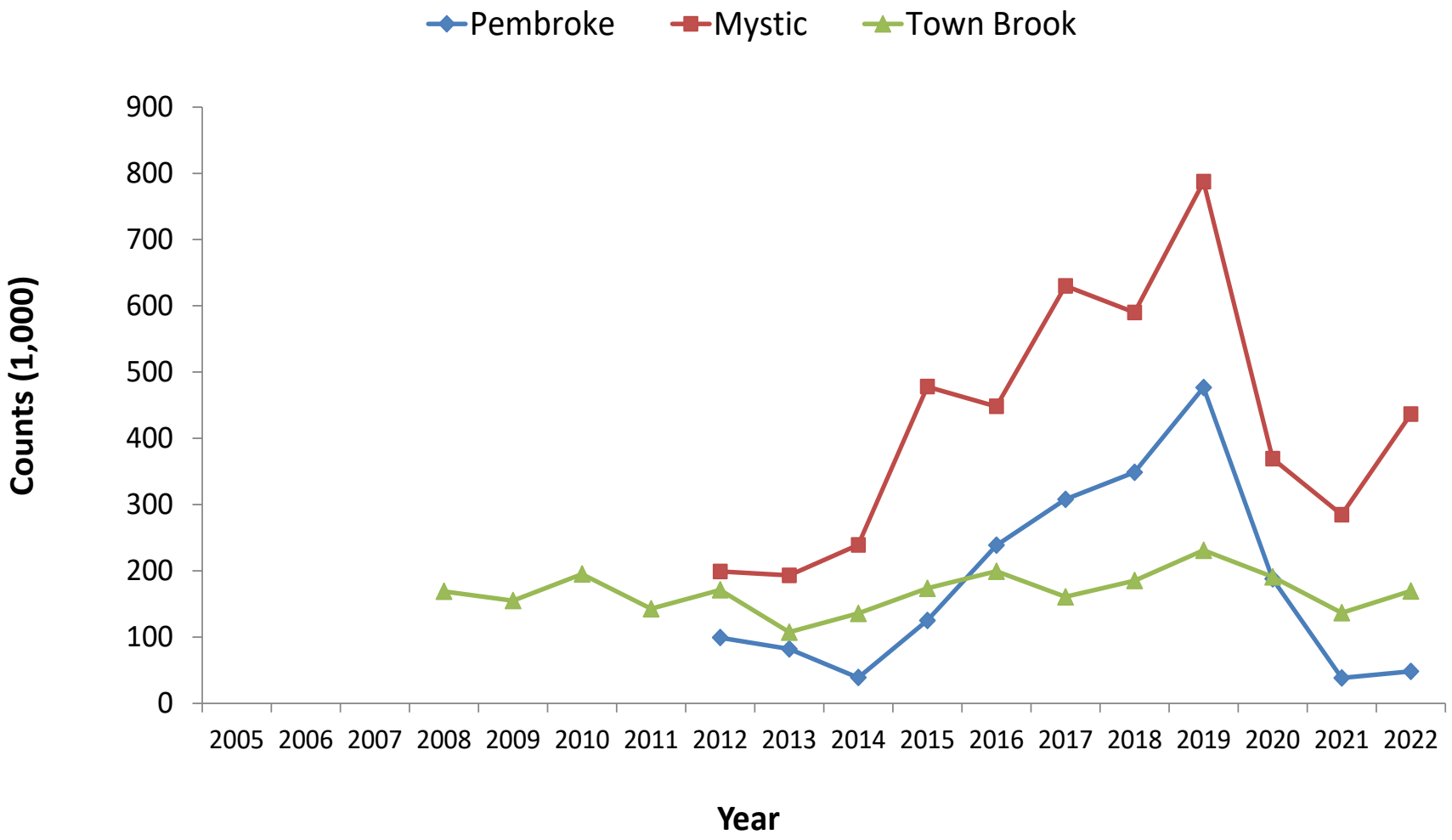


Nemasket River, Mattapoisett River, Monument River and Back River

Massachusetts River Herring 20-Year Count Index
1996 - 2022

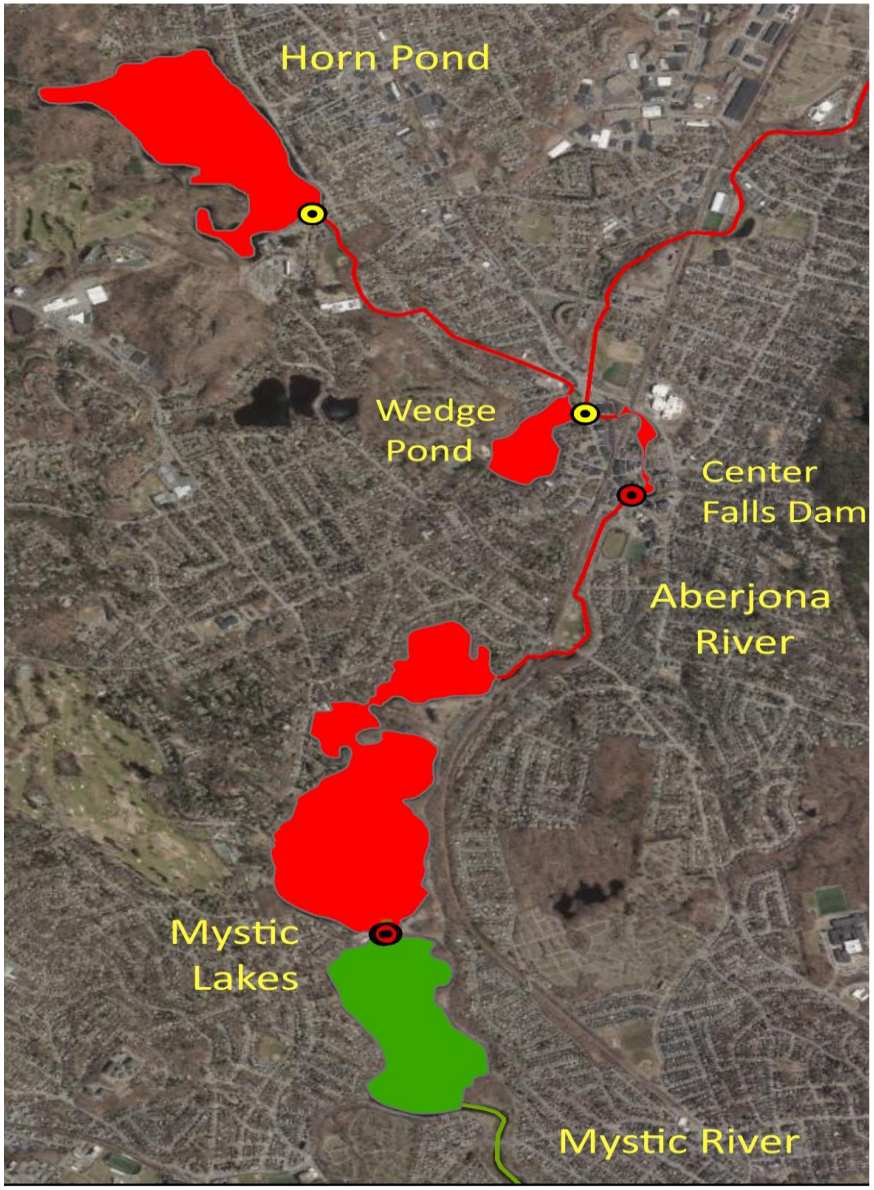


River Herring Runs with Restoration



Mystic River Watershed

- No fish passage into Mystic Upper Lake and the Aberjona River in 2011
- Mass. Department of Conservation and Recreational rebuilds the Mystic Lakes Dam in 2012
- Project includes new fishway, eel ramp and downstream migration channel



