



2017 Water Quality Monitoring Report

Monitoring Team

The Rethink Runoff Stream Team (formerly the Chittenden County Stream Team) is a program that engages citizens across a nine-town region to implement projects that reduce non-point source pollution and stormwater volume at the local level. The participating towns are Burlington, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington, Williston, and Winooski. The Water Quality Monitoring program is managed by the Chittenden County's Municipal Stormwater Separate System Committee, coordinated by the Winooski Natural Resources Conservation District, and made possible through the support of the Vermont Department of Environmental Conservation LaRosa program. This report describes the results from the 2017 collection season; the sixth, consecutive year data was collected by this volunteer-led stream water quality monitoring effort in Chittenden County.

When, Where, and What the Stream Team Monitors

The Rethink Runoff Stream Team (RRST) has collected biweekly water quality samples at several pollutant “impaired” or “stressed” stream sites in Chittenden County since 2012. These urban or suburban streams suffer from excessive nutrient loads, sodium chloride, sedimentation, high temperatures, bacteria, and/or other pollutants. Samples were collected on seven different dates in 2017: on five, scheduled bi-weekly dates and on two “high-flow” dates (i.e. during a rain event). High-flow sampling provides a snapshot of the potentially, elevated or diluted pollutant-loads moving through these systems when it rains. Samples were taken and analyzed for turbidity, total phosphorus, and chloride at all 18 sites. The specific sampling sites and their locations are listed in Table 1 and a map of the sites is shown in Figure 1.

Biweekly sampling dates occurred on: June 27th, July 11th, July 25th, August 8th, and August 22nd. Rain event sampling or “high-flow” (freshet) events occurred at sites on Indian, Muddy, Potash, Centennial and Morehouse Brooks on July 17th and August 18th. Nearly an inch of precipitation fell from July 23-25, therefore the 25th sampling date is classified as a highflow event. All other biweekly sampling dates fell during dry conditions or baseflow events.



Report prepared by:
Holly Kreiner, Conservation Specialist
Winooski Natural Resources
Conservation District



Funded by: LaRosa Partnership, VT
Department of Environmental Conservation
Watershed Management Division

Table 1. Chittenden County Stream Team 2017 Water Quality Sampling Sites

<i>Stream</i>	<i>Location</i>	<i>Site ID</i>	<i>Lat / Long</i>
Centennial Brook	Grove Street in Burlington	Centennial 10	44.48525 / -73.18340
	Patchen Road in South Burlington	Centennial 20	44.47411 / -73.17354
Indian Brook	Essex High School	Indian 10	44.49668 / -73.11093
	Lang Farm in Essex	Indian 20	44.50442 / -73.09190
Malletts Creek	McMullen Road	Malletts 10	44.60779 / -73.20103
Munroe Brook	Route 7 and Bay Road	Munroe 10	44.40453 / -73.21729
	Spear & Webster Intersection	Munroe 20	44.38984 / -73.20103
Morehouse Brook	Landry Park Winooski	Morehouse 10	44.50037 / -73.19370
Muddy Brook	River Cove Road in Williston	Muddy 10	44.47293 / -73.13505
	Marshall Ave in Williston	Muddy 20	44.45340 / -73.13833
	Van Sicklen Road in Williston	Muddy 30	44.42823 / -73.14622
Potash Brook	Kindness Court in South Burlington	Potash 10	44.44572 / -73.21348
	Farrell Street in South Burlington	Potash 20	44.44660 / -73.20415
	Dorset Street in South Burlington	Potash 30	44.45150 / -73.17849
	Tilley Drive South Burlington	Potash 40	44.44873 / -73.14849
Englesby Brook	Pine St in Burlington	Englesby 10	44.45627 / -73.21394
	Behind Redstone Campus in Burlington	Englesby 20	44.46636 / -73.19774
Smith Hollow Brook	Off the Bike Path on Julie Drive	Smith Hollow 10	44.53926 / -73.20439

