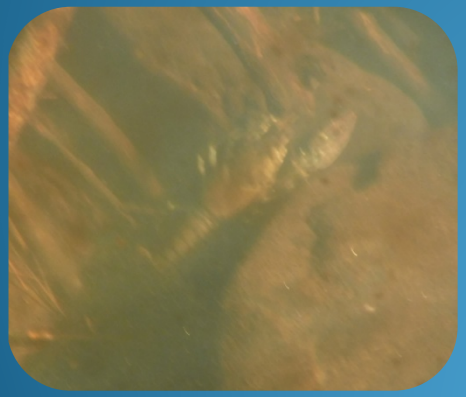
Westford Stream Monitoring 2018 Results



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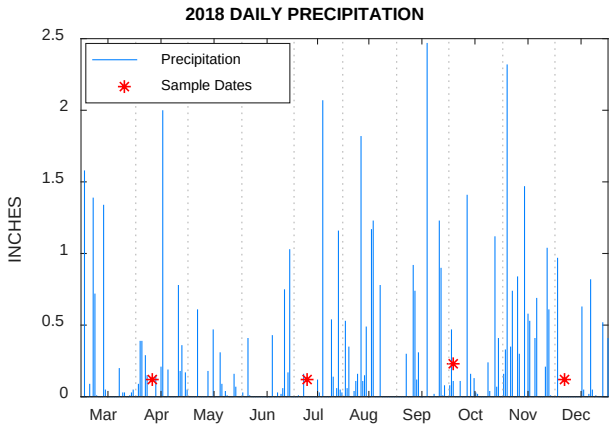
Summary

- Regular stream monitoring
  - 4/10, 7/8, 9/30, 12/3
  - Lots of rain this year
  - Results similar to previous years
    - Coldspring Brook still highest nitrate. Cause still unknown
    - Reed Brook nitrate might be dropping (rain flushing out residual?)
    - Rain in late Fall lowered conductivity (flushed out salts?)
- Special studies
  - 4/10, Vine Brook for nitrates
    - Low nitrates. Good baseline values
  - 6/10, high conductivity in Pond, Tadmuck Brooks
    - Conductivity highest at start of brooks, near Rt 110
    - Appears to correlate with sodium level (analysis done by Westford Water Department)
  - 6/10, low pH in Boutwell Brook
    - Lowest (3.6) near WA, increased to 6.53 where enters Stony Brook
    - Needs more research

