

Westford Stream Monitoring 2015 Results



Westford Stream Team:

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Outline

➤ Regular stream monitoring

- 2 new sites/brooks: Nonset, Pond Brooks
- High nutrients
- Changes from previous years

• Special studies

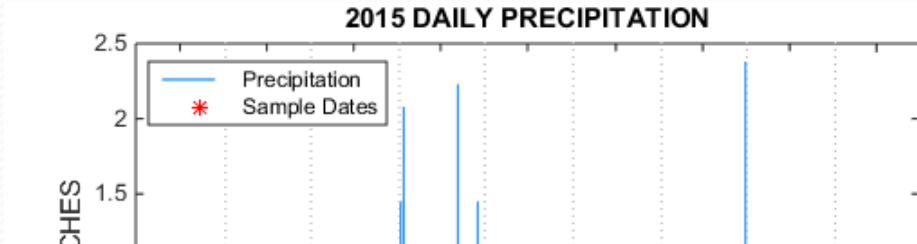
- Not done due to low water volume
 - Reed Brook
 - Coldspring Brook

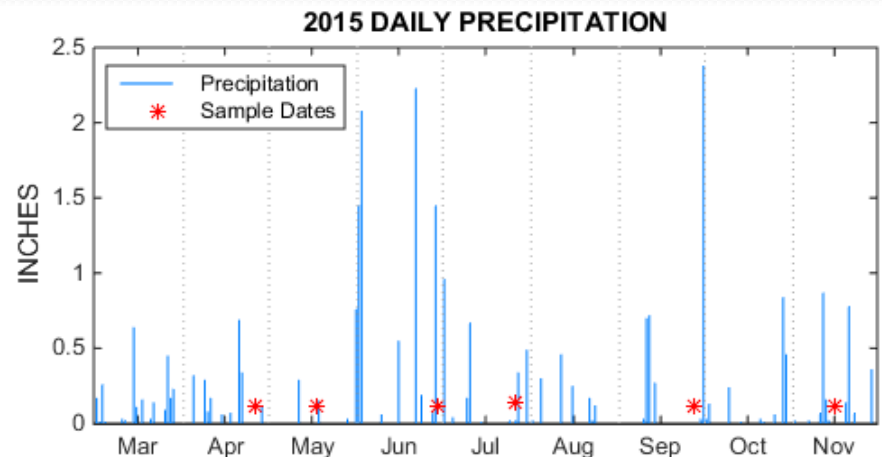
• 2016 Proposal



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
- 
- 2015 DAILY PRECIPITATION
- CHES
- Legend: Precipitation (blue line), Sample Dates (red asterisk)



