

# Westford Stream Monitoring 2015 Results



Westford Stream Team:

Diane Duane

Kate Hollister

Hal Schreiber

Bill Duane

Ron Gemma

Rich Strazdas

Michael Mendes

Richard Hendl

Katie Hendl

# Outline

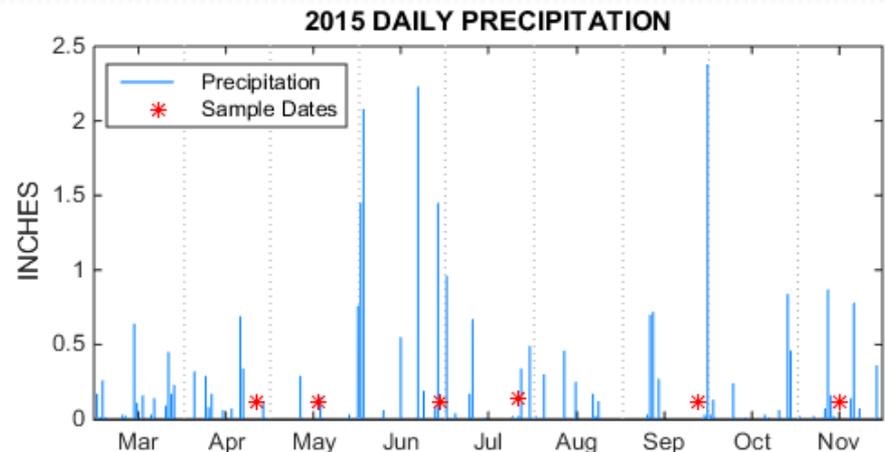
- Regular stream monitoring
  - 2 new sites/brooks: Nonset, Pond Brooks
  - High nutrients
  - Changes from previous years
- Special studies
  - Not done due to low water volume
    - Reed Brook
    - Coldspring Brook
- 2016 Proposal



West Street pond outflow to Reed Brook  
Leaves caught at grate block water flow

# Sampling Overview

- Sampled 12 streams, 14 sites
  - Stony Brook watershed: April, June, September, November
    - Many streams were dry in August, so moved to September
  - Nashoba Brook watershed: May, July, September, November
- River observation forms
- YSI meters for dissolved oxygen, temperature, pH, conductivity
- Bottle samples analyzed by Nashoba Analytical Laboratory for nitrates, ortho-phosphorous, total phosphorous (P)
- Coordinated with OARS
- Weather data provided by Larry Mack



# Sampling Sites

**Total: 14 sites**

Stony watershed: 8

Nashoba watershed: 6

**New in 2015**

Pond Brook

Nonset Brook (stopped  
sampling in 2011)