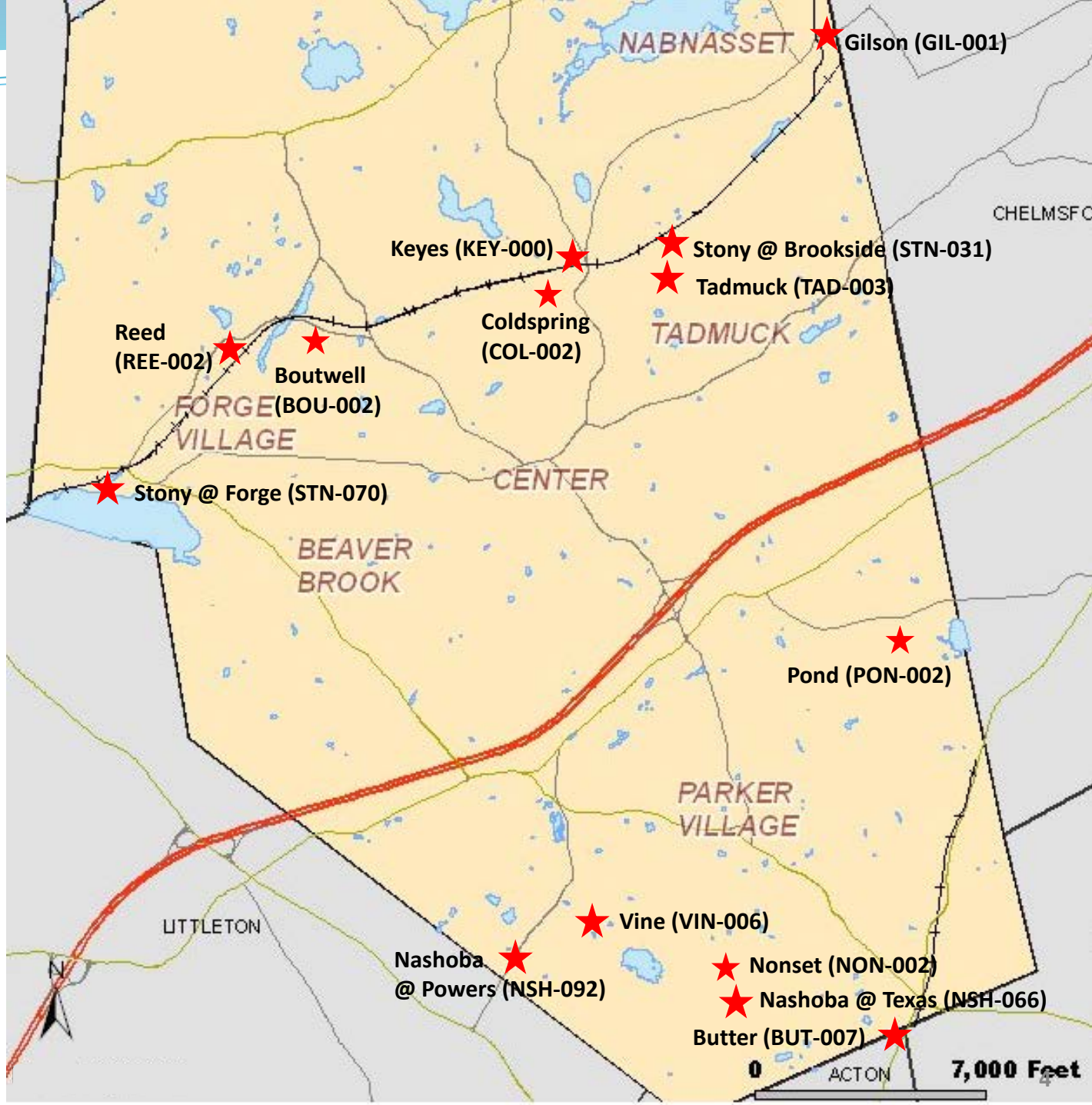
Sampling Overview

- Sampled 12 streams, 14 sites
  - Stony Brook watershed (8)
  - Nashoba Brook watershed (6)
- 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



Key to Site IDs

Brook (Reed)
↓
REE-002
↑

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

2018 Results (Southern)

NSH-092	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	3.8	1064	634	11.3	6.6	0.24	ND	ND
7/8	16.4	1476	1232	7.3	7	0.27	ND	0.08
9/30	12.3	1053	797	8.9	6.9	0.13	0.03	0.05
12/3	6.0	601	383	10.2	6.6	0.29	ND	0.05

NSH-066	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	4.6	745	455	10.0	6.7	0.33	ND	ND
7/8	19.0	936	828	5.5	6.8	0.38	0.03	0.09
9/30	12.4	833	634	7.7	6.7	0.17	0.03	0.07
12/3	5.9	462	294	10.4	6.6	0.38	ND	0.06

VIN-006	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	4.6	912	556	11.4	6.6	0.14	ND	ND
7/8	16.3	730	608	7.3	6.9	0.38	0.02	0.11
9/30	12.6	895	683	8.8	6.7	ND	0.03	0.06
12/3	5.7	488	308	10.6	6.4	0.19	ND	0.06

BUT-007	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	3.8	423	252	11.6	6.3	0.64	ND	ND
7/8	15.6	305	250	5.3	6.6	0.47	0.03	0.21
9/30	12.1	360	271	9.1	6.3	0.34	0.02	0.08
12/3	6.1	266	170	10.4	5.8	0.43	ND	0.1

NON-002	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	3.4	347	204	9.9	6.3	0.05	ND	ND
7/8	16.5	208	174	5.2	6.5	0.45	ND	0.1
9/30	11.5	343	255	6.4	6.2	0.31	0.02	0.07
12/3	5.8	241	153	10.1	6.2	0.45	ND	0.09

