

# Monitoring of Diadromous American Shad and Eel in the Taunton River Watershed

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MA Division of Marine Fisheries



# The other diadromous fish...

- American Shad
- American Eel

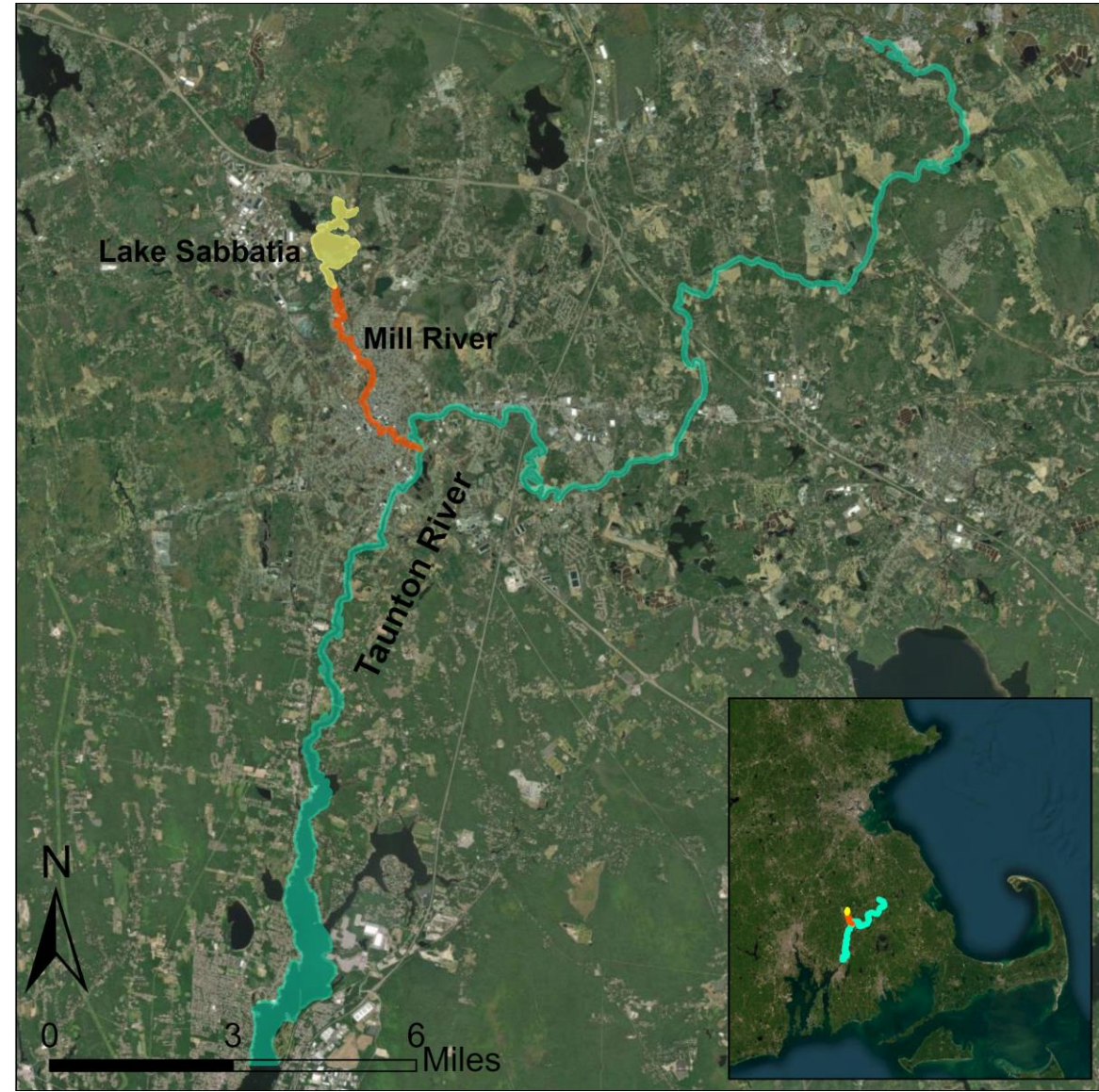


# Program

- Taunton River watershed and restoration history
- Ongoing monitoring
  - American Shad- Methods and Results
  - American Eel- Methods and Results
- Future plans
- More eels!
- Questions

# Taunton River Watershed

- Taunton River
  - ~36 mi long
  - Dam free
- Mill River
  - ~ 4 mi long
- Lake Sabbatia
  - ~248 acres