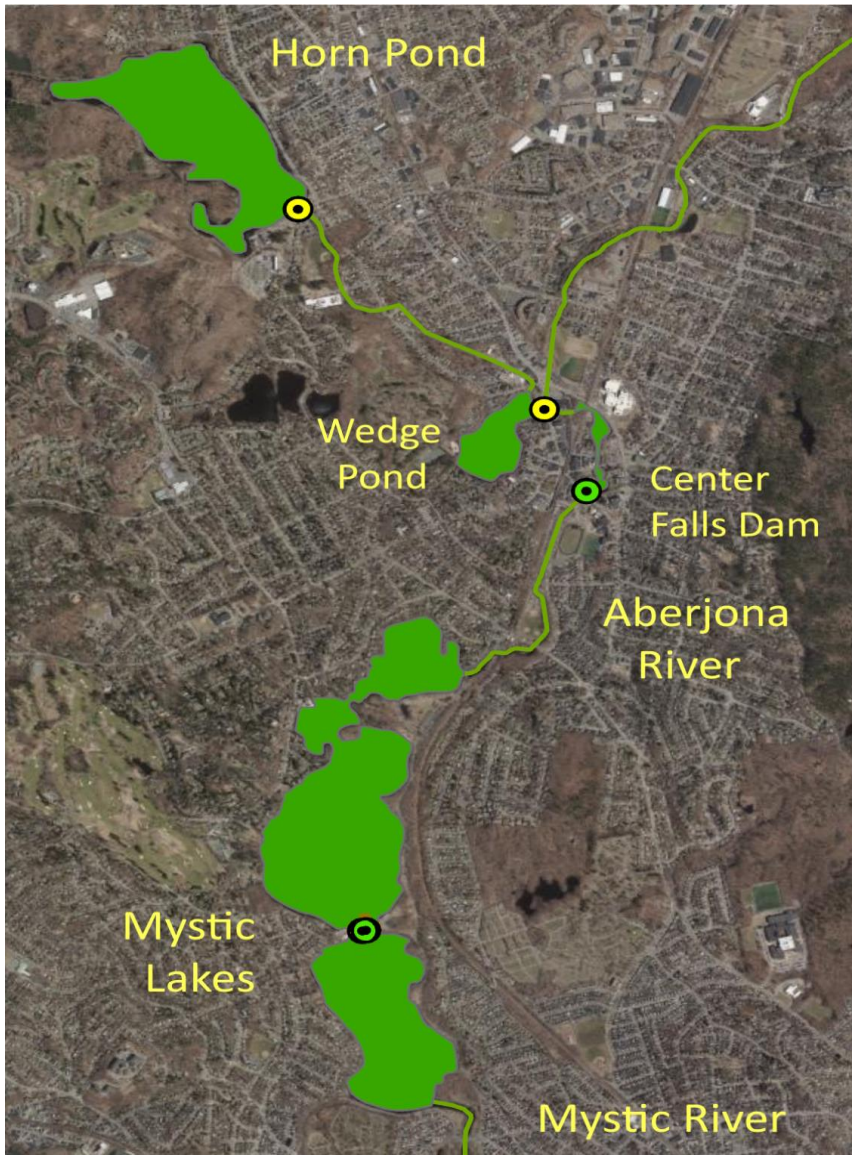
Mystic River Watershed

- Fishway installed at the impassable Center Falls Dam in Winchester in 2016 funded largely by EPA Superfund

- DMF makes modifications to Scalley Dam bypass at Horn Pond in 2018: herring pass into Horn Pond

