

# **Mystic River: Herring Monitoring, Habitat Assessment and Restoration Efforts**

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# Mystic River Herring Monitoring

- MyRWA herring monitoring program
- Herring habitat assessment
- Other restoration efforts and opportunities







Upper  
Mystic  
Lake

Lower  
Mystic  
Lake

Somerville

Arlington

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# Ecological significance of River Herring

- Found in rivers, coastal waters
- Anadramous
- Economically and ecologically significant
- Important to the food web
  - striped bass, cod, ospreys, loons, herons, bald eagles, egrets, blue fin tuna



# Herring Population Decline

- Dams and other impediments
- Habitat degradation
- By-catch
- Overfishing
- Poaching
- Natural predators



# Prior Efforts





# Herring Monitoring Program

80 volunteers

675 counting  
periods

2 trainings

3+ public  
education  
opportunities



Trained 120  
volunteers. 85  
completed  
program



685 counting  
periods



2 formal  
trainings, 3  
informal



3 open house  
events  
attended by  
over 100  
people



# Why count herring?

- Simple indicator of stock
  - Allows us to estimate spawning population
  - Data will inform trends for Massachusetts





# Data Collection

- Massachusetts Division of Marine Fisheries Protocol
  - Visual Counts, 9 per day
- Herring count from April 1 - June 22, 2012



# Data Collection



Photo courtesy of David Mussina

Monitors conduct  
ten minute  
observations



Data collected,  
data QC by  
MyRWA



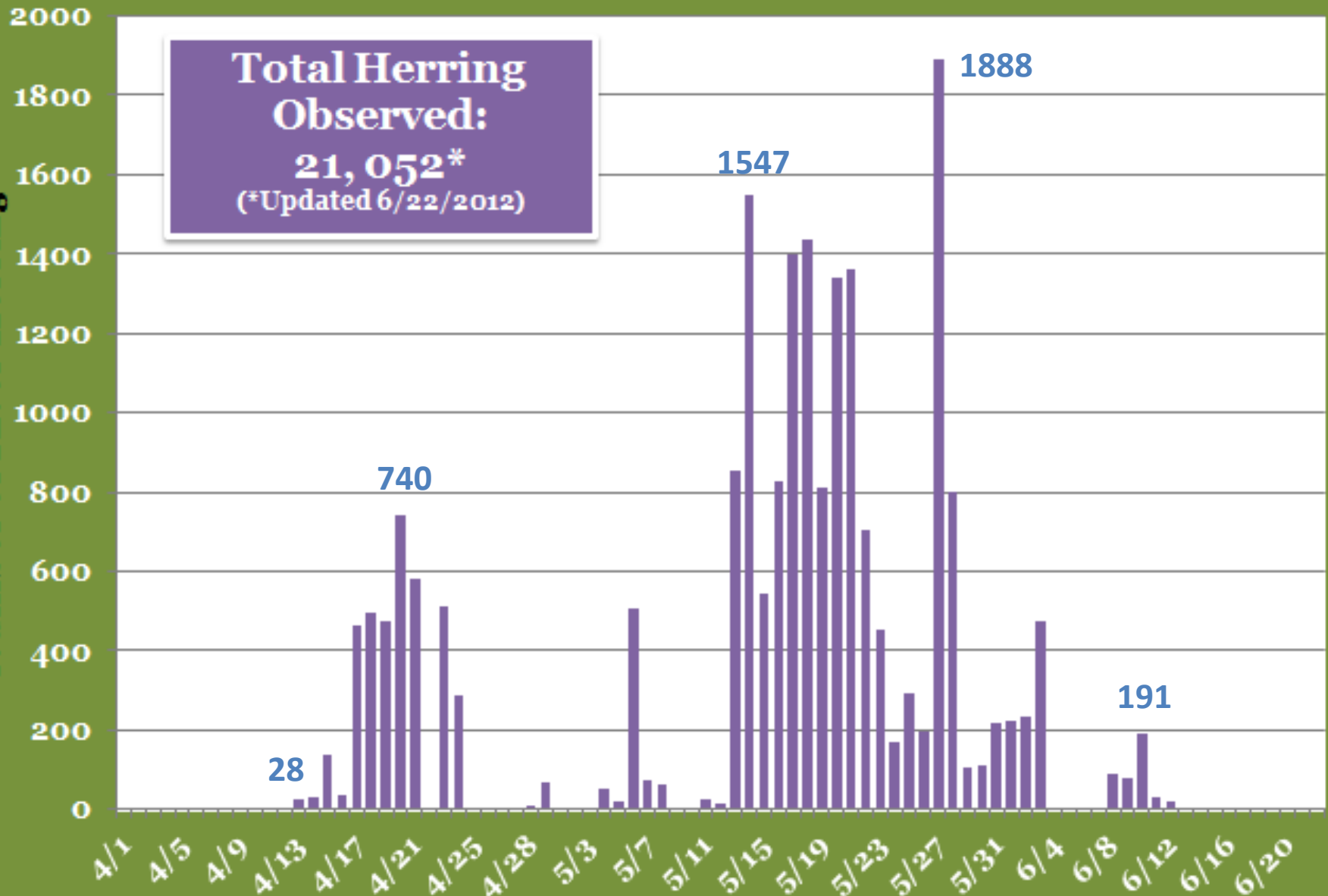
Input data into a  
statistical model to  
estimate total run