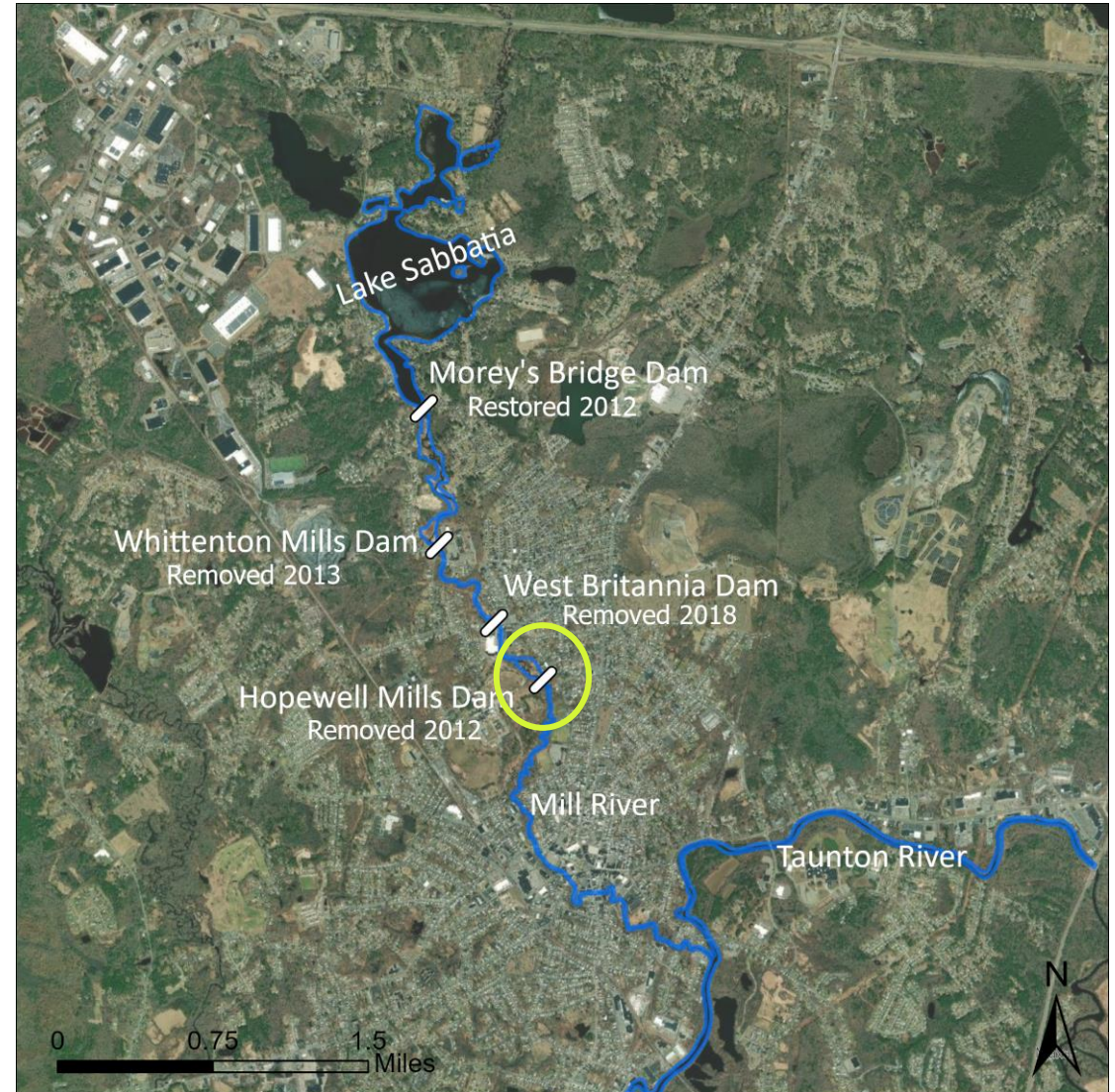


# Taunton River Watershed

- Restoration history
  - Hopewell Mills Dam removal in 2012



April 2012



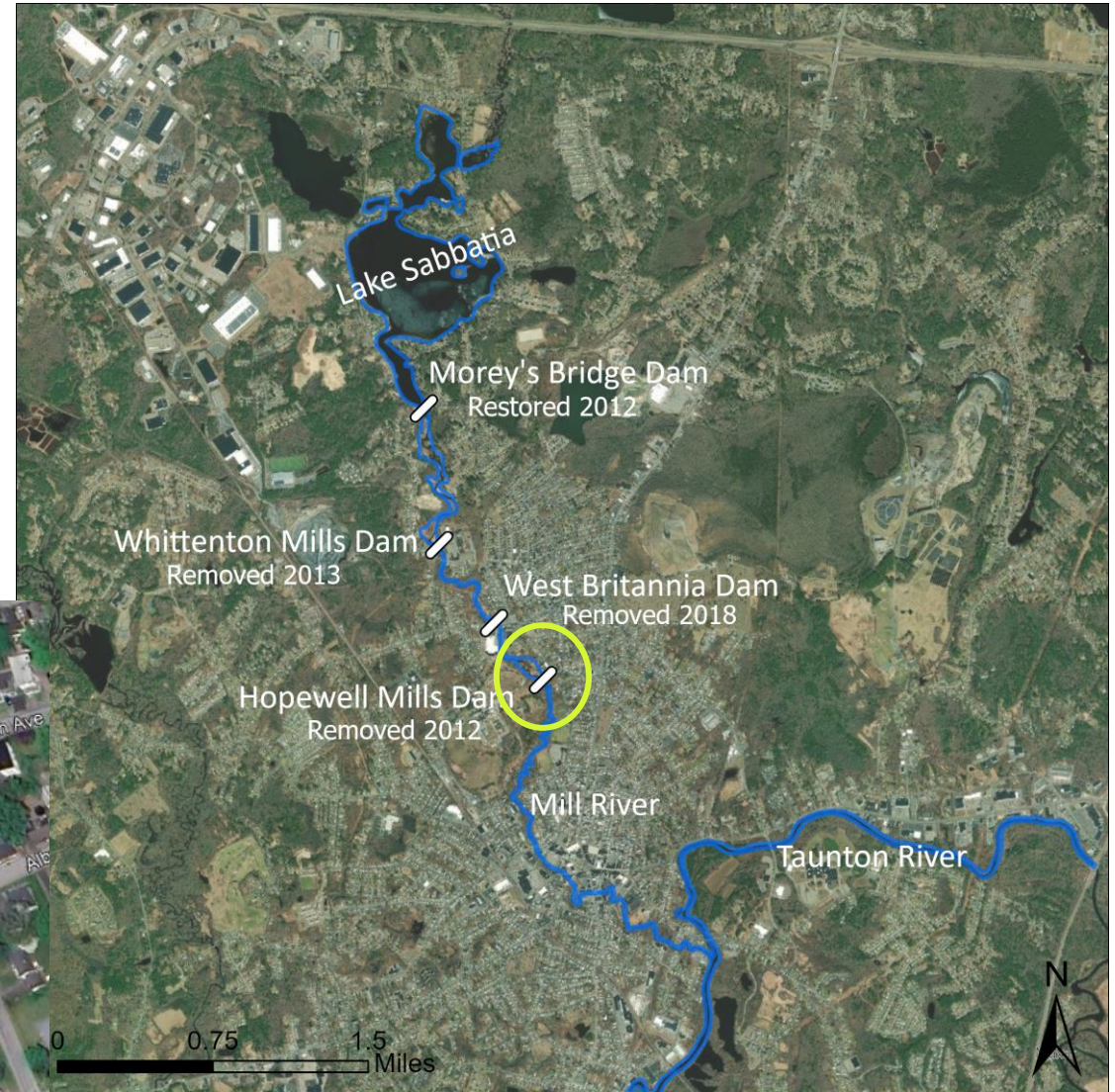
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# Taunton River Watershed

- Restoration history
  - West Britannia Dam removed in 2018



April 2012





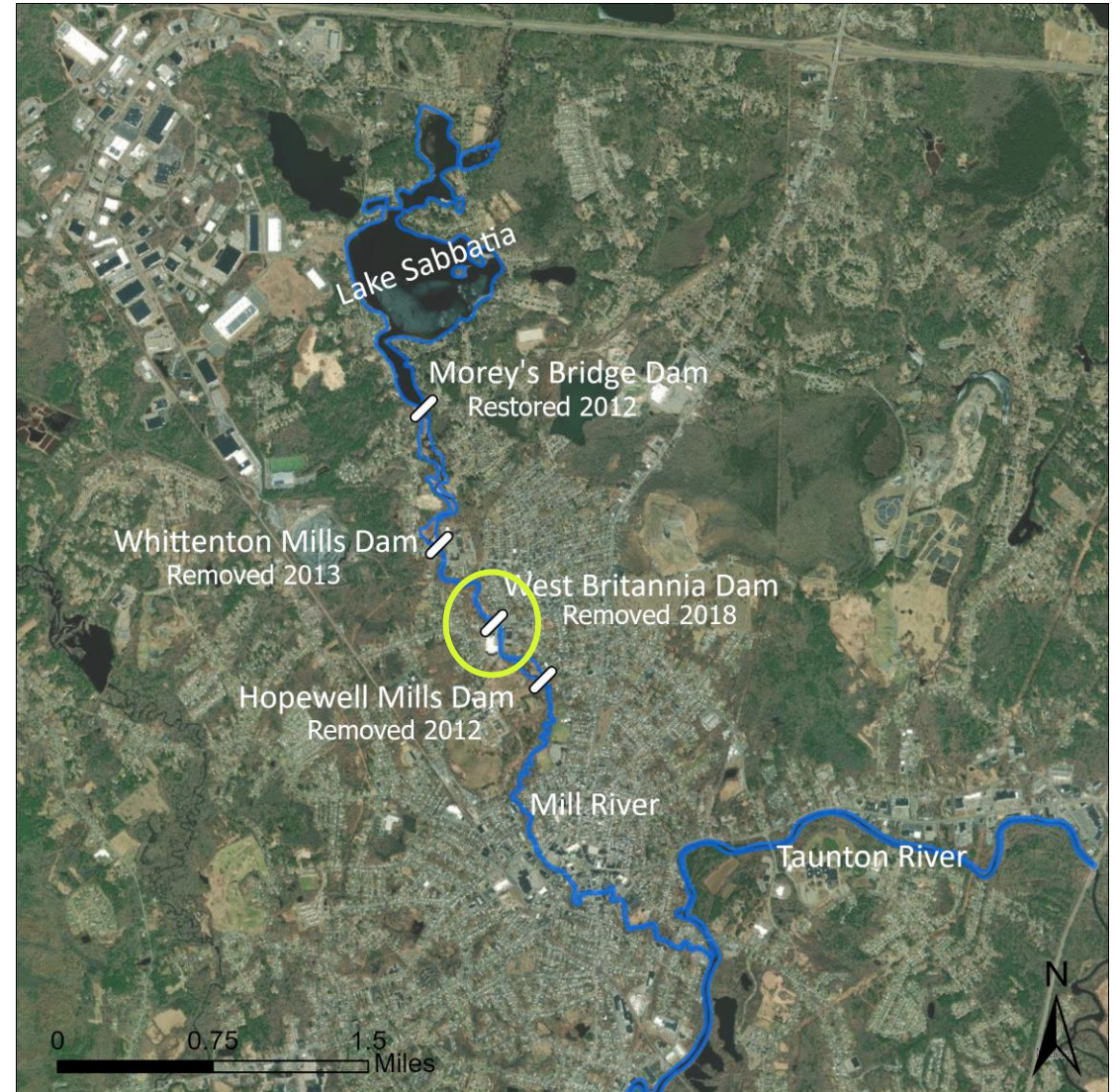
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- Restoration history
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April 2012

February 2018



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- Restoration history
  - Whittenton Mills Dam removed in 2013



April 2013



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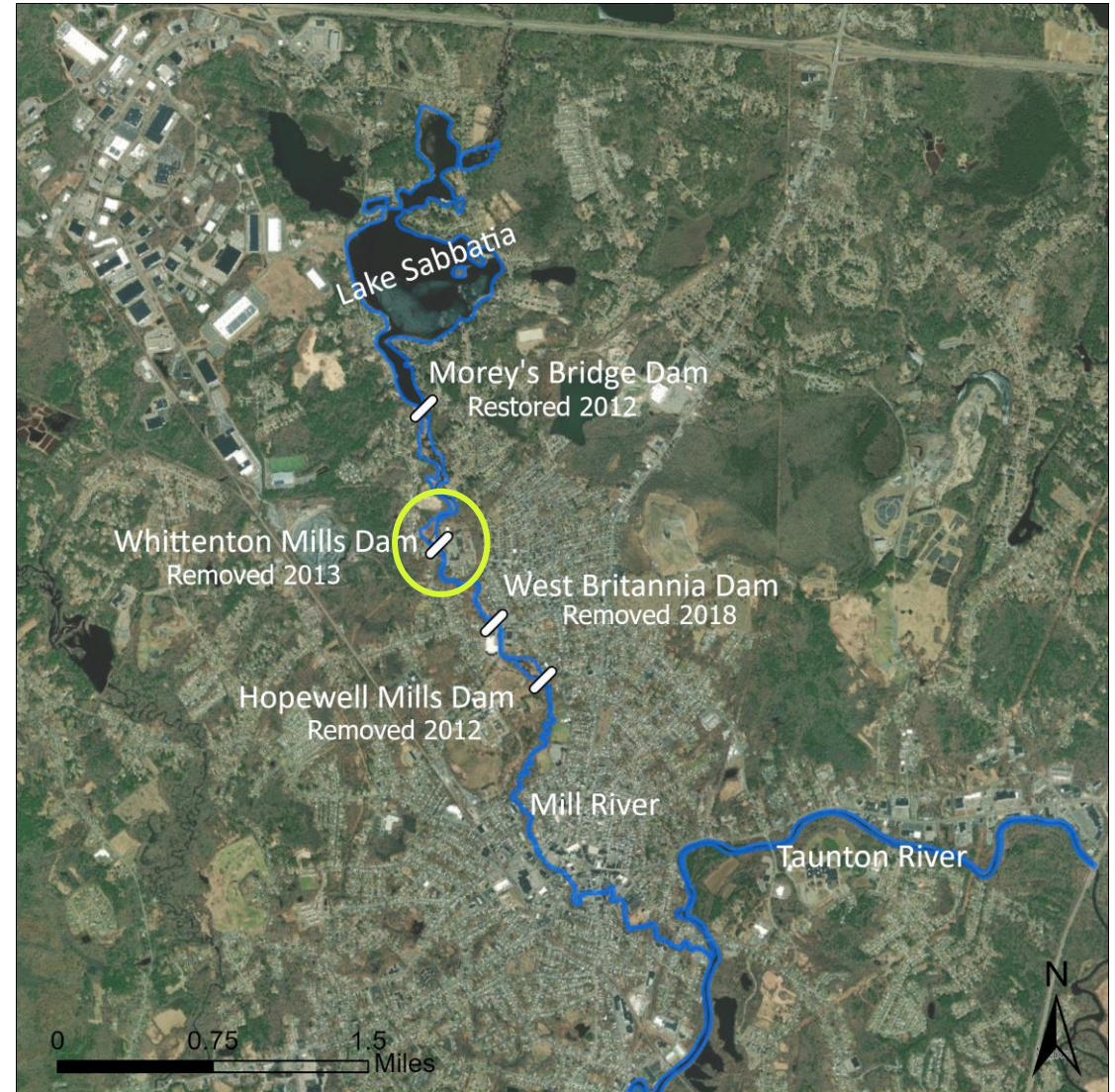
April 2013