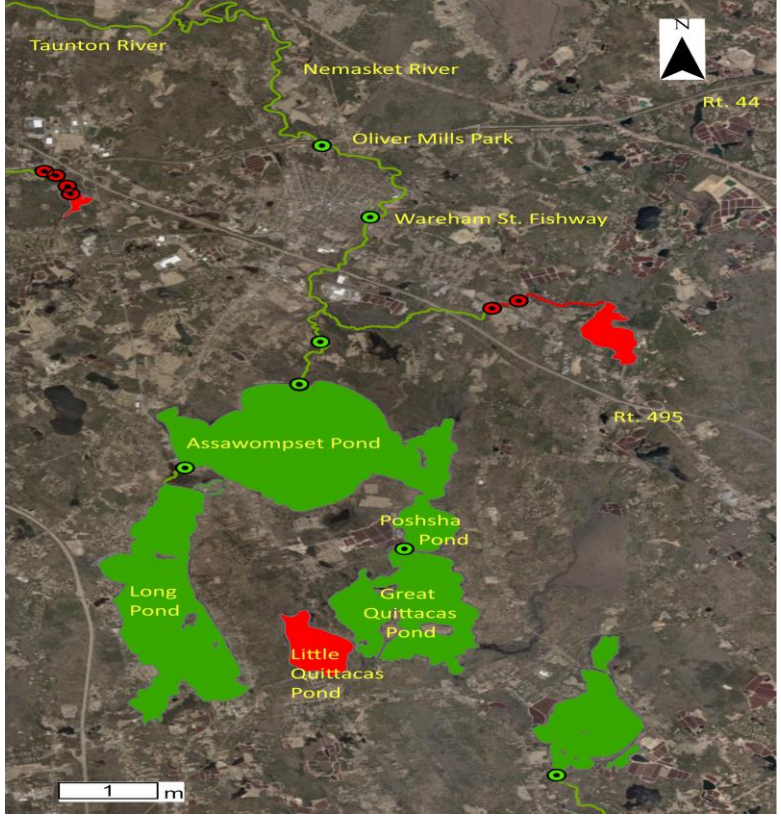
- Allows passage to 287 acres of spawning and nursery habitat

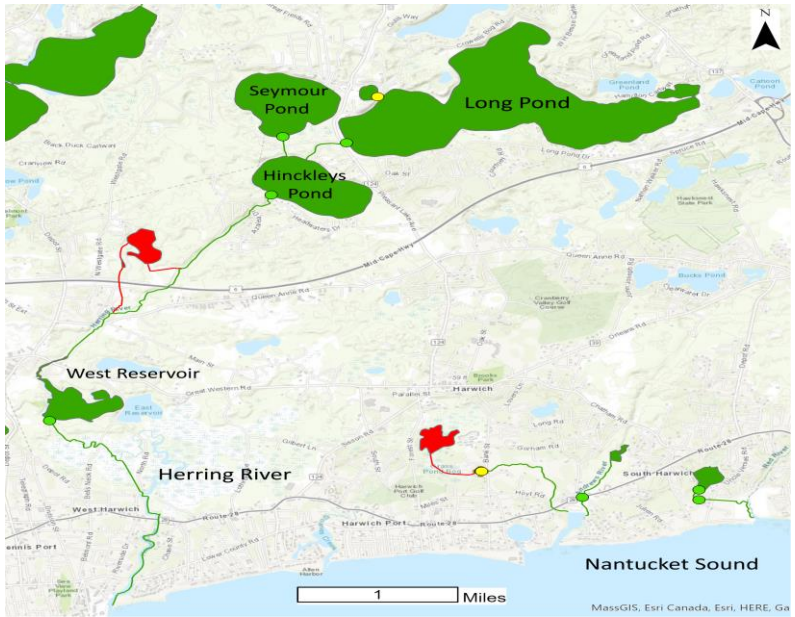
Top herring spawning run count in MA during 2017 and 2022