# River Herring observed at Upper Mystic Lake Dam

**Total Herring  
Observed:  
21,052\***  
(\*Updated 6/22/2012)

Number of River Herring



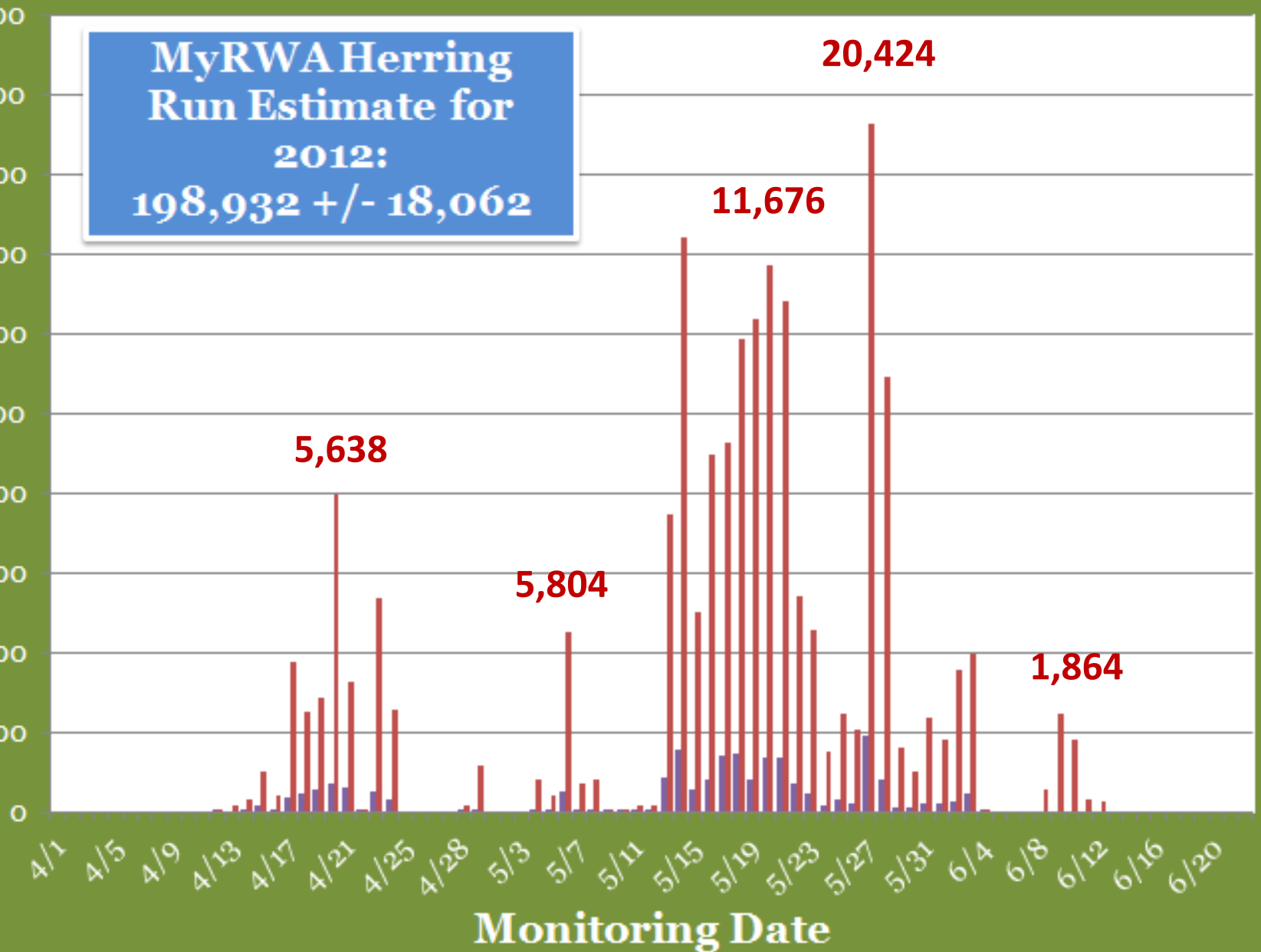
Monitoring Date



# River Herring recorded daily at Upper Mystic Dam

**MyRWA Herring  
Run Estimate for  
2012:  
198,932 +/- 18,062**

Number of River Herring





# Other Observations

- Found no correlation between precipitation and fish observed
- Air temperature and water temperature