September 2014



# Taunton River Watershed

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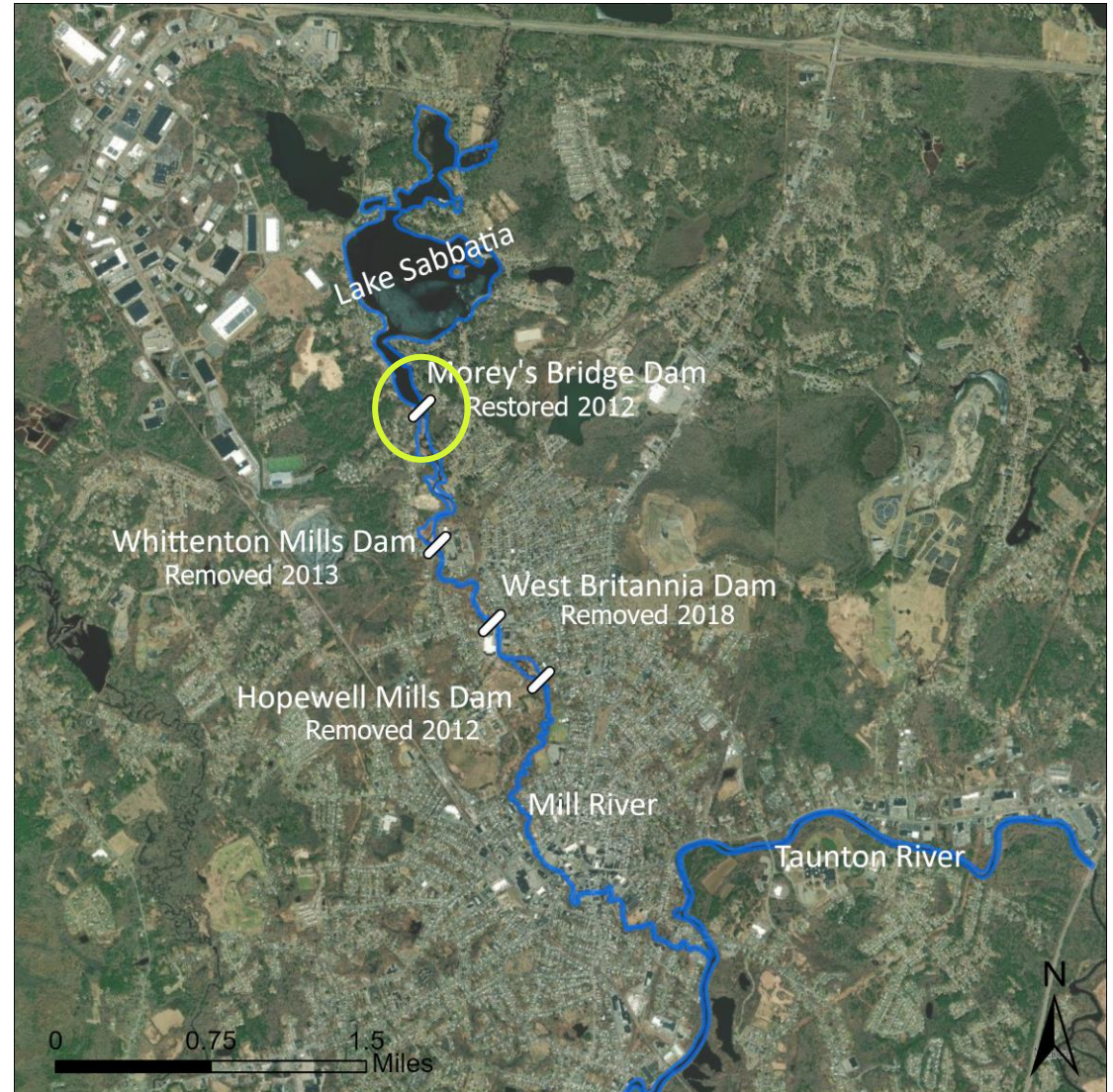