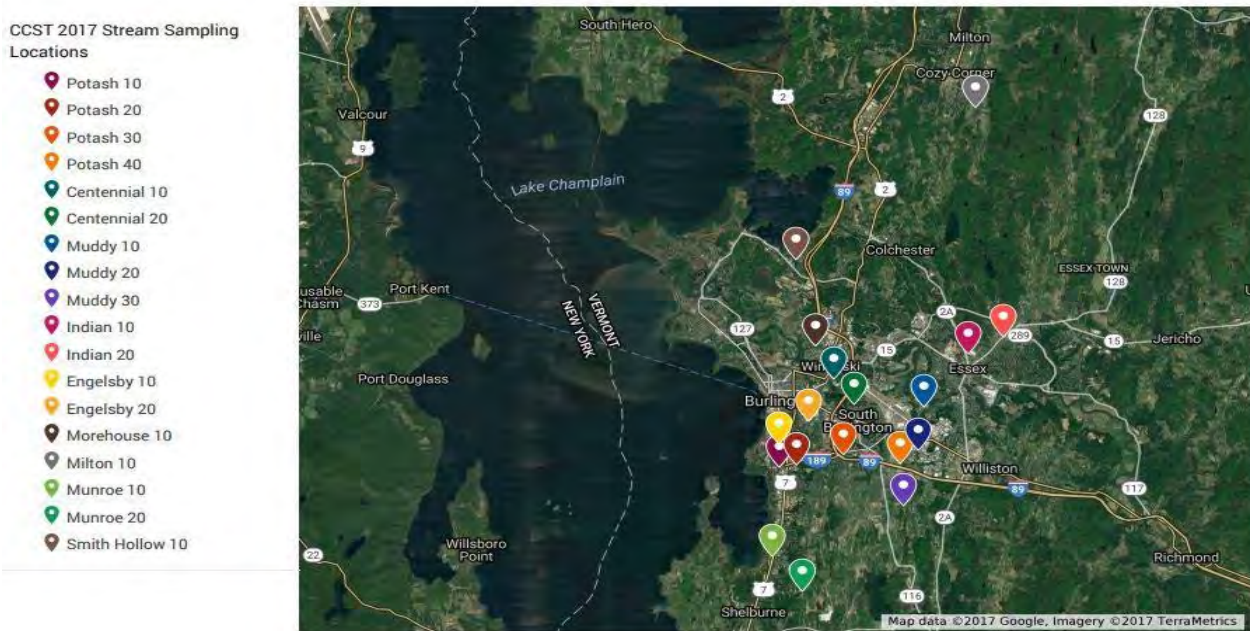
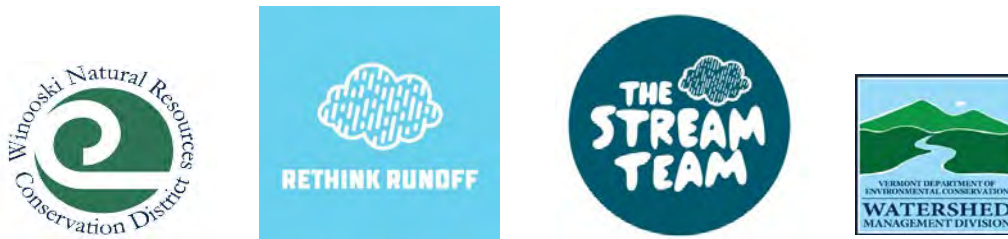


Figure 1 - 2017 Rethink Runoff Stream Team Water Quality Monitoring Sites



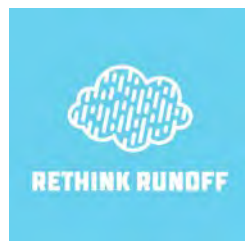
Phosphorus Results

Phosphorus is an essential nutrient for plants and animals that is naturally limited in most freshwater systems. Even a modest increase can set off a chain of undesirable events, such as algal blooms, accelerated plant growth, low dissolved oxygen, and the subsequent die off of aquatic life. Although phosphorus naturally occurs in soils and rocks, additional phosphorus enters waterways through runoff from sources such as fertilized lawns and cropland, pet waste, failing septic systems, animal manure from storage areas or livestock access, wastewater treatment plants, and streambank erosion. The VT water quality standard for phosphorus in Class B warm water medium-gradient streams is 27 µg/L.

Table 2. 2017 RRSST Phosphorus Results Summary: This table depicts mean phosphorus levels in µg/L during both baseflow (dry) and high-flow (rain) sampling events in 2017. Overall mean values exceeding the Vermont chronic chloride standard of 27 µg/L are shown in red. Raw data is presented in Appendix C.