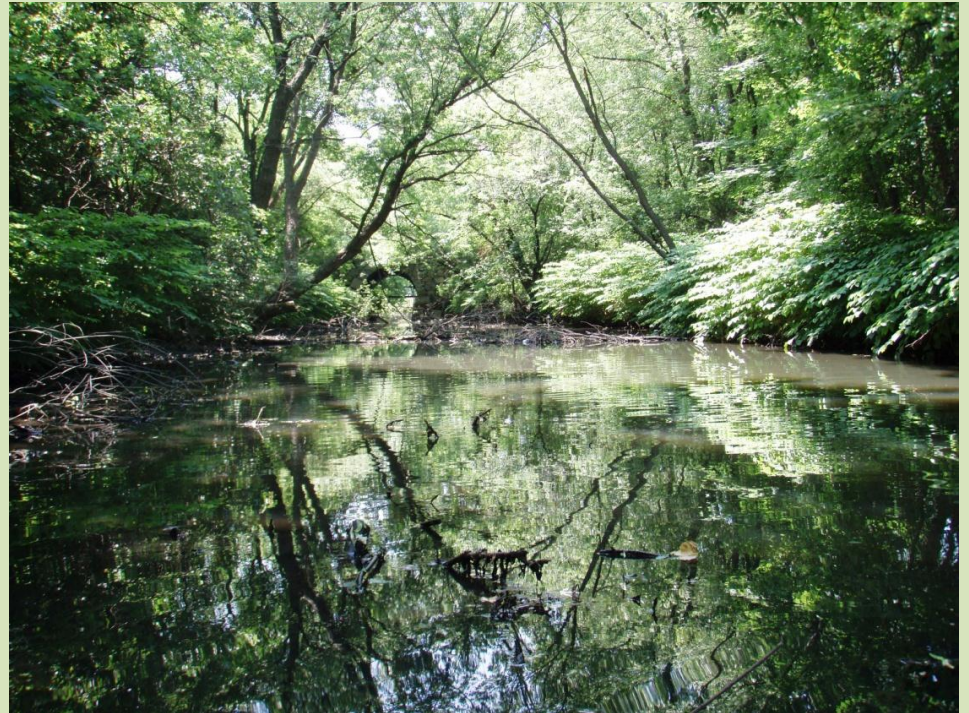
# Herring Habitat Assessment





# Herring Habitat Assessment

- Spawning Temperature
- Nursery Temperature
- Dissolved Oxygen
- Nutrients
  - Nitrate/Nitrate
  - Total Phosphorus