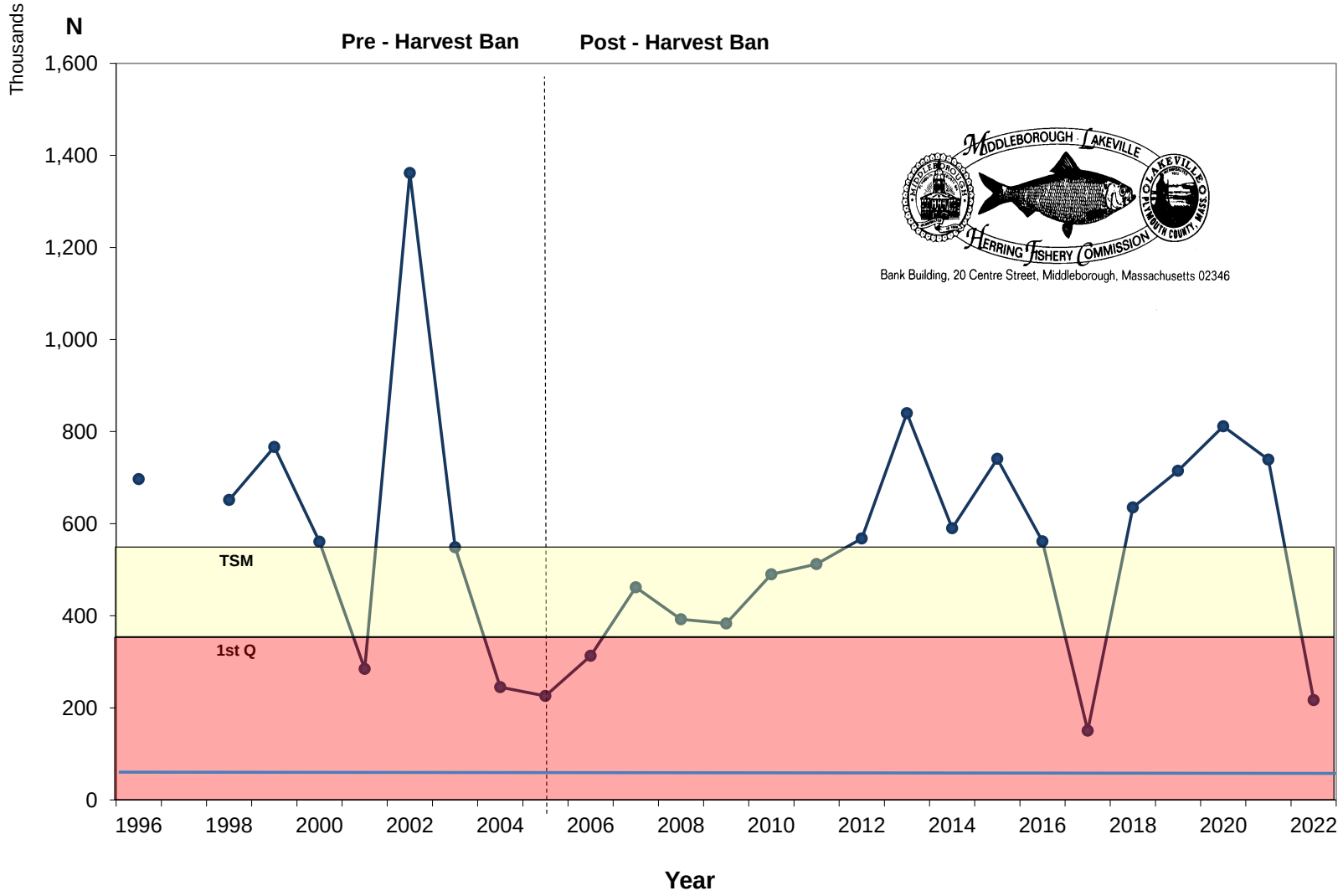
River Herring Harvest Plans ASMFC SFMP

- Four Towns have requested harvest plans in the last 5-6 years
- Nemasket River plan is up for renewal this year
- Herring River, Harwich, plan under review