## Key to Site IDs

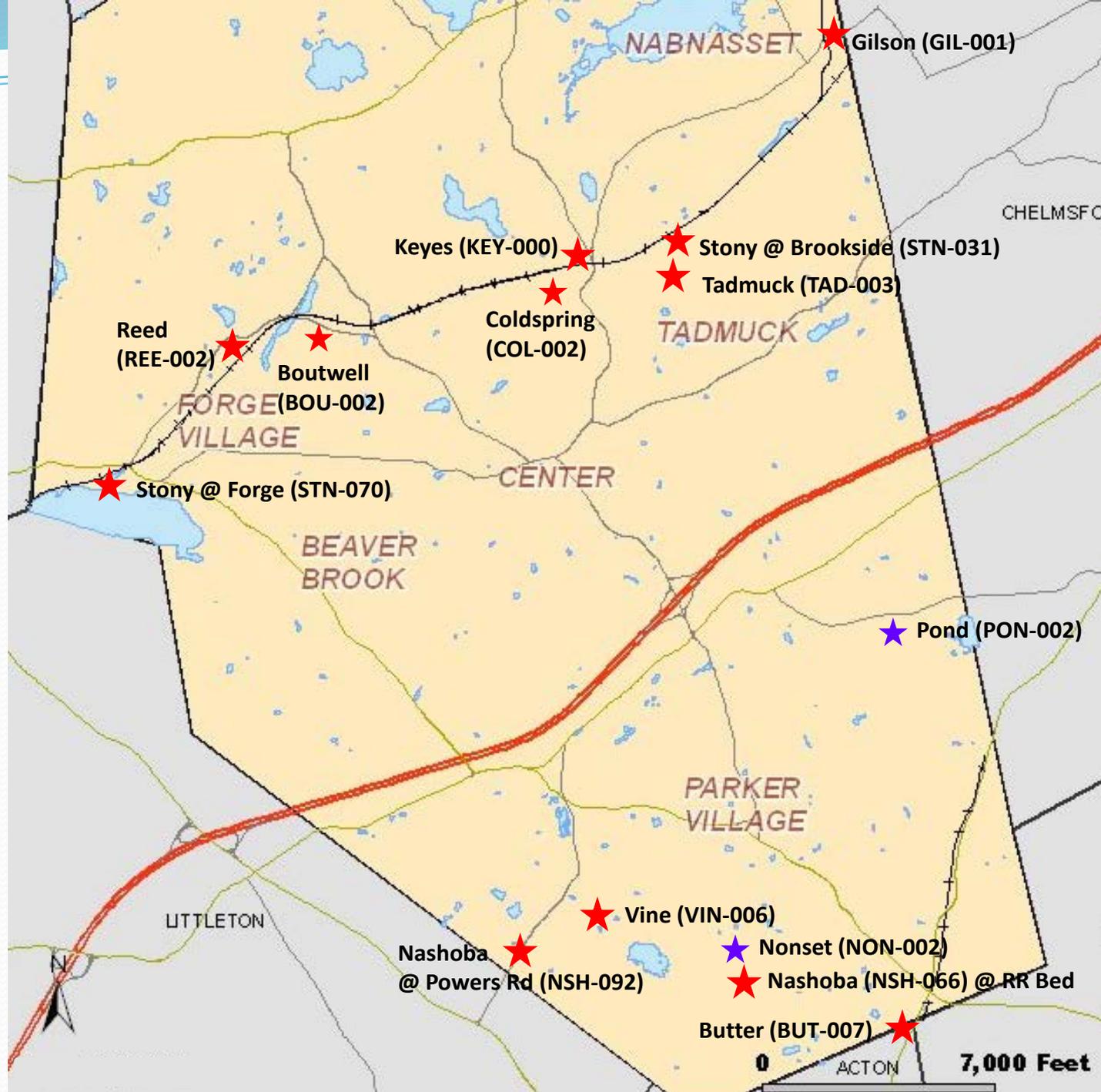
Brook (Reed)



REE-002

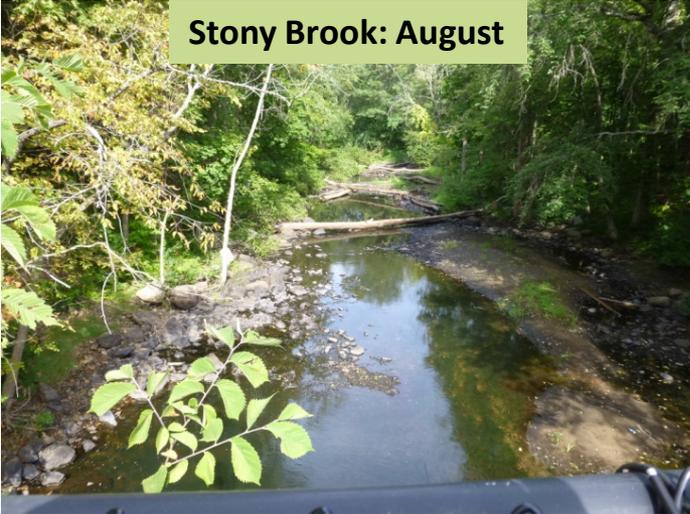


Distance (0.2 mile) to  
the river it flows into  
(Reed flows into  
Stony Brook)