Location	Average Phosphorus during Baseflow - Dry Conditions	Average Phosphorus during Rain Events	Average Phosphorus Concentrations
Centennial 10	51.53	372.77	212.15
Centennial 20	101.5	--	--
Englesby 10	71.3	--	--
Englesby 20	89.85	--	--
Indian 10	39.88	54.57	47.23
Indian 20	43.8	--	--
Mallets Creek 10	32.73	--	--
Munroe 10	51.68	--	--
Munroe 20	46.95	--	--
Morehouse 10	26.28	85.23	55.76
Muddy 10	72	--	--
Muddy 20	65.63	88.7	77.17
Muddy 30	71.25	--	--
Potash 10	42.85	--	--
Potash 20	43.13	59.8	51.47
Potash 30	52.15	--	--
Potash 40	95.45	--	--
Smith Hollow 10	48.57	--	--

Mean baseflow phosphorus levels exceeded the proposed Vermont state standard of 27 µg/L at all sites in 2017, except on Morehouse Brook. However, the four averaged baseflow dates and three averaged freshet events at Morehouse Brook nearly doubled the standard as seen with other sites. The upstream sites on Englesby, Centennial, and Potash Brooks added in 2017 all show the highest levels of baseflow phosphorus; even higher concentrations than in downstream sites. In 2017, Centennial 10 near the mouth displayed the highest mean phosphorus concentration at just over 212 µg/L; nearly seven times the



standard. Centennial 20 displayed the highest baseflow phosphorus at a mean concentrations of 101.5 µg/L.

Phosphorus levels in Chittenden County Streams 2012-2017

Since the onset of this monitoring program in 2012, mean concentrations of phosphorus during baseflow have remained significantly above the 27 µg/L standard at all stream sites. There was a reduction in phosphorus levels in 2017, but sites still retain levels two or three times the standard in the majority of cases.

Average Total Phosphorus in RRST monitored streams from 2012-2017 - Baseflow conditions only

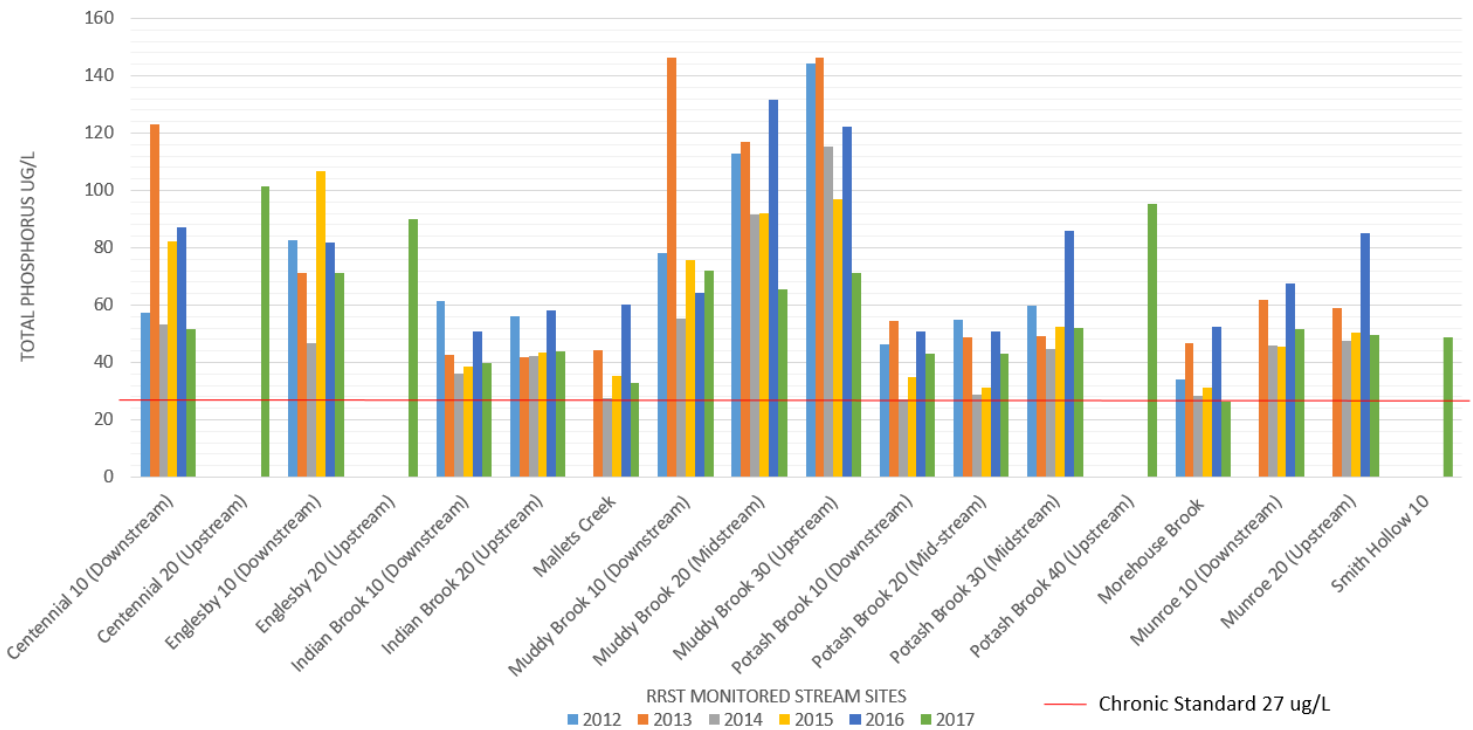
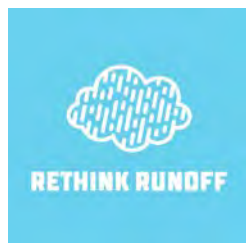