# Taunton River Watershed

- Restoration history
  - Morey's Bridge Dam restored in 2012

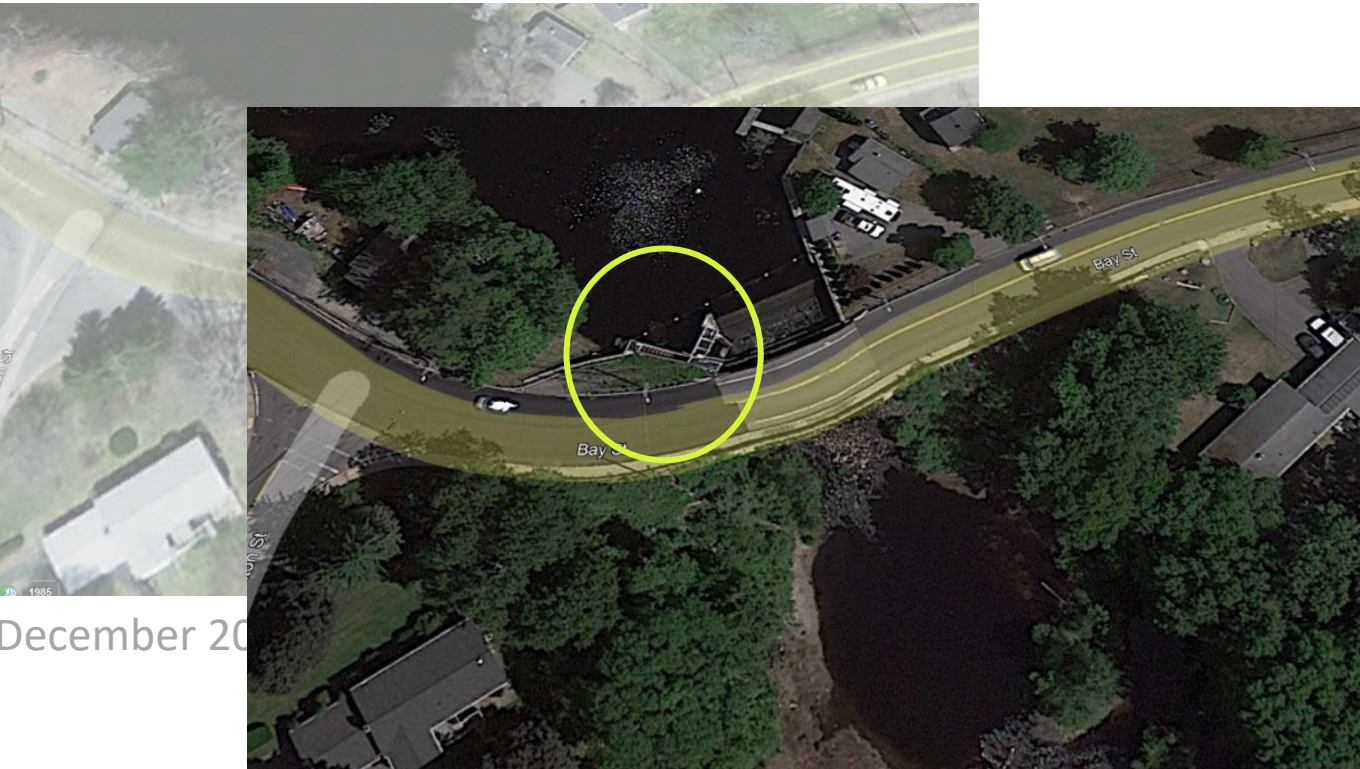


December 2010



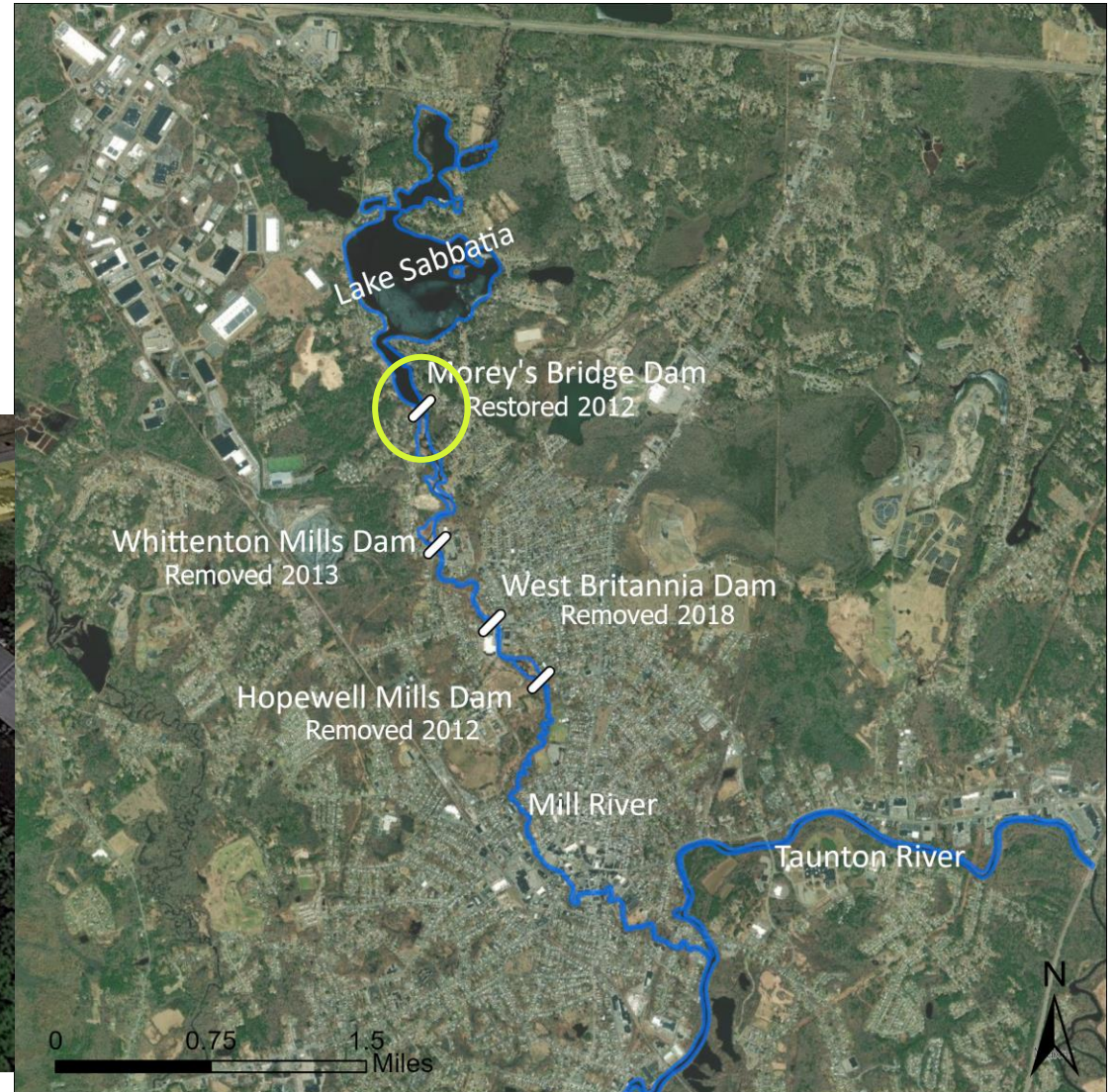
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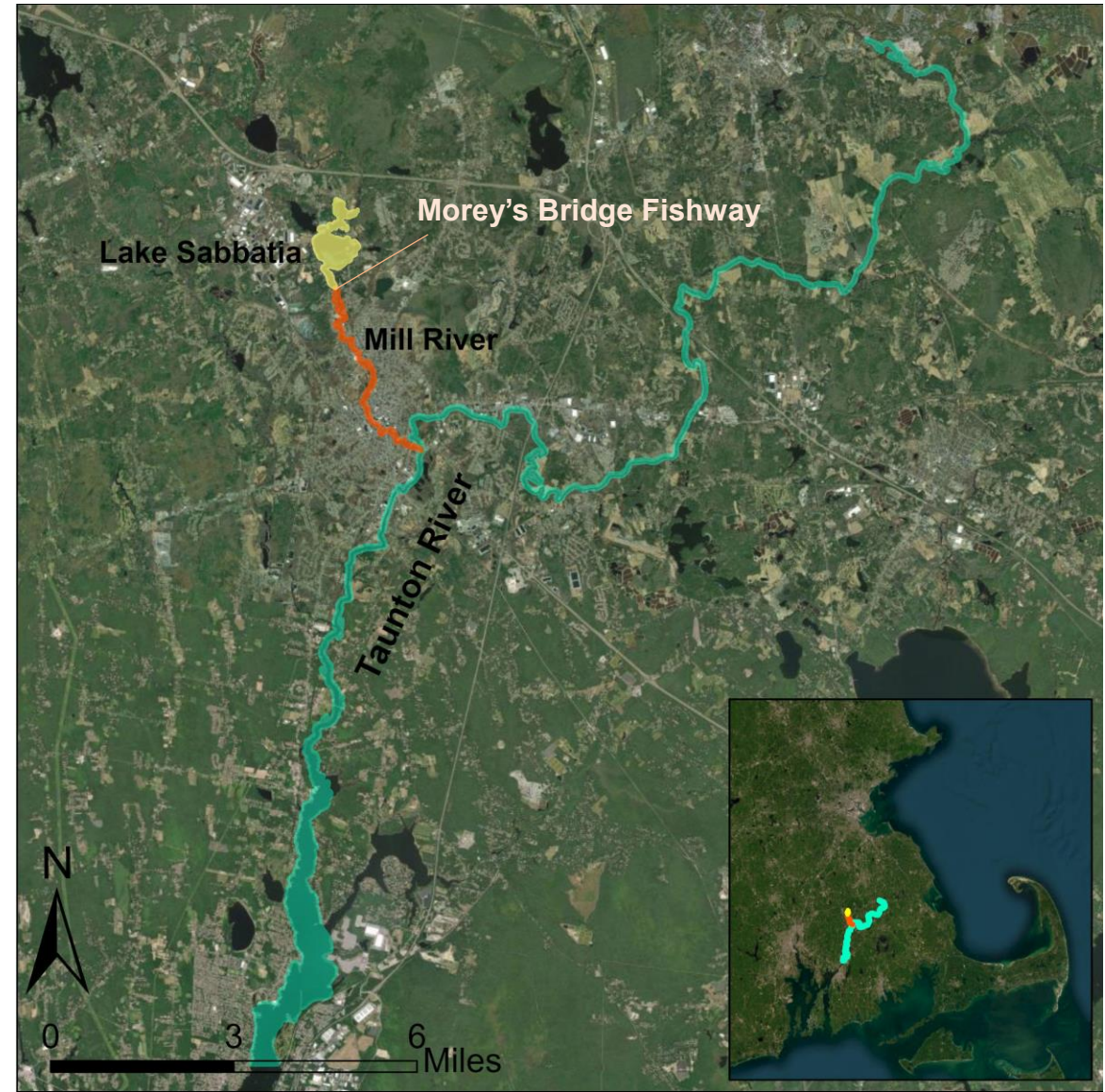
December 20

June 2022



# Diadromous Fish Monitoring

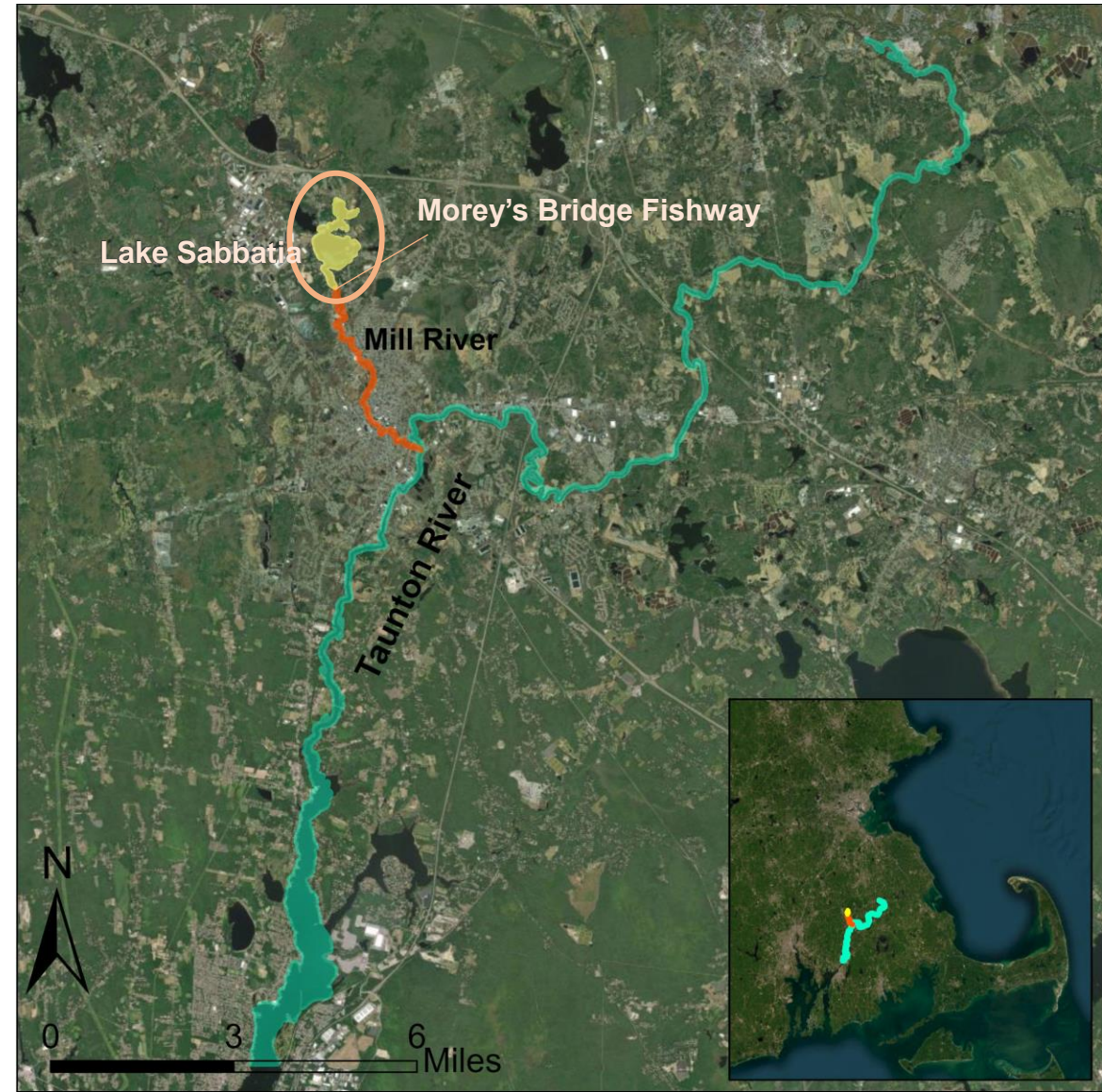
- River Herring
  - Underwater video at Lake Sabbatia
- American Eel
  - Eel (1+) ramp at Morey's Bridge
  - Mark-Recapture survey of yellow-phase eels in Lake Sabbatia
- Sea Lamprey
  - Redd survey between West Britannia Dam and Hopewell Mills Dam sites
- American Shad
  - Monthly (May-Oct) beach seine survey for juveniles along lower Taunton River
  - MassWildlife boat electrofishing