# The Year of the Drought ...

**Stony Brook: August**



**Nonset Brook: September**



**Tadmuck Brook: August**



**Vine Brook: September**



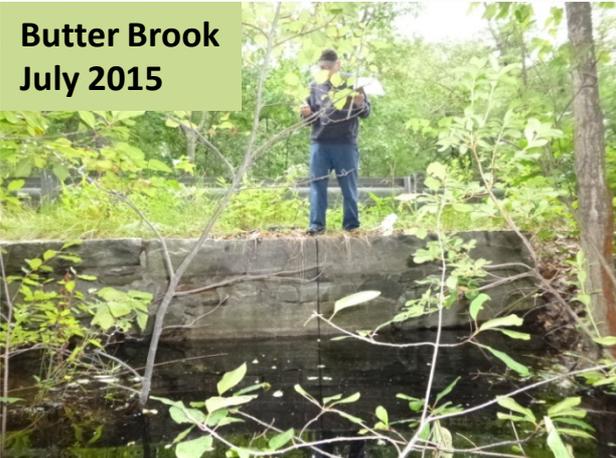
# ... and the Beaver

- Beaver activity has increased over the years
  - 4+ dams along Nashoba Brook
  - Stony Brook at RR bridge
  - Reed, Butter, Pond Brooks
- Beaver dams helped to retain water during the drought ...
- ... but they can also contribute to site damage and loss of water quality
  - Butter Brook turning anaerobic upstream of dam
  - Dam under Nashoba Brook bridge causes water to flood trail and erode river bank

Butter Brook  
October 2014



Butter Brook  
July 2015



~4 ft high



Reed Brook  
August 2015

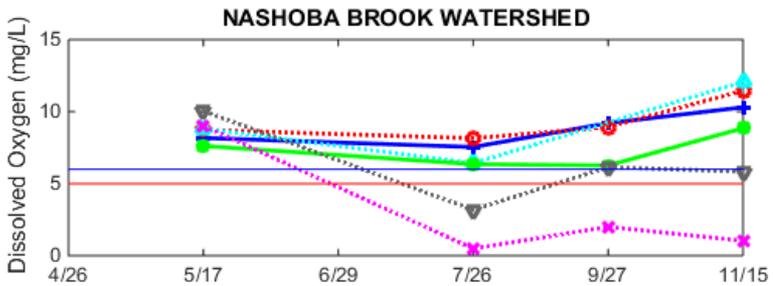


Nashoba Brook  
November 2015

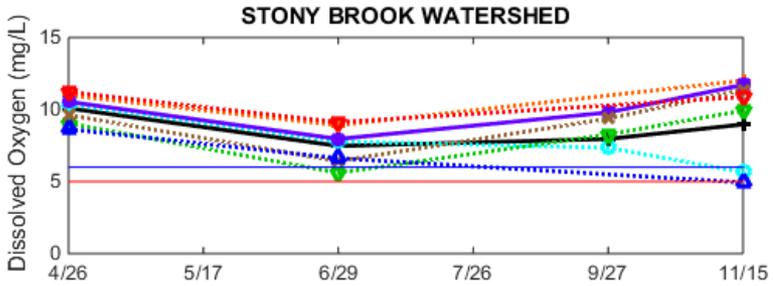


# Dissolved Oxygen and Temperature

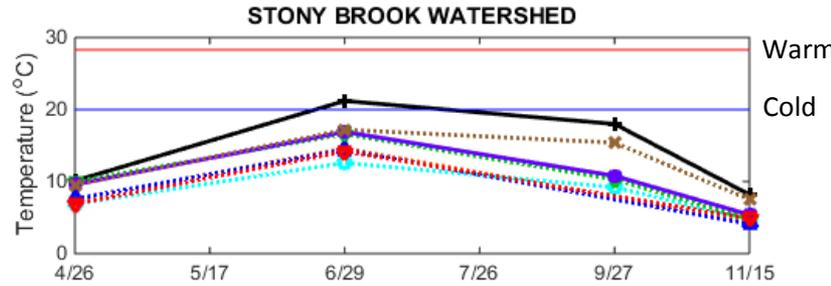
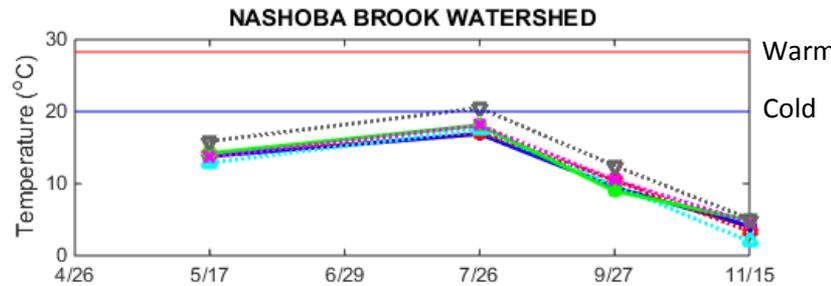
—◆— Nashoba (Powers Rd)    -○- Vine    -△- Nonset    -■- Stony (Forge Pond)    -○- Reed    -+- Tadmuck    -△- Boutwell  
-◆- Nashoba (RR bed)    -★- Butter    -▽- Pond    -◆- Stony (Brookside)    -▽- Keyes    -★- Gilson    -▽- Coldspring