Figure 2 - Comparison of Mean Total Phosphorus Levels 2012-2017 during Baseflow Conditions.

The State of Vermont’s base-flow phosphorus standard is 27 µg/L for class B, “warm water medium-gradient” streams is shown by the red line. Note: an assumption was made that most of the streams monitored by the RRST would fall under the first category, although the streams monitored are not listed as warm-water streams in the 2014 Vermont Water Quality Standards.



Chloride Results

Chloride is a component of salt found naturally in minerals and in oceans. While a low level of instream chloride can originate from natural sources, higher levels are generally due to the use of deicing salts. Elevated chloride levels in surface waters can negatively impact the health and reproduction of aquatic species, according to the Vermont Surface Water Management Strategy. The Environmental Protection Agency’s (EPA) and State of Vermont’s (VT) current water quality standard for chloride is 230 mg/L (chronic criteria) and 860 mg/L (acute criteria). This is the concentration of chloride above which chronic or acute health effects have been observed in of aquatic species.

Table 3. 2017 RRST Chloride Results Summary: This table depicts mean chloride levels in mg/L during baseflow (dry) and high-flow (rain) sampling events in 2017. Overall mean values exceeding the Vermont chronic chloride standard of 230 mg/L are shown in red. Raw data is presented in Appendix C.

Site ID	Average Chloride in Dry Conditions Only	Average Chloride during Rain Events	Average Chloride Concentrations
Centennial 10	498.13	368	433.07
Centennial 20	172	--	--
Englesby 10	206.4	--	--
Englesby 20	434	--	--
Indian 10	134	108.77	121.39
Indian 20	40.15	--	--
Mallets Creek 10	32.58	--	--
Munroe 10	71.63	--	--
Munroe 20	31.05	--	--
Morehouse 10	99.5	77.27	88.39
Muddy 10	99.5	--	--
Muddy 20	100.63	85.2	92.92
Muddy 30	25.05	--	--
Potash 10	266	--	--
Potash 20	259.5	275.33	267.42
Potash 30	202.3	--	--
Potash 40	144.23	--	--
Smith Hollow 10	117	--	--

Mean baseflow chloride levels exceeded the proposed Vermont state standard of 230 mg/L in Centennial, Englesby, and Potash Brooks in 2017. As suspected, chloride levels were higher during baseflow conditions in the majority of cases due to dilution. Centennial Brook showed the highest chloride level again in 2017, with a mean baseflow concentration of over 498 mg/L. The newly added upstream site on Englesby also displayed an average concentration nearly twice the standard (434 mg/L).



Chloride levels in Chittenden County Streams 2012-2017

Since the onset of this monitoring program, mean chloride levels at Centennial 10 have remained significantly above 230 mg/L standard. Standards were surpassed in four out of the six years in Englesby Brook and in five of the six years in Potash Brook; both of which include 2017 results. Chloride levels did not exceed the EPA’s and VT’s acute standard, which is 860 mg chloride/L, in any individual sample over this six year period.