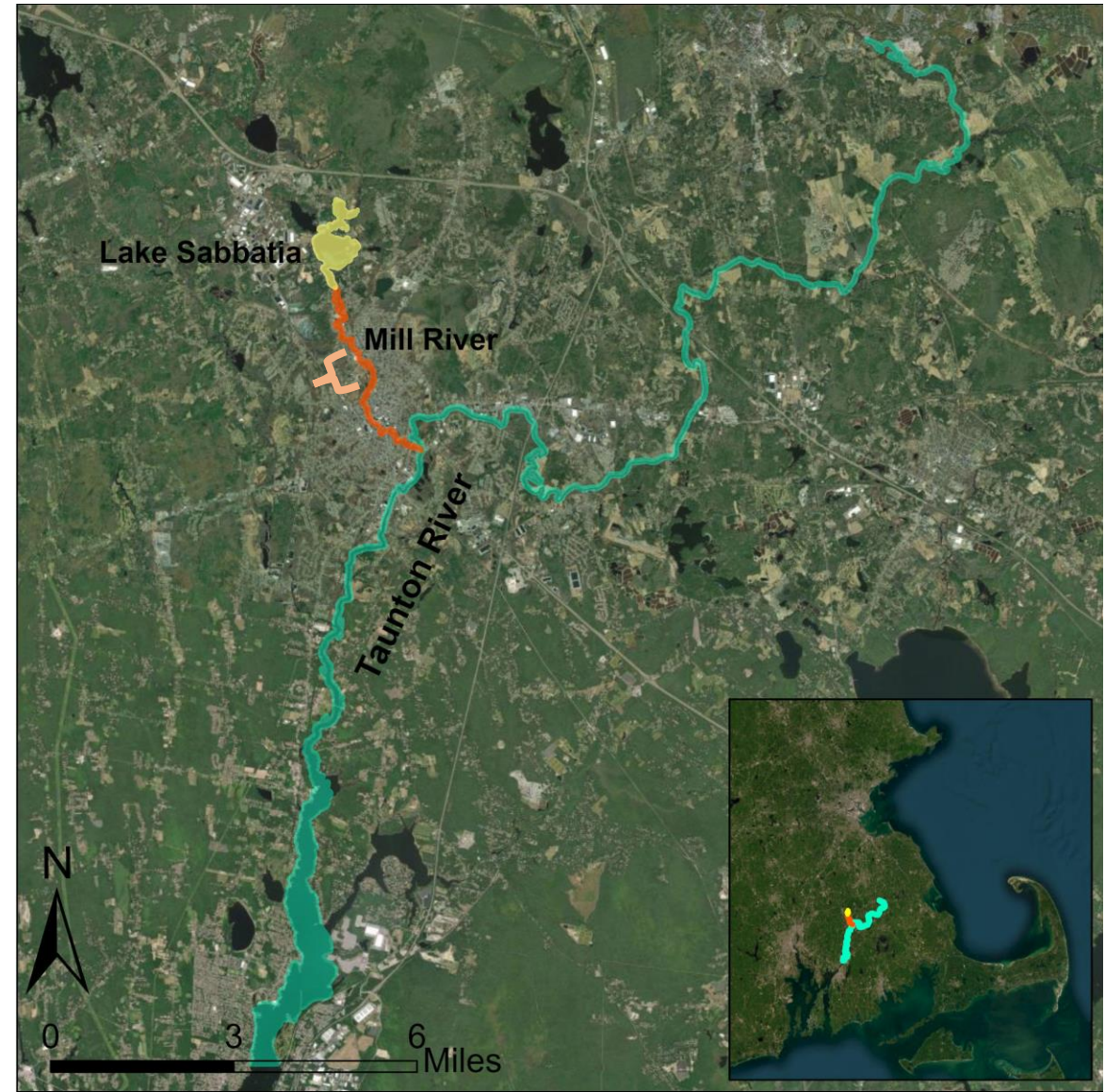
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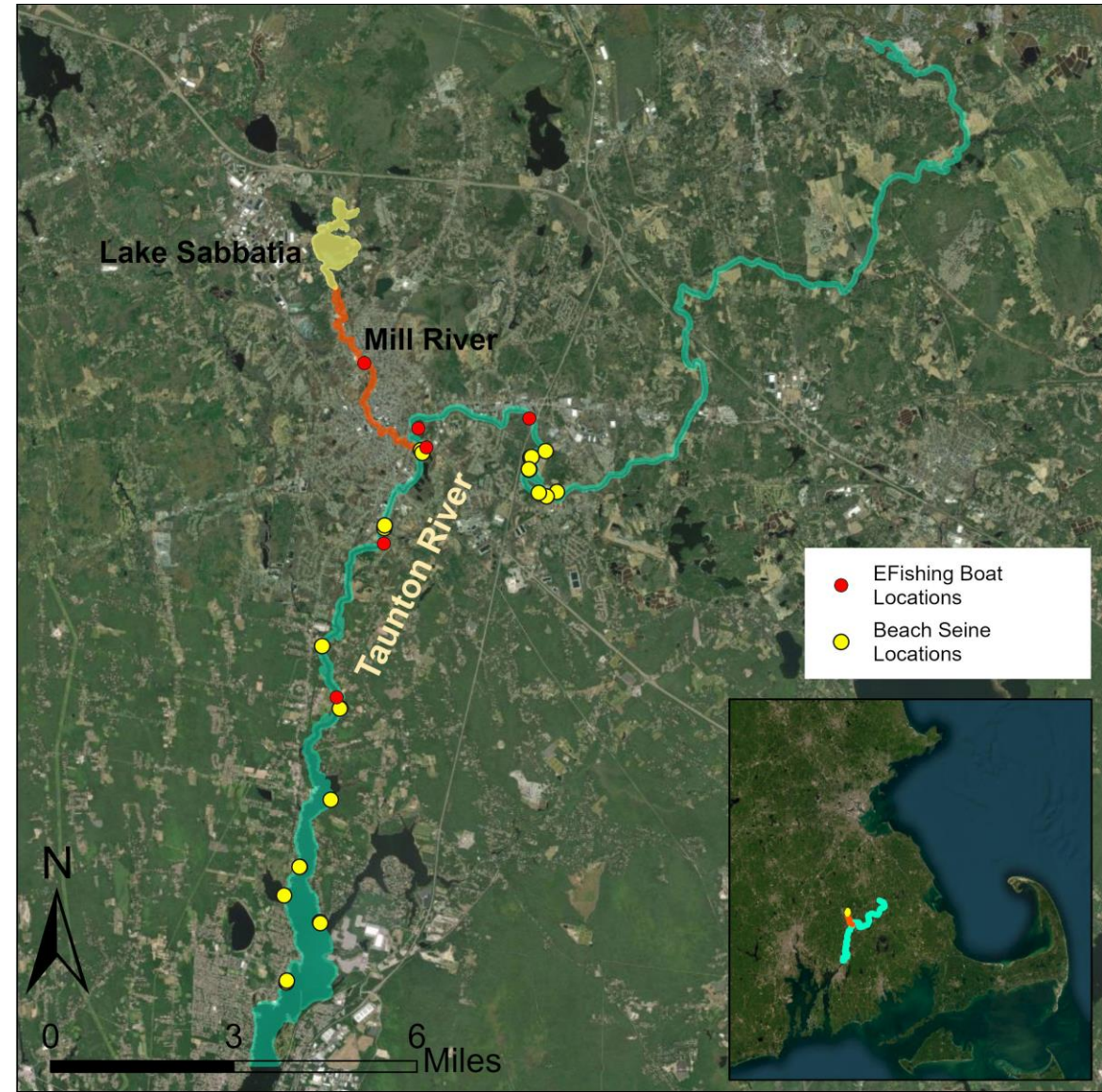
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# American Shad



- Alosine species, anadromous and iteroparous (most of range)
- American Shad historically abundant in Taunton River but native population abundance is currently very low
- Partnering with USFWS and MassWildlife to restore American shad in the Taunton River!
  - Historically abundant population
  - Access to suitable habitat
- USFWS stocking larval and juvenile shad in the Taunton River starting in 2022
  - North Attleboro National Fish Hatchery
  - 2022: 5,027,224 larval shad, 77,104 juvenile shad
  - 2023: 5,699,205 larval shad