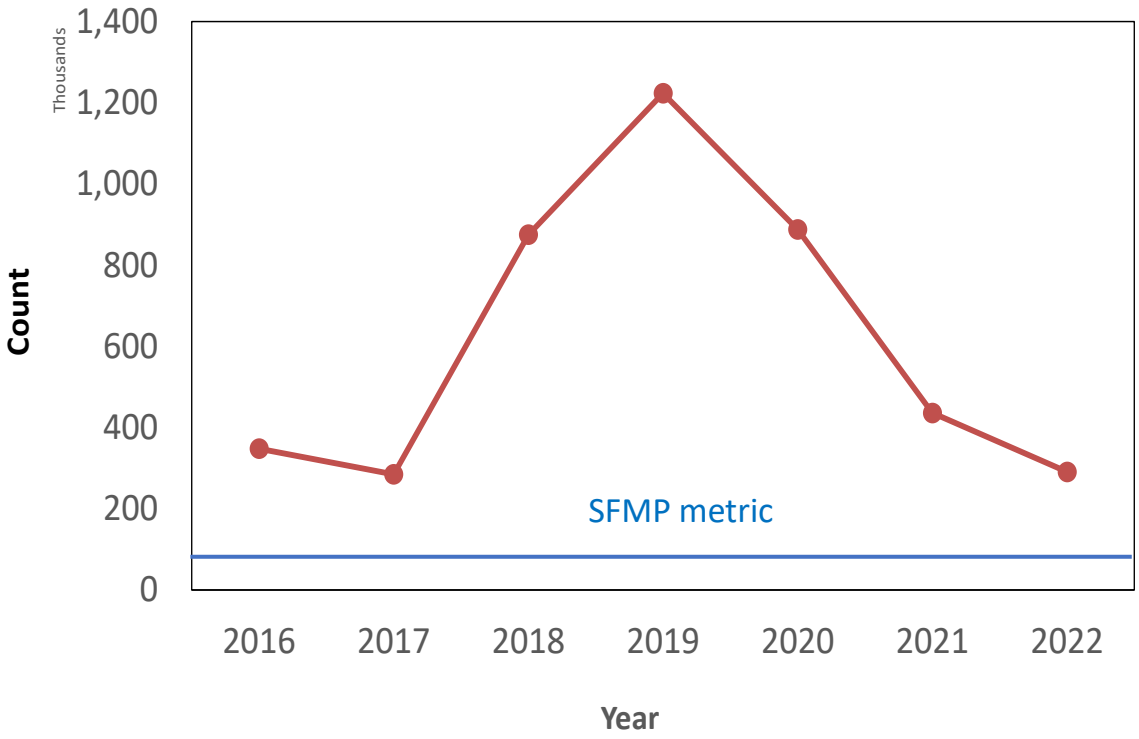


Nemasket River - Visual Count 1996 - 2022



SFMP metric

Herring River, Harwich – Electronic Count 2016 - 2022



Spring 2022 – Large Run of Glass Eels

- Large run of glass eels seen on East Coast
- Some monitored MA runs were well above average with a few time-series records