Sampling Sites

Total: 14 sites

Stony watershed: 8

Nashoba watershed: 6

New in 2015

Pond Brook

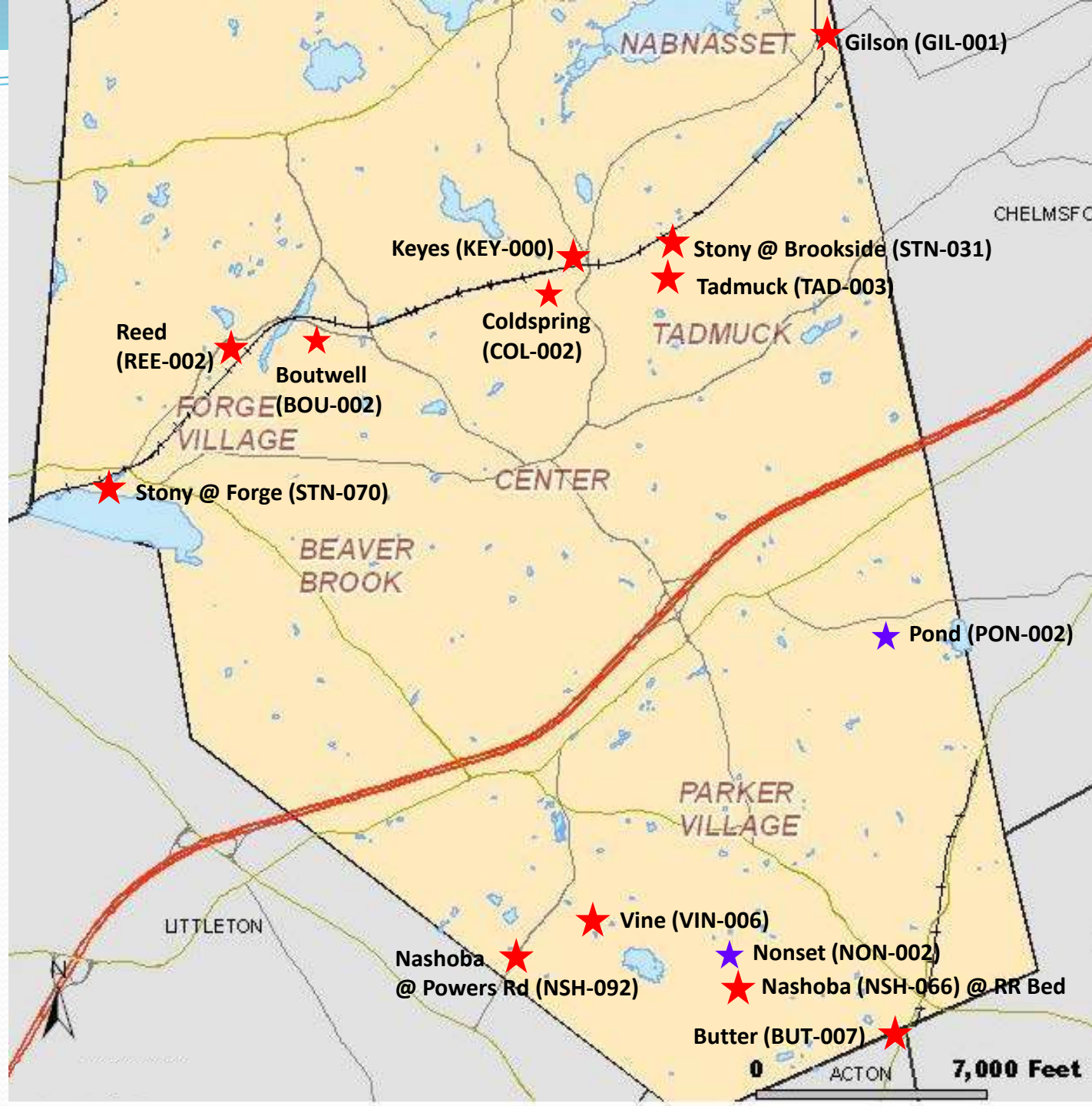
Nonset Brook (stopped
sampling in 2011)

Key to Site IDs

Brook (Reed)