# Herring Habitat Assessment

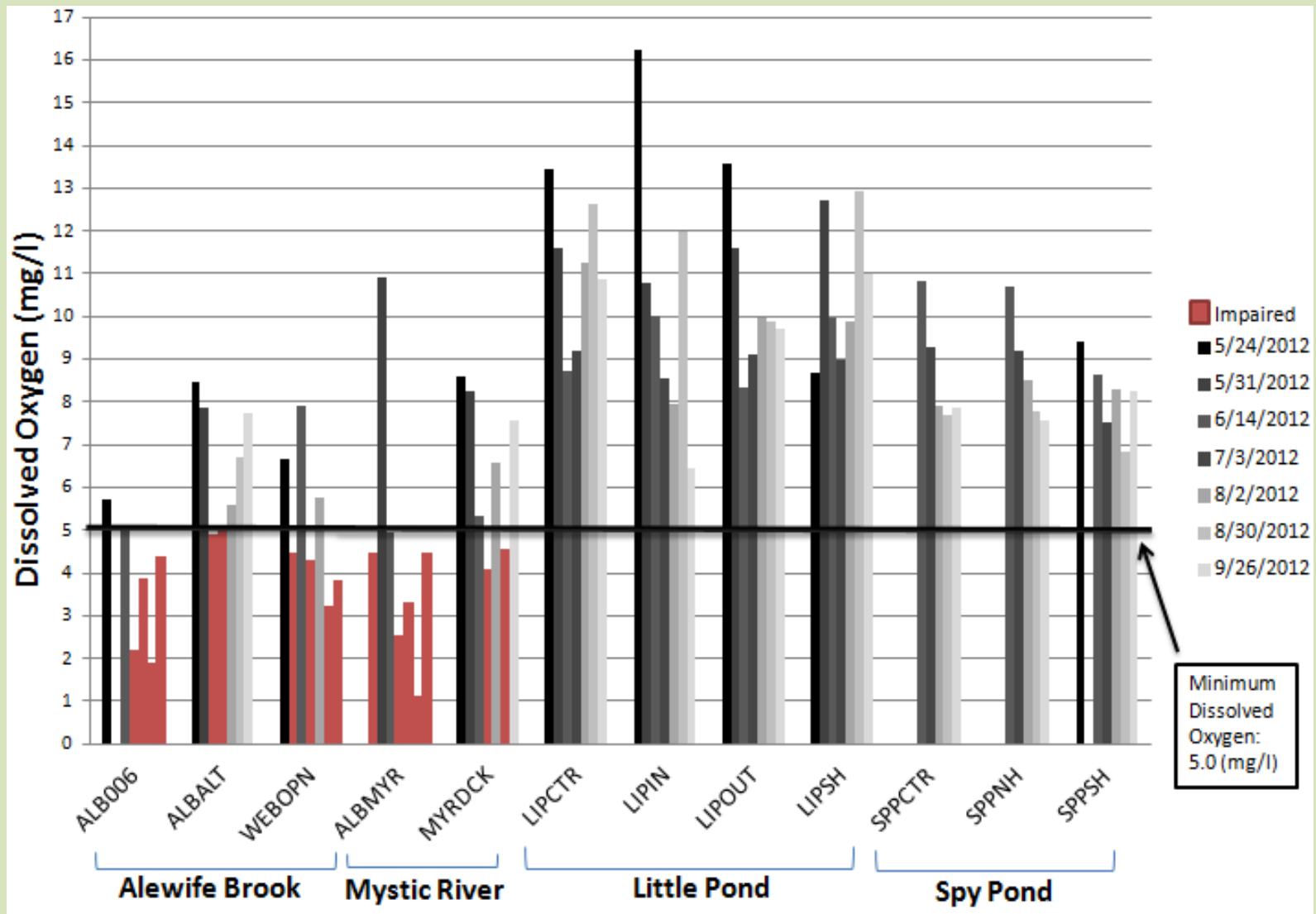
## Water Temperature

Spawning	
Alewife Brook	<i>suitable</i>
Mystic River	<i>suitable</i>
Little Pond	<i>suitable</i>
Spy Pond	<i>suitable</i>

Nursery	
Alewife Brook	<i>suitable</i>
Mystic River	<i>suitable</i>
Little Pond	<i>suitable</i>
Spy Pond	<i>suitable</i>



# Herring Habitat and Dissolved Oxygen





# Herring Habitat and Nutrients:

## Nitrite and Nitrate

Nitrite/Nitrate	
Alewife Brook	<i>impaired</i>
Mystic River	<i>impaired</i>
Little Pond	<i>suitable</i>
Spy Pond	<i>impaired</i>

Spy Pond (SPPNH, SPPCTR, SPPSH)						
Parameter	Units	Acceptable Criteria	Sample Size (No.)	Exeeding Samples (No.)	Exceedance (%)	Classification
Temp. (Nursery)	C	$\leq 28.3$	4	0	0	<i>suitable</i>
Temp. (Spawning)	C	$\leq 26.0$	15	0	0	<i>suitable</i>
DO	mg/L	$\geq 5.0$	19	0	0	<i>suitable</i>
N+N	mg/L	$\leq 0.32$	7	1	14	<i>impaired</i>
TP	mg/L	$\leq 0.008$	7	7	100	<i>impaired</i>