PON-002	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	5.2	1329	827	10.4	6.5	0.5	ND	ND
7/8	22.2	1393	1319	3.0	6.6	ND	0.02	0.09
9/30	13.1	1157	894	4.6	6.4	0.13	0.04	0.05
12/3	5.5	924	581	9.4	6.4	0.5	ND	0.07

Red highlight indicates
- pH: below MA Class B standard (6.5)
- DO: below MA fishery standard (5 mg/L)
- Nitrate: > EPA 50th percentile (0.43 mg/L)
- Total P: > EPA 50th percentile (0.05 mg/L)

Blue highlight indicates very high conductance
Source is unknown (natural or pollution?)

Temp: Temperature
Sp Cond: Specific Conductance
Cond: Conductivity
DO: Dissolved Oxygen
P: Phosphorous

2018 Results (Northern)

STN-070	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	6.4	680	439	11.3	7.1	0.21	ND	ND
7/8	26.4	685	703	7.2	7.3	ND	ND	ND
9/30	18.4	652	570	7.1	7.2	ND	0.01	0.03
12/3	3.3	445	260	10.7	6.7	0.25	ND	0.08

STN-031	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	5.9	607	385	11.5	7	0.23	ND	ND
7/8	21.6	625	585	8.1	7.2	0.06	ND	0.03
9/30	15.5	570	466	7.9	7	ND	0.01	0.04
12/3	4.7	394	241	11.8	6.8	0.36	ND	0.04

REE-002	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	5.0	434	268	11.3	6.2	0.53	ND	ND
7/8	12.6	310	236	8.5	6	1.1	ND	0.07
9/30	11.5	445	330	8.9	6.2	0.96	0.01	0.04
12/3	8.3	258	176	10.1	6.3	0.54	ND	0.06

GIL-001	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	5.9	420	267	11.0	6.9	0.55	ND	ND
7/8	23.3	451	437	6.0	6.9	0.45	ND	0.09
9/30	15.6	411	337	7.0	6.8	0.56	0.02	0.04
12/3	4.8	344	211	11.1	6.8	0.46	ND	0.03

KEY-000	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	6.0	250	159	11.0	6.6	ND	ND	ND
7/8	20.1	357	324	5.8	6.7	0.06	ND	0.06
9/30	14.7	249	200	6.0	6.4	ND	0.01	0.04
12/3	4.9	194	120	10.5	6.2	0.16	ND	0.04

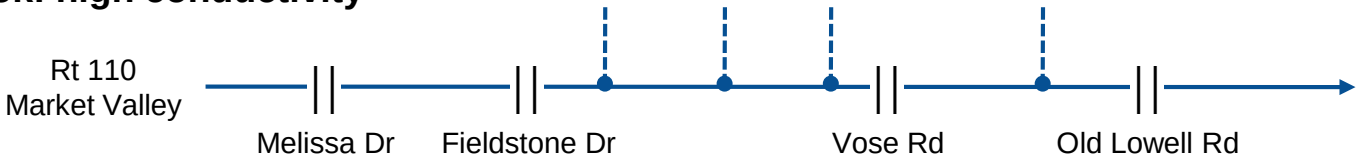
BOU-002	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	3.5	548	323	11.1	6.2	0.24	ND	ND
7/8	18.5	535	468	2.0	6.6	ND	0.03	0.15
9/30	11.9	410	307	7.6	6.3	ND	ND	0.04
12/3	5.6	355	224	10.8	6.2	0.37	ND	0.06

TAD-003	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	4.0	926	555	12.3	6.6	0.39	ND	ND
7/8	18.1	947	822	7.8	7	0.39	0.02	0.13
9/30	12.7	804	615	9.7	6.8	ND	0.02	0.04
12/3	6.0	558	356	11.6	6.6	0.71	ND	0.04