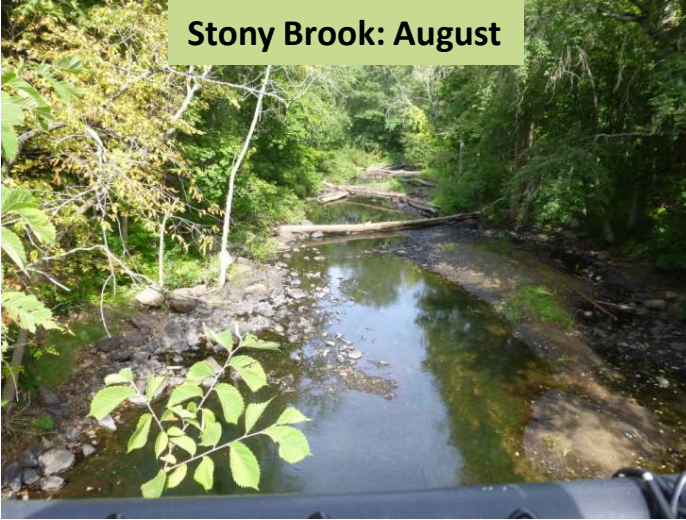
↓
REE-002

↑
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



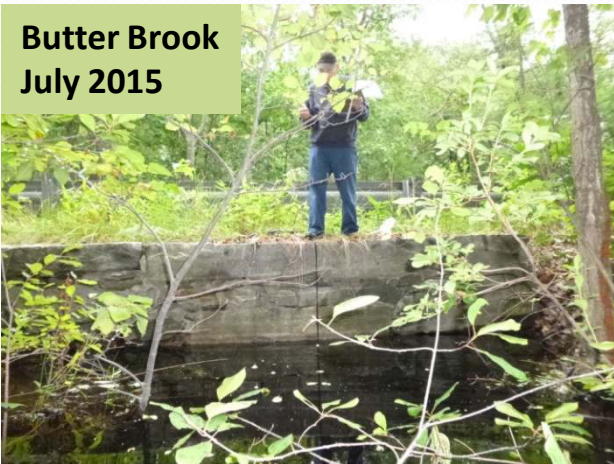
... and the Beaver

- 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**

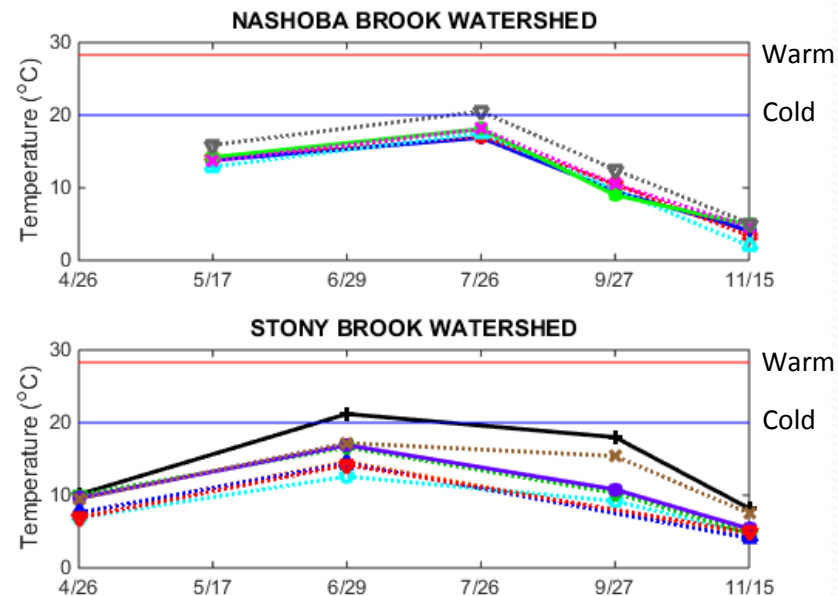
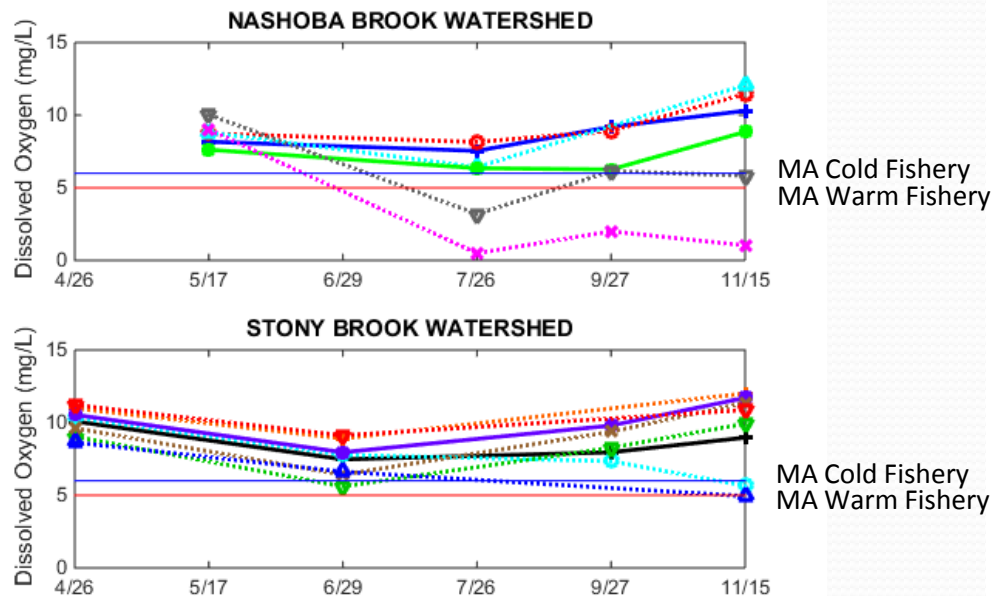