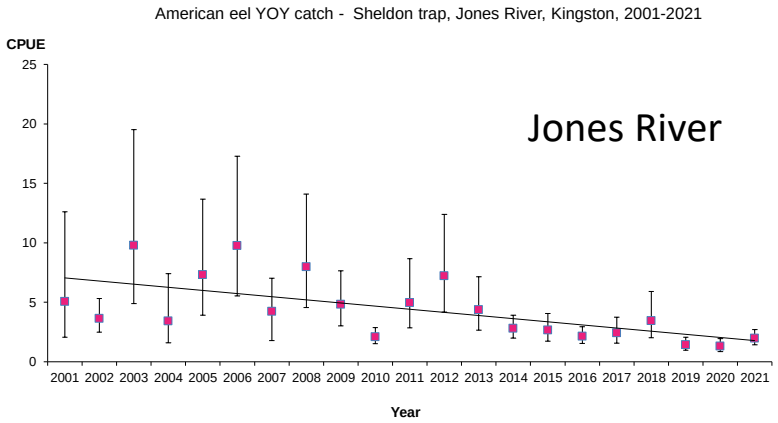
American Eel Indices of Abundance

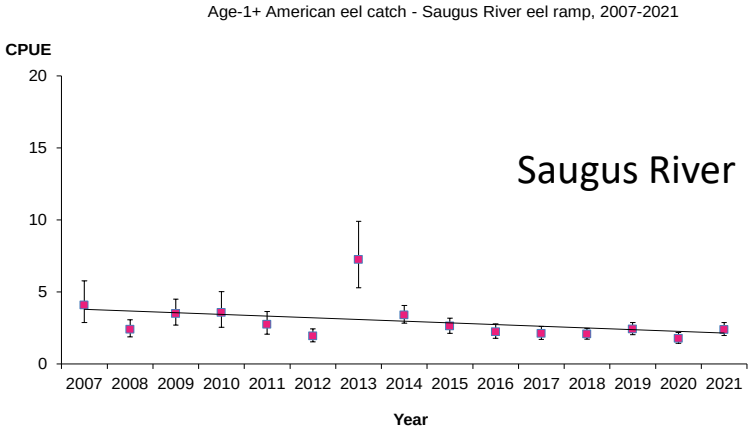
ASMFC eel stock assessment 2022

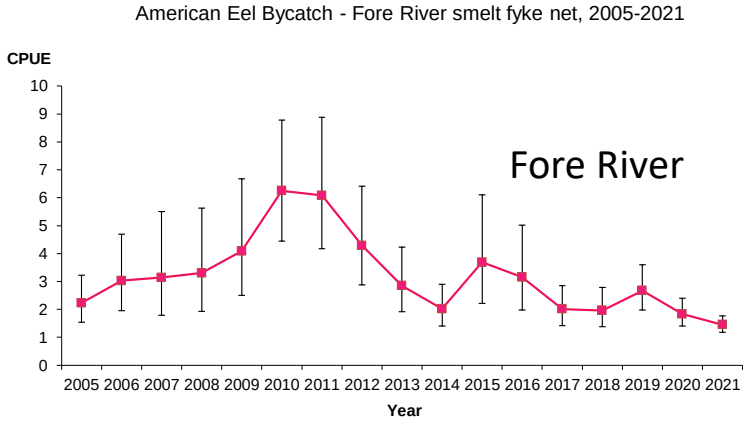
- Jones River YOY eel trap was accepted as glass eel index at last stock assessment

- Saugus River eel ramp accepted in 2022 as age-1+ eel index

- Fore River smelt fyke net eel bycatch in 2022 as yellow eel index







Positive Drivers for Improved River Herring Stocks

1. **Clean Water Act**
2. **Reduced Harvest**
3. **Fishway Improvements**
4. **Dam Removals**
5. **Reduction in Cranberry Bog Production**

Potential Drags on River Herring Restoration

1. **Coastal Development**

    - Eutrophication
    - Water Use *concern over impact on early life stages*

2. **Climate Change**

3. **Natural Mortality**

4. **Fishing Mortality**

Early Life Stage Recruitment

1. Warming and Eutrophication impacts on freshwater spawning and nursery habitats

2. Warming and Eutrophication impacts on marine nursery habitats

3. Natural and Fishing Mortality

4. Reduced outflow for emigration

Management Responses to Water Use Impacts to Juvenile River Herring

1. Apply knowledge of migration cues

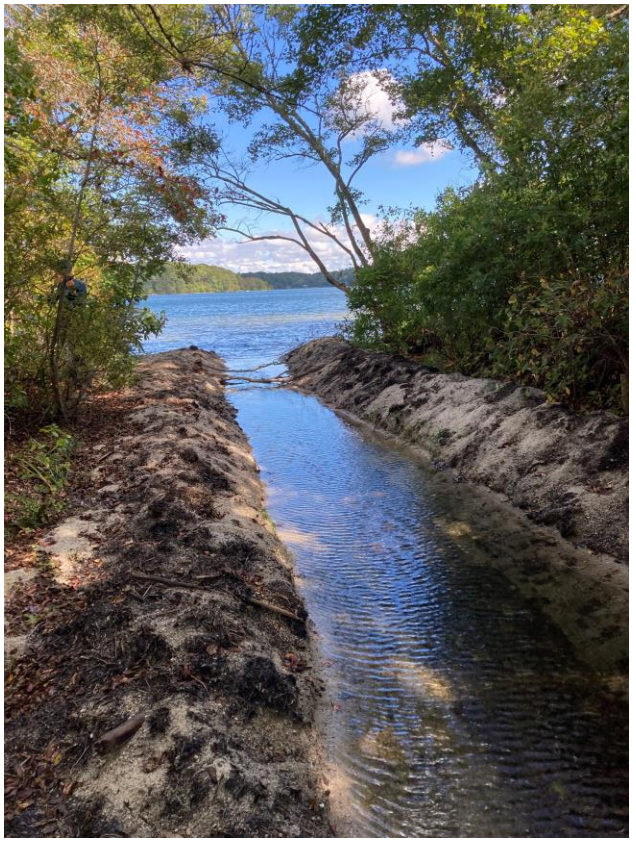
2. Case-by-case watershed management

3. Stream maintenance

4. Pond level management for fish emigration

   - Document pond level targets and seasonal actions

Motel Fish Kill

Monument River, Bourne

Thank you for all that you do….