MA Cold Fishery  
MA Warm Fishery



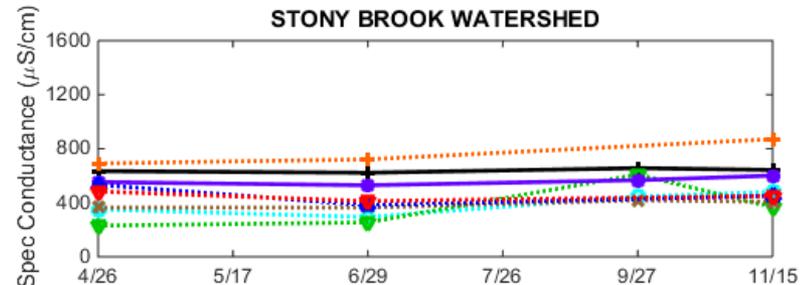
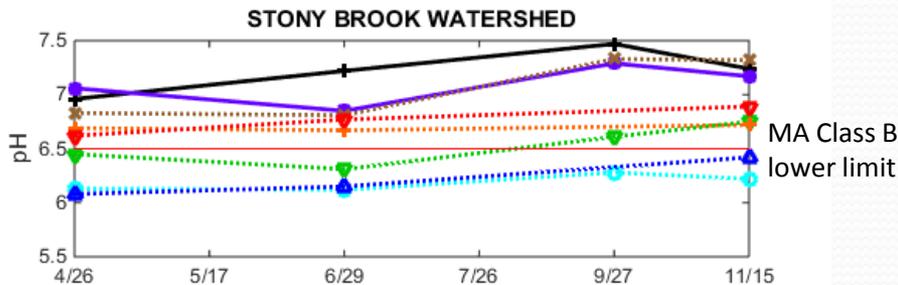
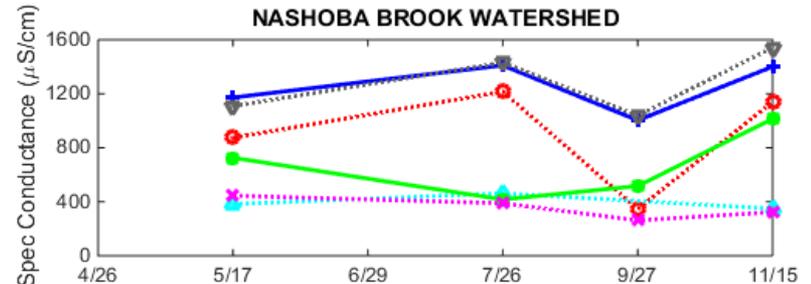
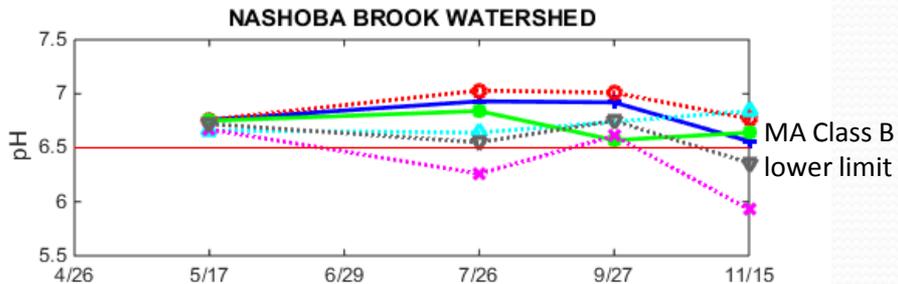
MA Cold Fishery  
MA Warm Fishery



- Dissolved oxygen mostly consistent with previous years
  - Butter Brook dropped to <2 mg/L after beavers built dam
- Some streams slightly cooler than pre-2014
  - Stony about 5 deg cooler
  - Keyes, Gilson

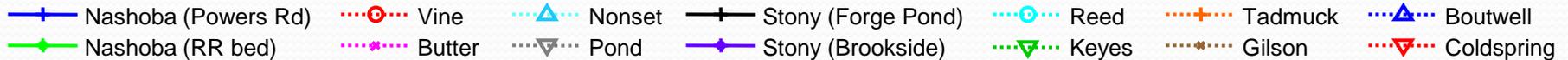
# pH and Specific Conductivity

—●— Nashoba (Powers Rd)    -○- Vine    -△- Nonset    -■- Stony (Forge Pond)    -○- Reed    -+- Tadmuck    -△- Boutwell  
-◇- Nashoba (RR bed)    -★- Butter    -▽- Pond    -◇- Stony (Brookside)    -▽- Keyes    -★- Gilson    -▽- Coldspring