**Nashoba Brook
November 2015**



Dissolved Oxygen and Temperature

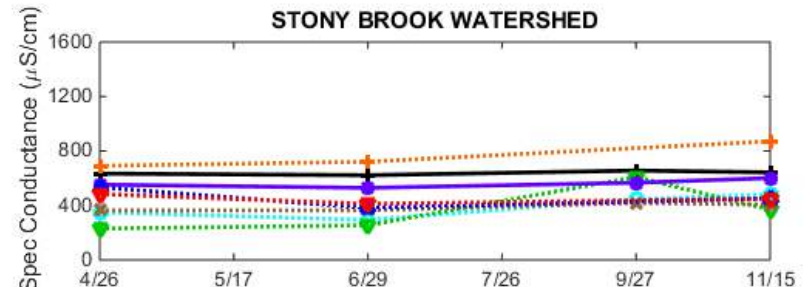
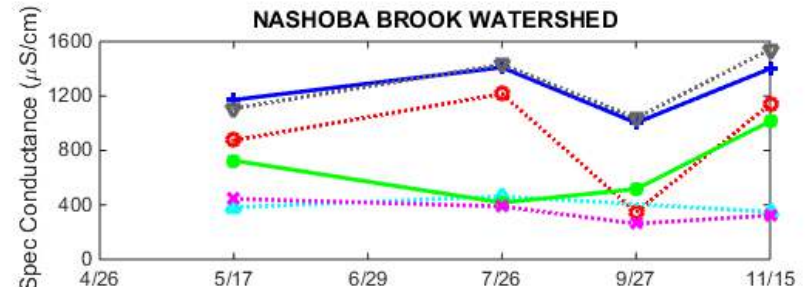
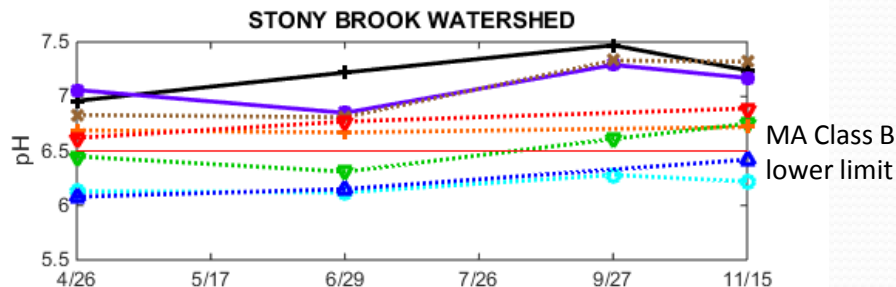
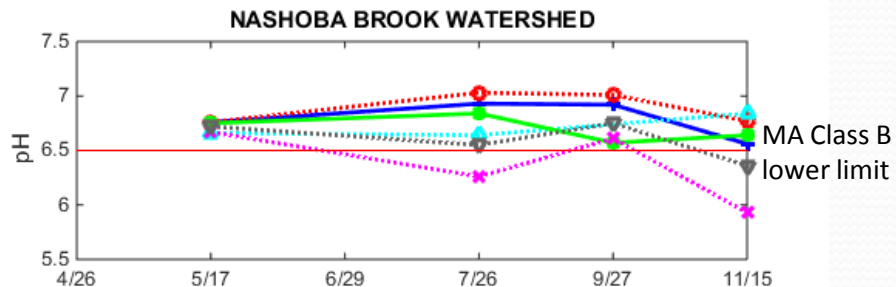
+ Nashoba (Powers Rd) ○ Vine △ Nonset — Stony (Forge Pond) ○ Reed + Tadmuck △ Boutwell
 ◆ Nashoba (RR bed) * Butter ▽ Pond ◆ Stony (Brookside) ▽ Keyes * Gilson ▽ Coldspring