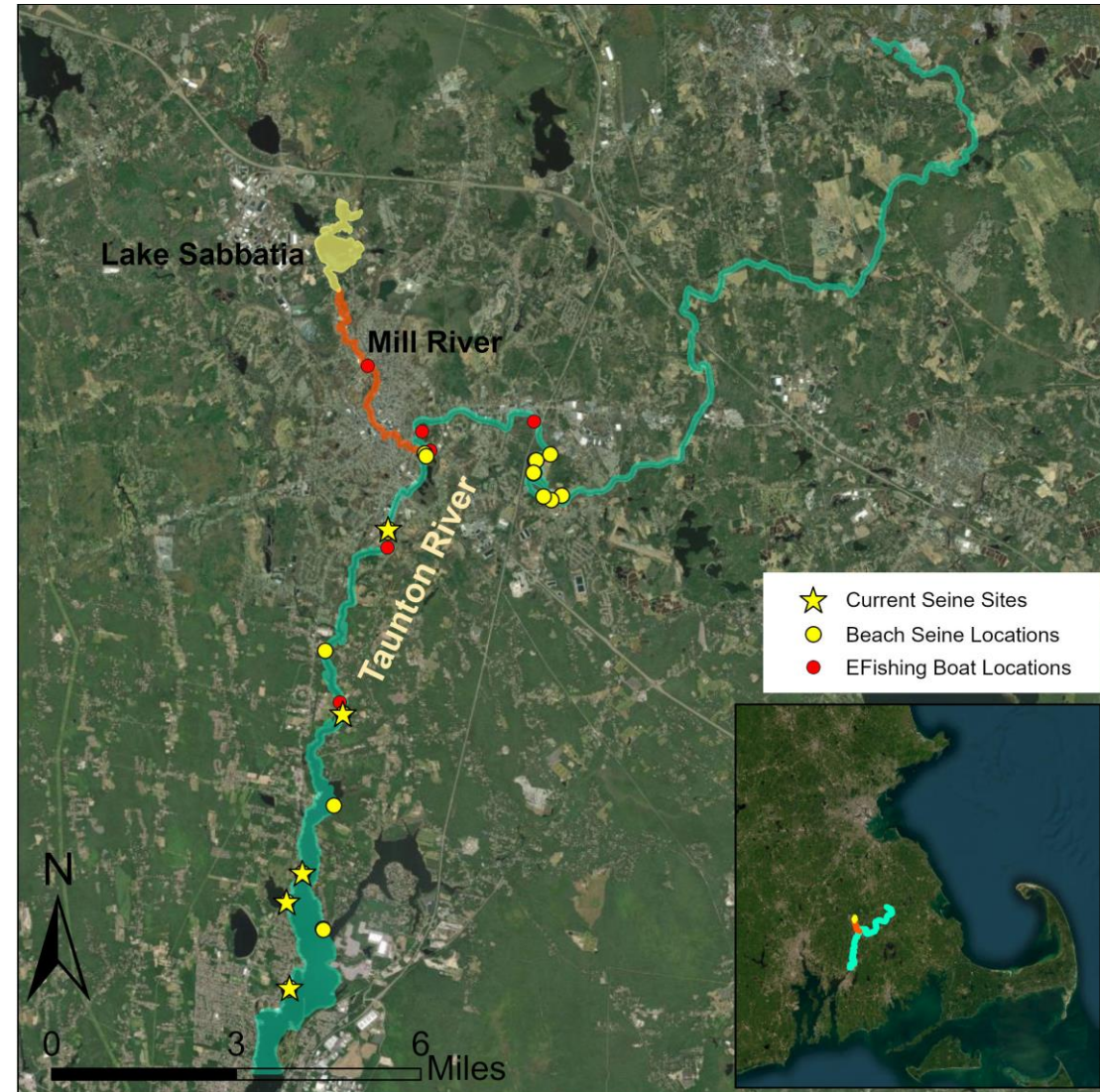
# American Shad Monitoring

- Goal: Monitor presence of American shad in Taunton River pre- and post- stocking effort
- DMF Juvenile Shad Beach Seine Survey
  - Began in 2017
  - Beach seine at 5-7 sites
  - Water chemistry at each site
  - Sampling once monthly from May-October :
    - Somerset Boat Ramp
    - Broad Cover
    - Osprey Landing
    - Berkley Park
    - Taunton Boat Club
- Boat electrofishing with MassWildlife
  - Monthly June- October in 2019, 2021
  - Targeting both adults and juveniles



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# American Shad Monitoring

- Beach Seine Results:
  - No shad caught in seine survey from 2017-2021
  - Juvenile shad caught July (9 shad) and October (7 shad) 2022
  - No shad caught in 2023 😞
    - Low catch abundance overall
- Boat Electrofishing Results:
  - Juvenile shad caught:
    - 2019: August (6 shad), October (1 shad)
    - 2020: July (1 shad)
    - 2021: August (5 shad)
  - No sampling 2022
  - Few adults caught





# American Shad Monitoring

Diadromous species caught in seine survey:

Species	N	Mean length (mm)	s.d.	Range
American Eel	4	177.7	36.6	140-213
American Shad	16	90.4	34.2	53-144
Atlantic Tomcod	54	51.7	30.0	20-95
River Herring	580	39.2	10.0	21-76
White Perch	30	88.6	19.2	66-150



American Eel



Alewife



Atlantic Tomcod

# American Shad Monitoring



Hogchoker



Winter Flounder



Striped Killifish



Oyster Toadfish

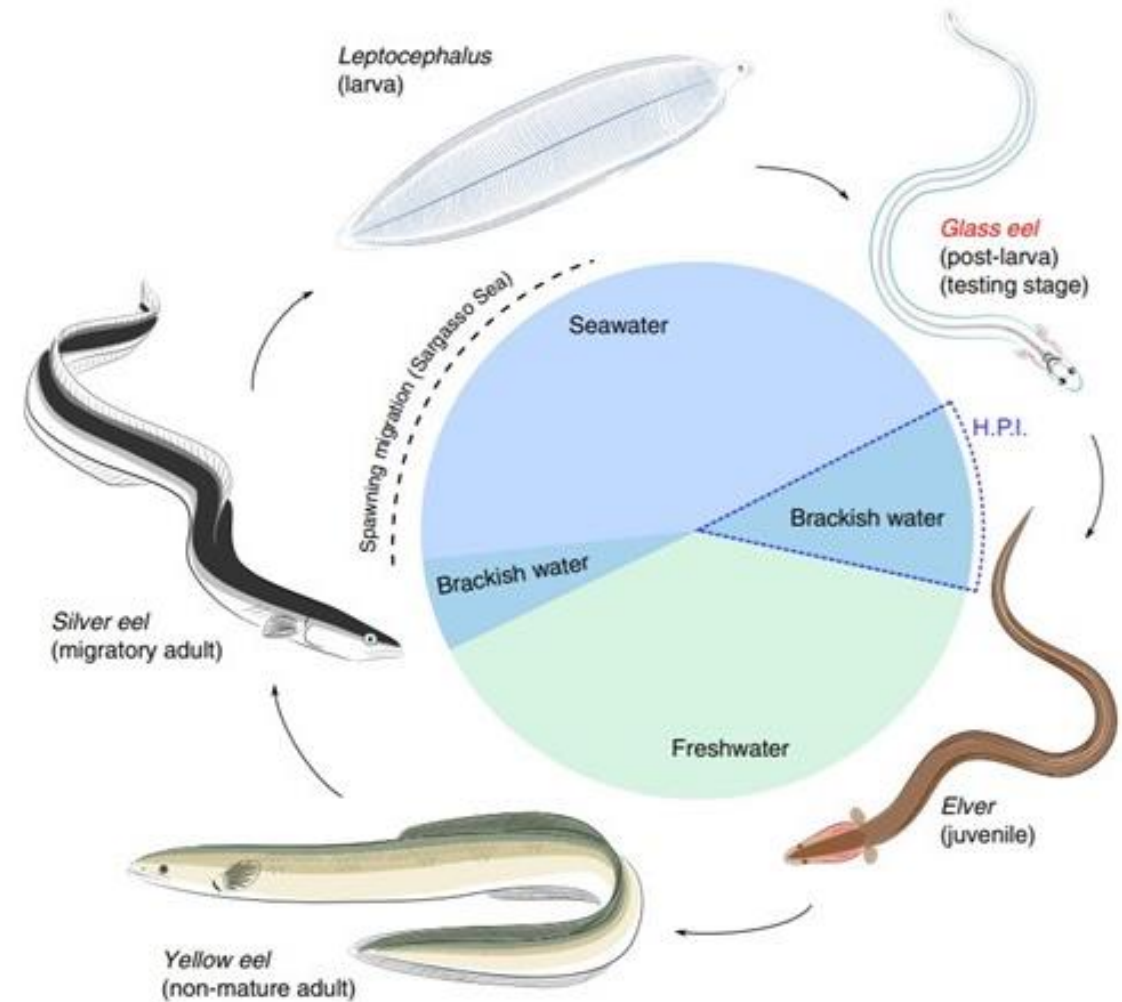
## Other species:

- Bay Anchovy
- Black Sea Bass
- Largemouth Bass
- Bluefish
- Bluegill
- Atlantic Croaker
- Cunner
- Tessalated Darter
- Unclassified Darter
- Fallfish
- Flounder
- Summer Flounder
- Winter Flounder
- Goby
- Gunnel
- Hogchoker
- Crevalle Jack
- Banded Killifish
- Striped Killifish
- Northern Kingfish
- Chub Mackerel
- Menhaden
- Sheepshead Minnow
- White Mullet
- Mummichog
- Yellow Perch
- Chain Pickerel
- Redfin Pickerel
- Florida Pinfish
- Northern Pipefish
- Northern Puffer
- Pumpkinseed
- Scup
- Northern Seabrook
- Striped Seabrook
- Gizzard Shad
- Shanny
- Golden Shiner
- Atlantic Silverside
- Spot
- Fourspine Stickleback
- Three-spine Stickleback
- White Sucker
- Banded Sunfish
- Red-Breasted Sunfish
- Tautog
- Oyster Toadfish