COL-002	Temp (C)	Sp Cond (uS/cm)	Cond (uS/cm)	DO (mg/L)	pH	Nitrate (mg/L)	Ortho P (mg/L)	Total P (mg/L)
4/10	4.2	669	403	12.3	6.6	1.7	ND	ND
7/8	16.2	721	600	7.4	6.9	2.8	ND	0.1
9/30	13.4	571	445	9.4	6.9	1.8	0.02	0.05
12/3	7.3	452	299	10.6	6.4	1.4	ND	0.04

Specific Conductance* Studies

Pond Brook: high conductivity

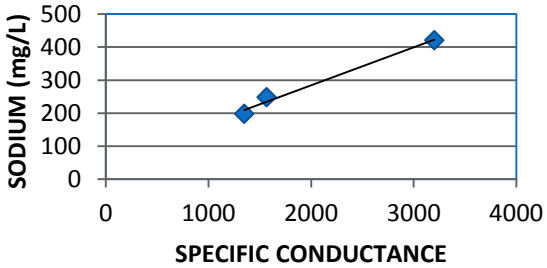


6/10	**4395**	**4239**	**2063**	**1343**
7/8	**4430**		**2285**	**1393**
9/30	**3201**			**1157**

Tadmuck Brook: high conductivity

-9/30: Also sampled at Drew Crossing, closer to Rt 110 (1567)

- Water Dept. measured Na for Drew, Drawbridge, Melissa



6/10	**1618**	**1330**	**1282**	**1094**	**967**
9/30	**1348**				**804**

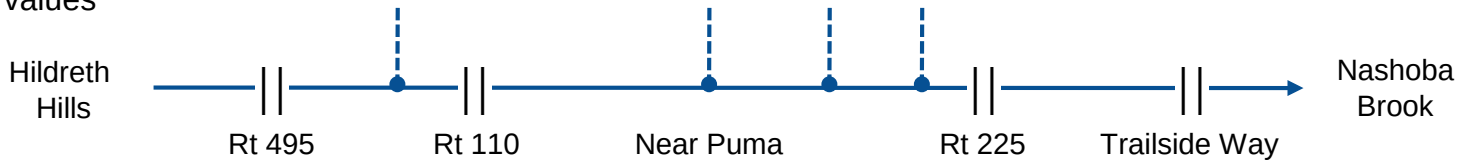
* Specific Conductance: conductivity normalized to 25 deg C. Used by us for ease of comparison across seasons

Main Brook
Feeder

Other Special Studies

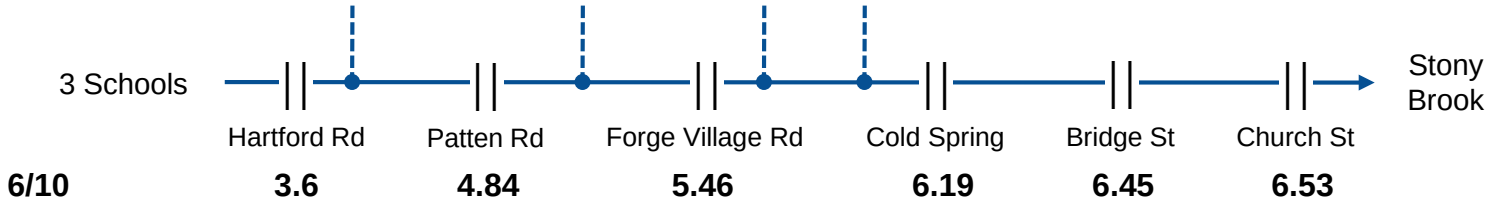
Vine Brook: high nitrates

-Sampled before high fertilizer use
- New owner for Regency Hotel
- Good baseline values



Boutwell Brook: low pH

- Dense plant cover at Hartford Rd
- School waste water treatment plant upstream
- Very low dissolved oxygen at al locations (< 5 mg/L)



Main Brook
Feeder

Bridge Over Nashoba Brook

The bridge has become impassable and is a safety hazard

The Team

Diane Duane

Hal Schreiber & Ron Gemma

Kate Hollister

Rich Strazdas & Ron Gemma

Mike Mendes & John Mandeville

Ben Mahler & Bill Duane