- 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

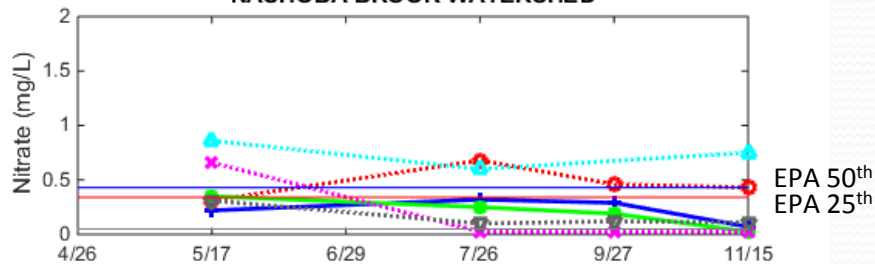


- pH is consistent with previous years
- Specific conductance is water conductivity normalized for 25-deg C temperature
 - Allows comparison over time (different ambient temperatures)
 - For Nashoba at Powers Rd – almost double the values in 2012
 - Gradual increase for Stony Brook since 2011

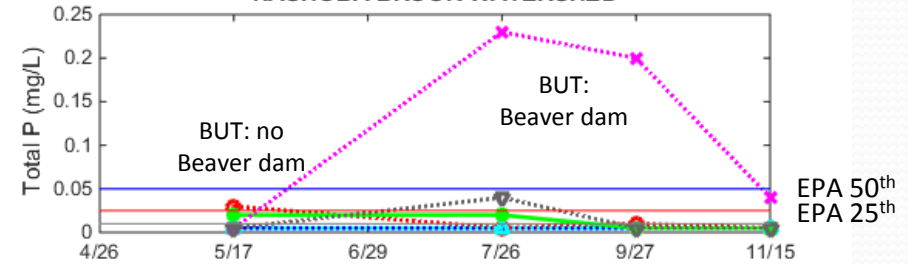
Nitrate and Total Phosphorous

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

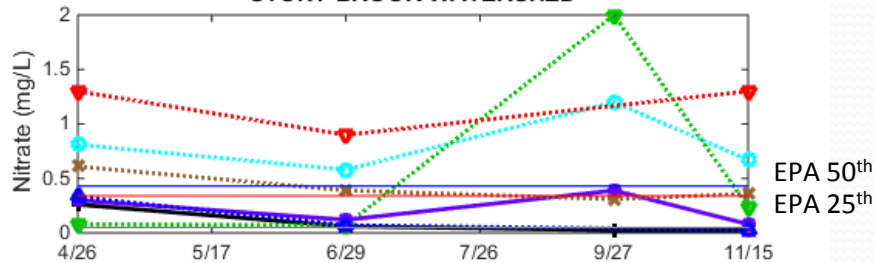