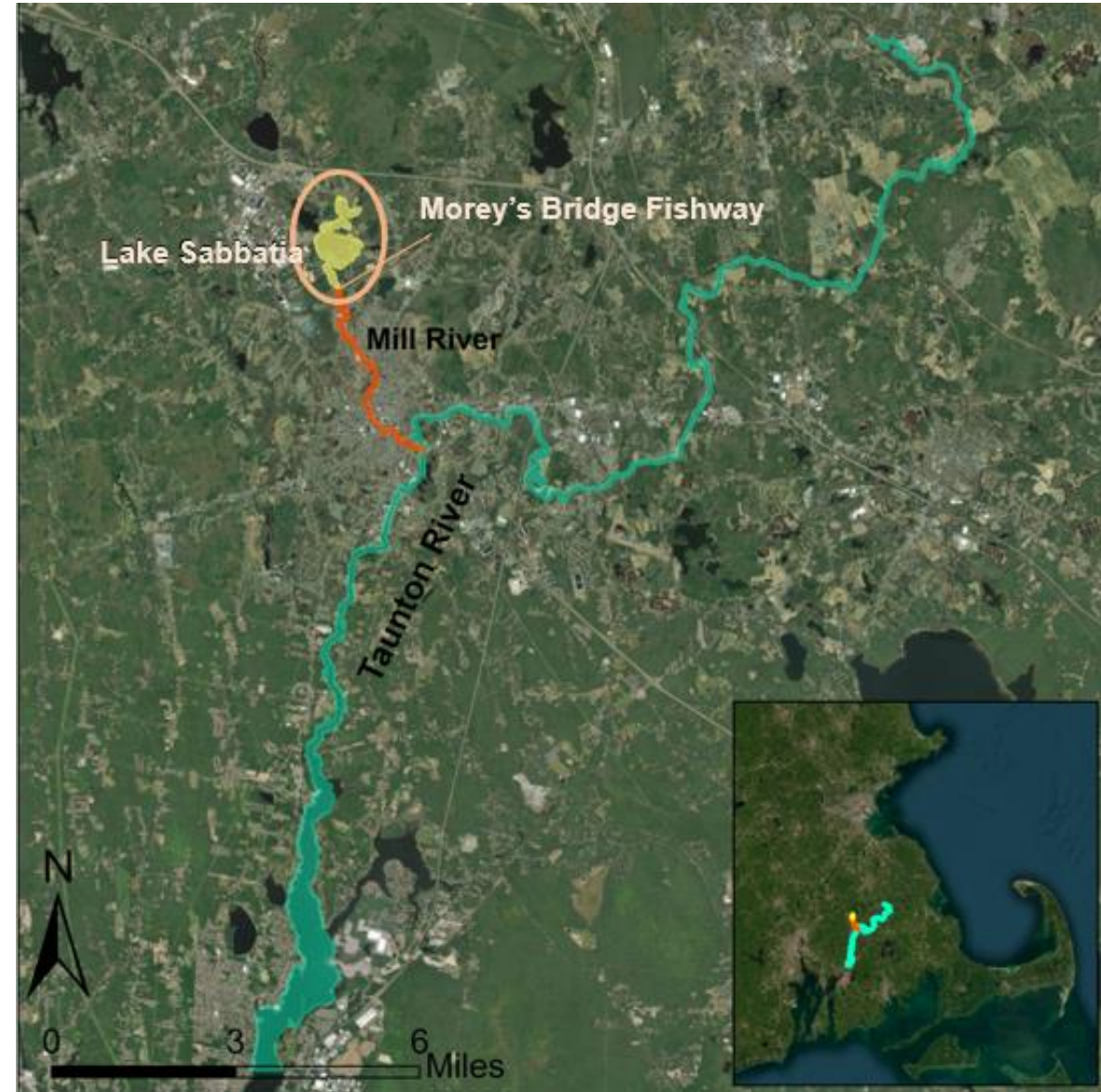
# American Eel

- Catadromous- Migrates from freshwater/river to the sea to spawn
- Semelparous- death after single spawning event
- Data limited species



# American Eel Monitoring

- Monitor elvers (age 1+) through eel ramp at Morey's Bridge Dam
- Monitor yellow-phase eel abundance through M-R survey in Lake Sabbatia



# American Eel Monitoring

- Monitor elvers (age 1+) through eel ramp at Morey's Bridge Dam
  - Ramp installed at fishway in 2014
  - Operated April-September
  - Eels collected from holding tank at top of dam, enumerated, and released into Lake Sabbatia

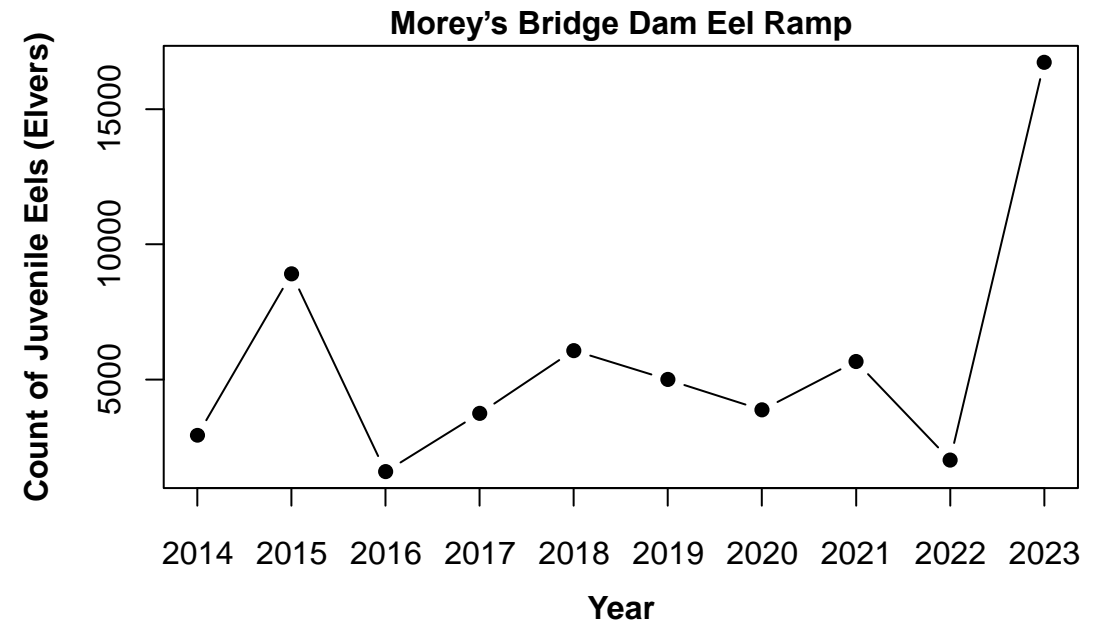


# American Eel Monitoring

- Eel Ramp Results:
  - Annual abundance of pigmented elvers into Lake Sabbatia varied over time series from 2014-2023
    - Decline in 2016 (1,596) and 2022 (2,026)
    - Large increase in 2023 (16,729)

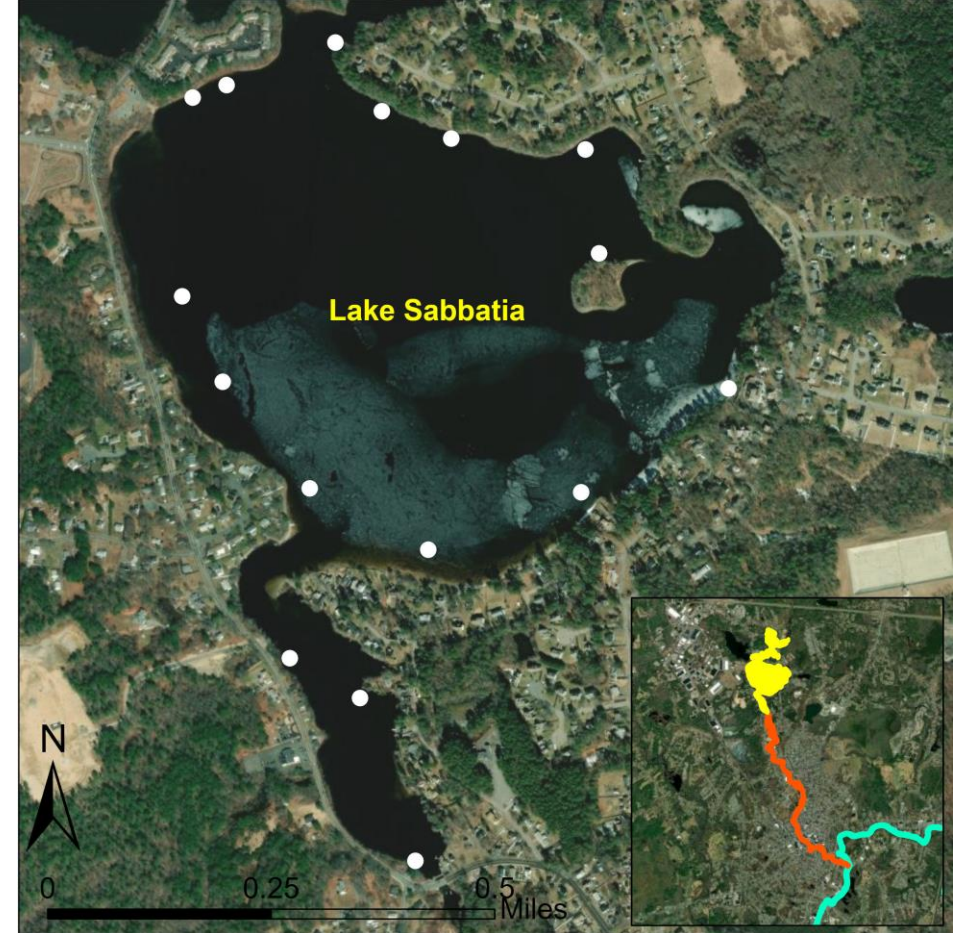


Eel box at Morey's Bridge Dam packed full of elver eels (C.Barba)



# American Eel Monitoring

- Monitor yellow-phase eel abundance through M-R survey in Lake Sabbatia
  - Survey began in 2013
  - Eels captured using baited eel traps set at 16 sites along Lake Sabbatia
  - Pots set four days/week for four weeks from mid-July to mid-August