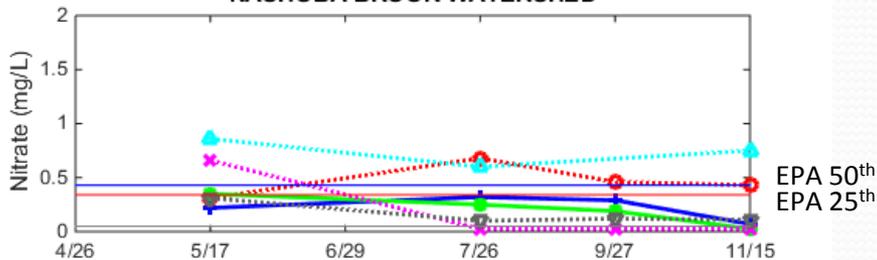


- pH is consistent with previous years
- Specific conductance is water conductivity normalized for 25-deg C temperature
  - Allows comparison over time (different ambient temperatures)
  - For Nashoba at Powers Rd – almost double the values in 2012
  - Gradual increase for Stony Brook since 2011

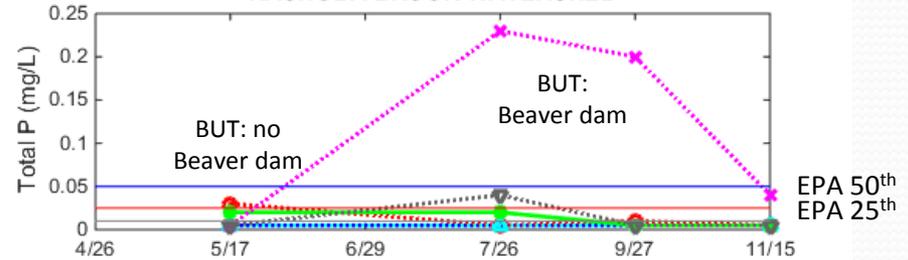
# Nitrate and Total Phosphorous



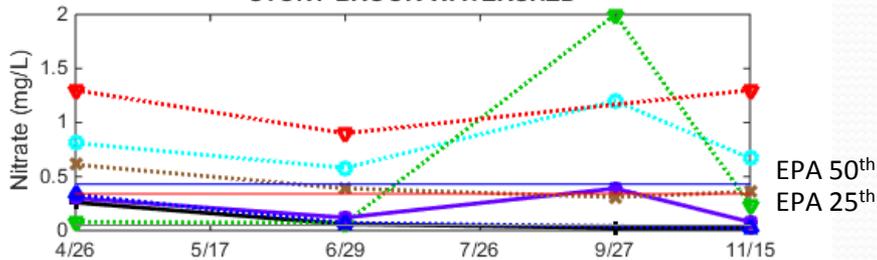
NASHOBA BROOK WATERSHED



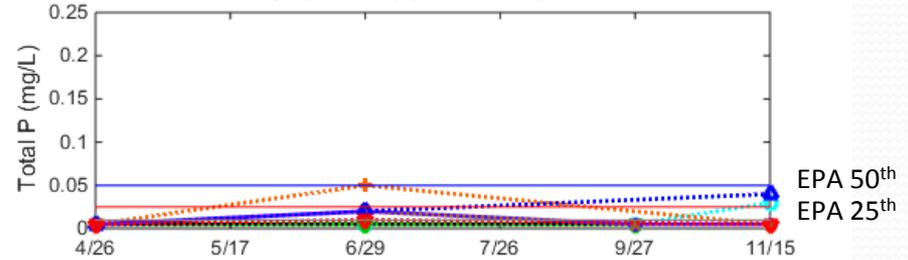
NASHOBA BROOK WATERSHED



STONY BROOK WATERSHED

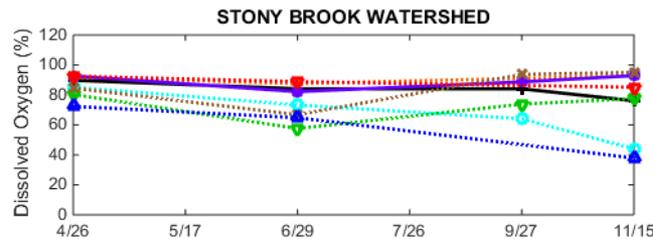
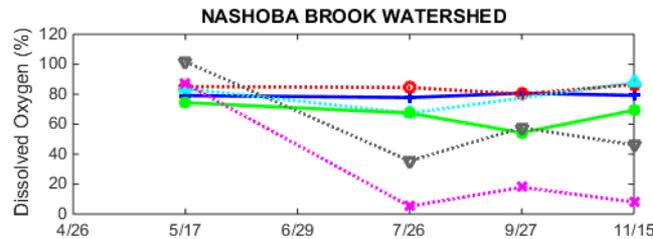
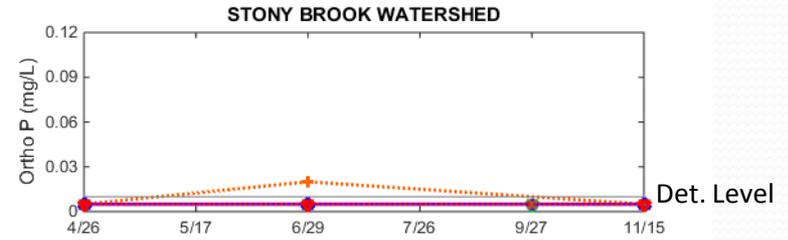
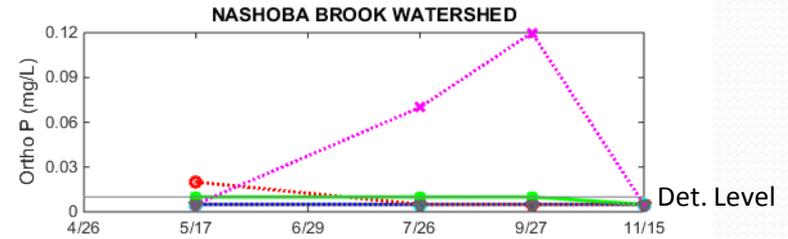
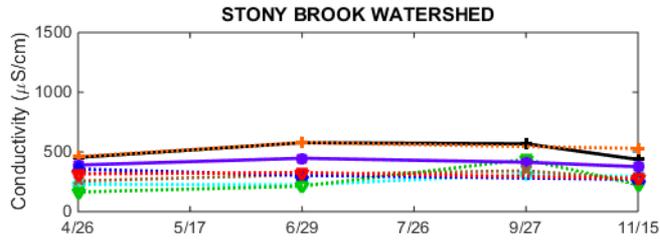
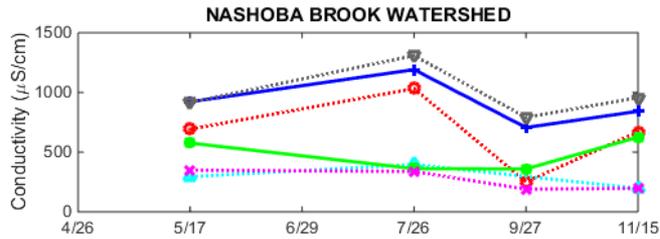


STONY BROOK WATERSHED



- Nitrate level high for Nonset, Reed and Coldspring Brooks
  - High level for Keyes on 9/27 may be due to low water level and plants
- Total P improved since 2012
  - Big improvement for Boutwell and Coldspring since 2014 (1<sup>st</sup> year)
  - Butter Brook may be due to decaying aquatic plants(?)

# Other Results (No References)



- |                         |                        |
|-------------------------|------------------------|
| —+— Nashoba (Powers Rd) | —+— Stony (Forge Pond) |
| —◆— Nashoba (RR bed)    | —◆— Stony (Brookside)  |
| —○— Vine                | —○— Reed               |
| —*— Butter              | —▽— Keyes              |
| —△— Nonset              | —+— Tadmack            |
| —▽— Pond                | —◆— Gilson             |
|                         | —△— Boutwell           |
|                         | —▽— Coldspring         |

# Outline

- Regular Stream Monitoring
- Special studies
- 2016 Proposal
  - Continue monitoring all named streams in Westford
  - Sample less often since have monthly baseline for most streams
    - Early April, June, September, November
    - Skip July, August due to low water volumes
  - Special studies for Coldspring, Reed due to high nitrate
  - Monitor Nonset and Butter Brooks to see if high nutrient levels continue

# The Team