NASHOBA BROOK WATERSHED



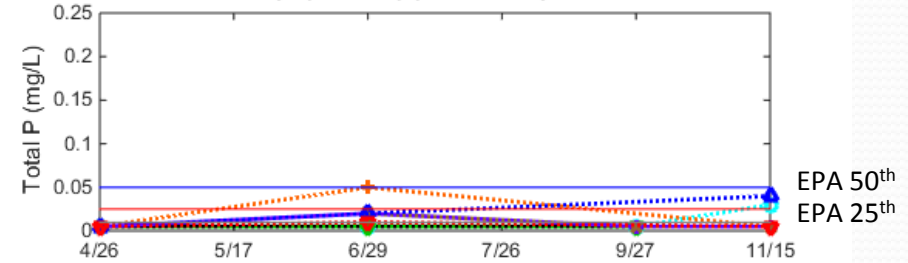
NASHOBA BROOK WATERSHED



STONY BROOK WATERSHED

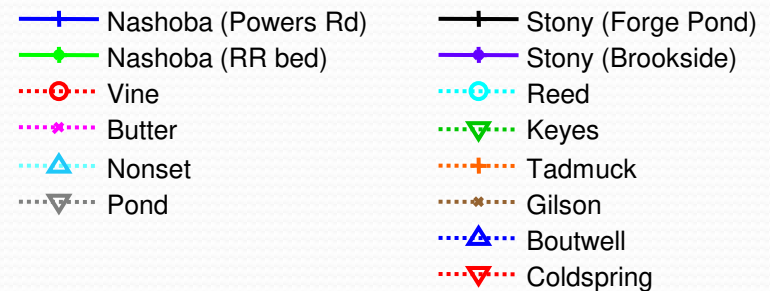
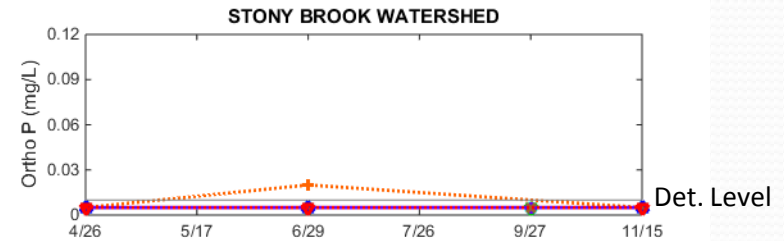
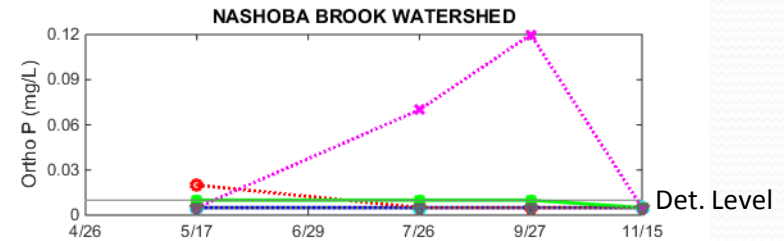
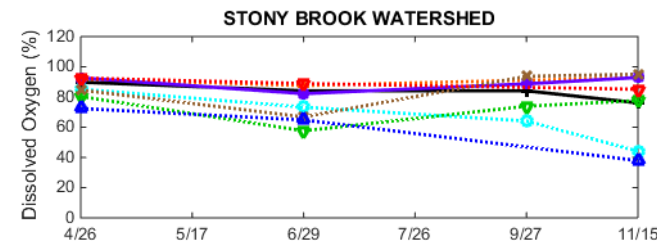
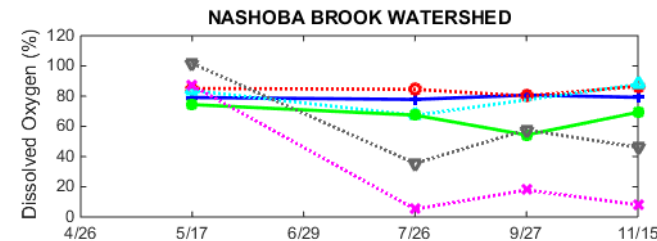
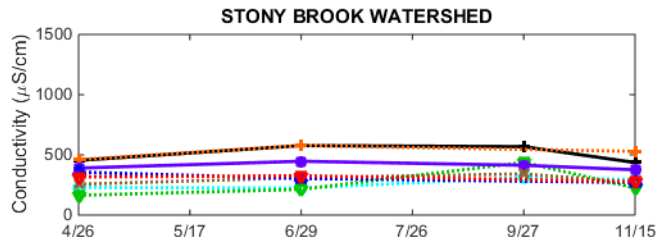
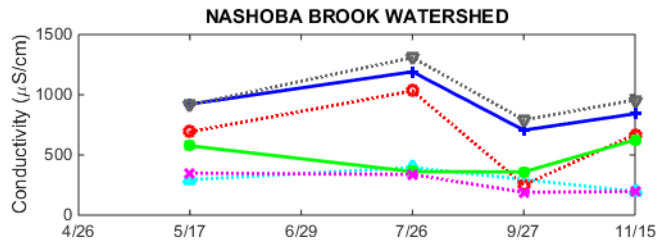


STONY BROOK WATERSHED



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

Other Results (No References)



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