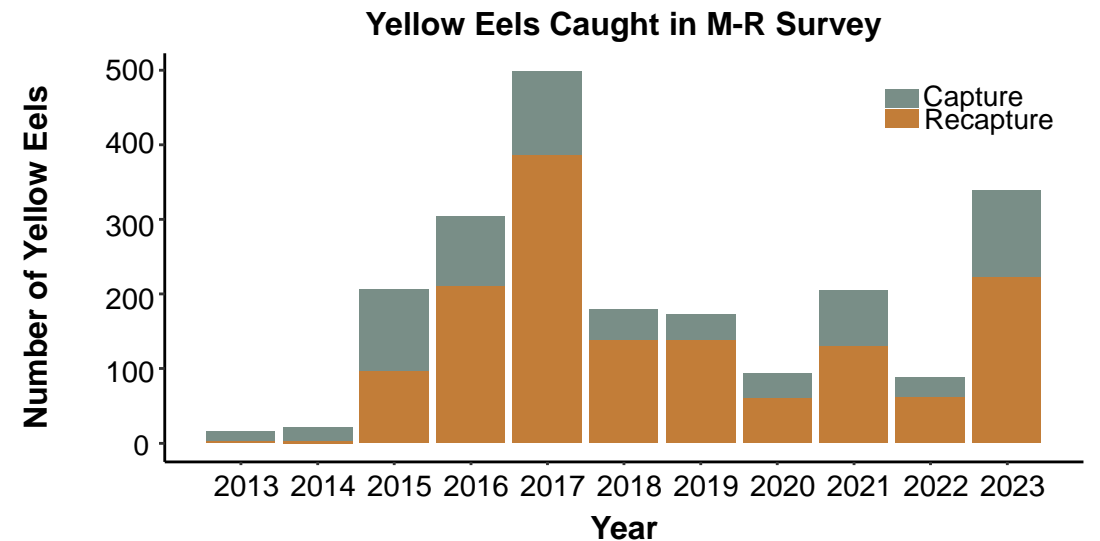
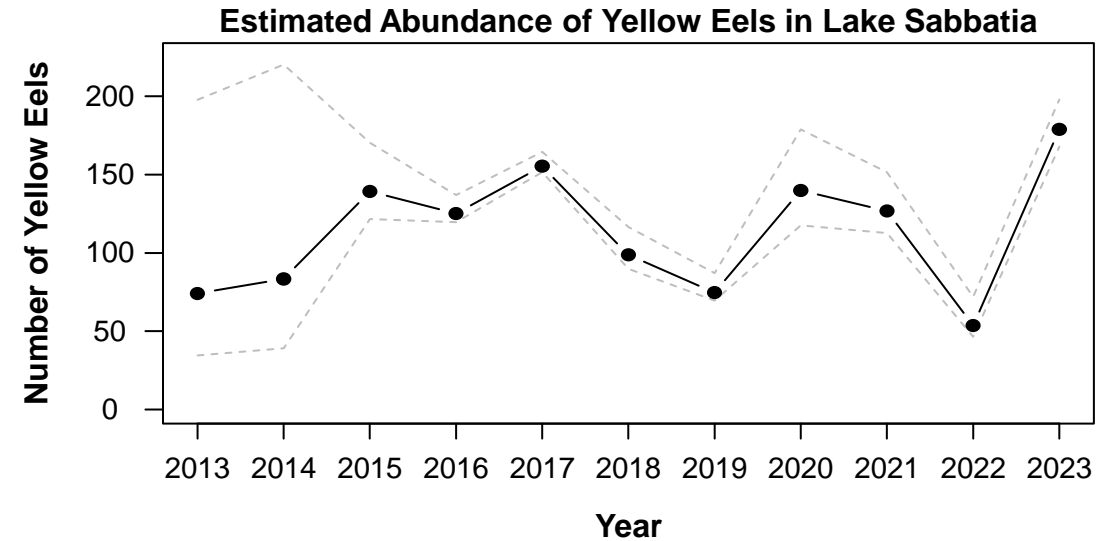
# American Eel Monitoring

- Monitor yellow-phase eel abundance through M-R survey in Lake Sabbatia
  - Captured eels processed shoreside:
    - Sedated with clove oil
    - Measured for total length
    - Scanned for PIT tag
    - Released if tagged or tagged using 12 mm PIT tag inserted into the gastric cavity, then released
  - Mark-recapture data used to estimate annual abundance through a robust design model in Program MARK (Kendall and Nichols 2002) following model outlined in Turner et al. (2018).



# American Eel Monitoring

- M-R study results:
  - Estimated abundance highly variable over the time series
    - Estimates range from 51 eels (2022) to 179 eels (2023)
  - 339 eels caught total
  - 114 eels tagged
    - 2022: 88 eels caught, 27 tagged
  - 225 recaptured eels
    - 18 eels captured  $\geq 5$  times over the 4 weeks
    - Three eels captured 8 times



# Next steps in the Taunton River Watershed

- American Eel Monitoring
  - Continue monitoring elver and yellow eels in Lake Sabbatia
    - City of Taunton began chemical pond treatments for invasive plants in 2023
    - How will eel population respond to pond treatments?



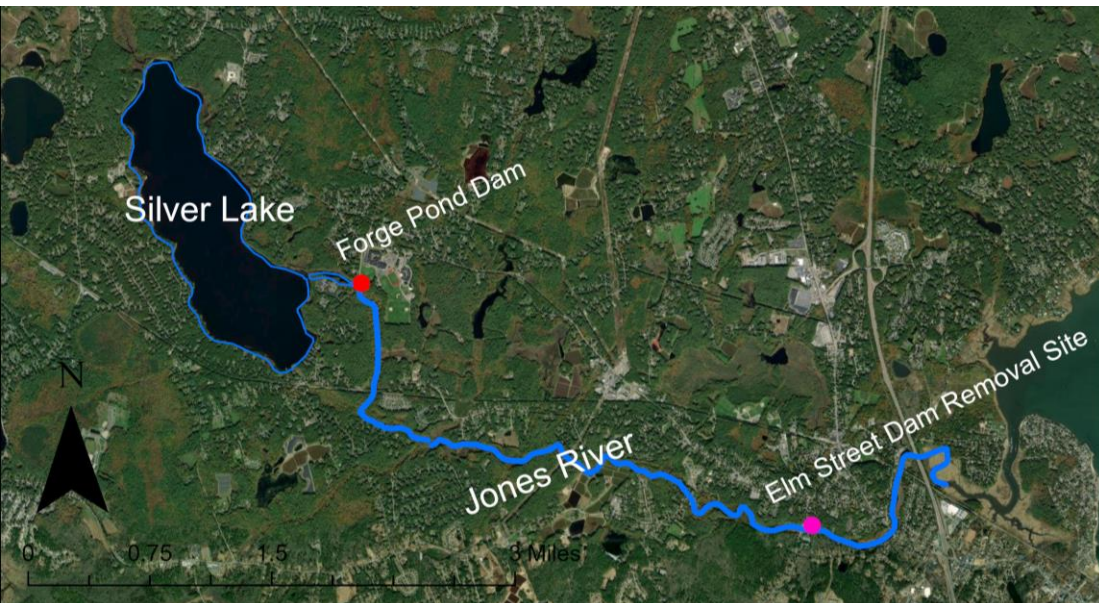
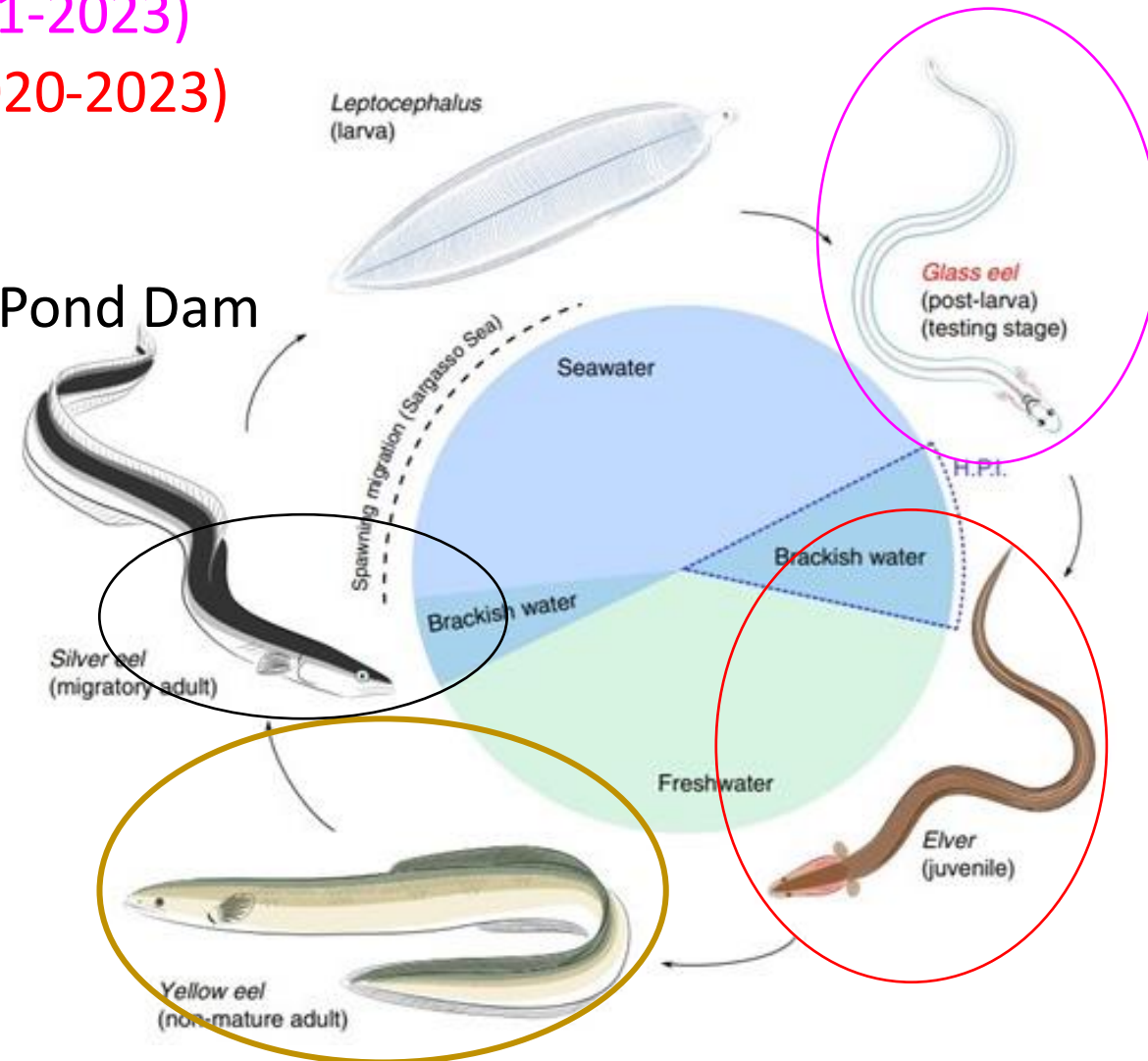
# Next steps in the Taunton River Watershed

- American Shad
  - Collaborate with MassWildlife and USFWS to collect native adult shad for genetic sampling
  - Work with local fishermen to increase fishing interest and collect genetic samples on adult fish
  - Continue to monitor juveniles through beach seine and electrofishing surveys
  - Hope for more shad in 3-5 years!



# American Eel in Jones River and Silver Lake

- Glass eels: Sheldon trap at Elm st. dam (2001-2023)
- Elvers (1+): eel ramp at Forge Pond Dam (2020-2023)
  - Partnering with JRWA
- Yellow-phase eels: M-R in Silver Lake (2023)
- Silver eel (migrating): Fyke net set on Forge Pond Dam fishway
  - Continuation of work done by Karissa Collins



# Thank you!

- Any questions?