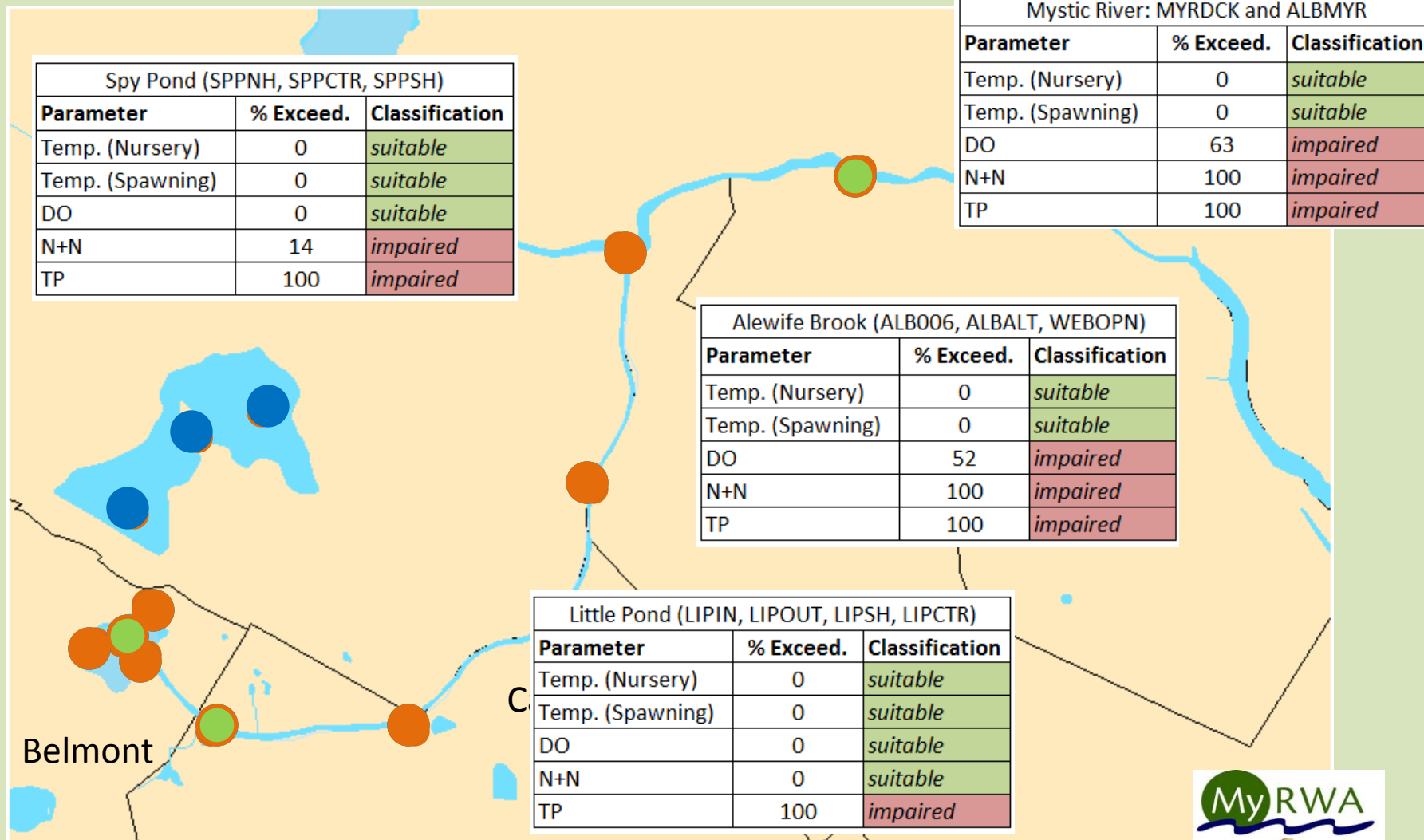
# Herring Habitat and Nutrients:

## Total Phosphorus

Total Phosphorus	
Alewife Brook	<i>impaired</i>
Mystic River	<i>impaired</i>
Little Pond	<i>impaired</i>
Spy Pond	<i>impaired</i>



# 2012 Herring Habitat Assessment



# Summary of Herring Habitat Assessment

## May – September 2012

Parameter	Units	Acceptable Criteria	Sample Size (No.)	Exeeding Samples (No.)	Exceedance (%)	Classification
Temp. (Nursery)	C	$\leq 28.3$	30	0	0	<i>suitable</i>
Temp. (Spawning)	C	$\leq 26.0$	60	0	0	<i>suitable</i>
Dissolved Oxygen	mg/L	$\geq 5.0$	90	22	24	<i>impaired</i>
Nitrite+Nitrate	mg/L	$\leq 0.32$	30	16	53	<i>impaired</i>
Total Phosphorus	mg/L	$\leq 0.008$	30	30	100	<i>impaired</i>





# Restoration Efforts and New Opportunities

- Cambridge storm water inputs
- USACE and the Malden River
  - wetlands restoration
  - aquatic habitat restoration
  - riverine migratory restoration
- Renovation of Center Falls Dam, Winchester





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[www.kickstarter.com/projects/imm/the-herring-migration-documentary-series](http://www.kickstarter.com/projects/imm/the-herring-migration-documentary-series)