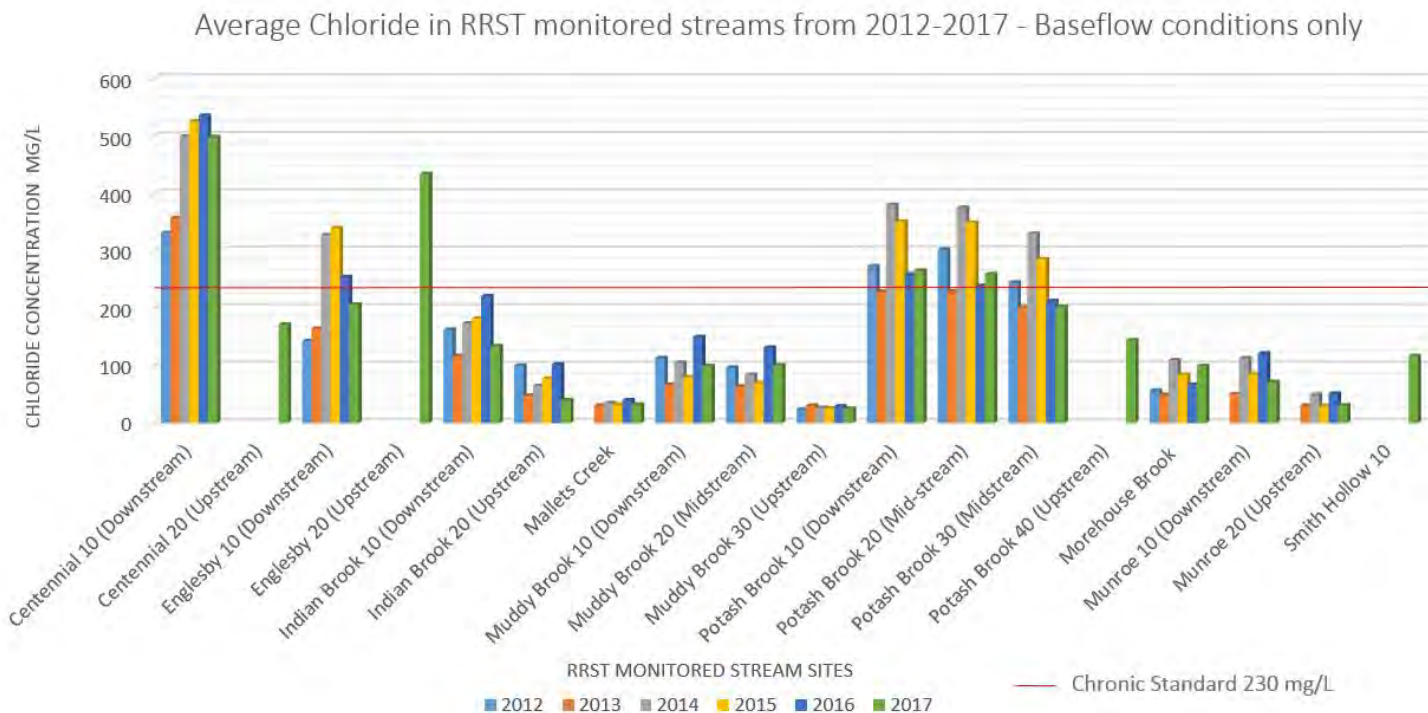


Figure 3 - Mean Chloride Levels in Chittenden County Streams 2012-2017. EPA’s and Vermont’s standard for 4-day average chloride levels (230 mg/L) is shown by the red line.

Turbidity Results

The turbidity of a water sample refers to its cloudiness. This measurement is based on the amount of algae, microbes, and sediment suspended in the water. High turbidity levels can negatively impact aquatic life by raising water temperature, decreasing forage and cover, and harming gill function, and has the potential to increase the presence and number of disease-causing organisms. Turbidity measurements can also be used as an indicator for erosion and increased nutrient levels in streams. The Vermont Water Quality Standards state that turbidity should not exceed 10 NTU (nephelometric turbidity units) in cold-water fish habitat and 25 NTU in warm-water fish habitat.

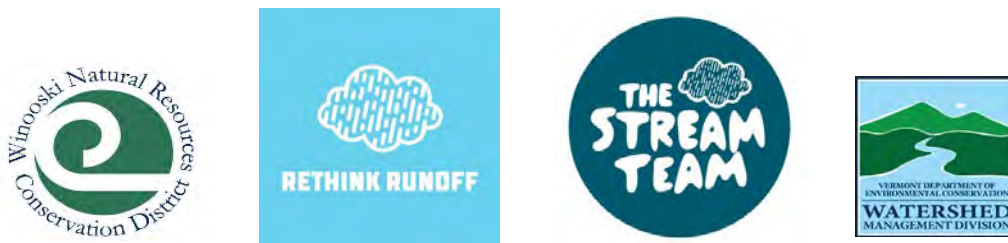


Table 4. 2017 RRST Turbidity Results Summary: This table depicts mean turbidity levels in NTU baseflow (dry) and high-flow (rain) sampling events in 2017. Overall mean values exceeding the Vermont standard of 25 NTU are shown in red. Raw data is presented in Appendix C.

Site ID	Average Turbidity in Dry Conditions Only	Average Turbidity during Rain Events	Average Turbidity Concentrations
Centennial 10	4.81	159.7	82.26
Centennial 20	5.43	--	--
Englesby 10	7.88	--	--
Englesby 20	11.93	--	--
Indian 10	7.1	11.41	9.26
Indian 20	9.78	--	--
Mallets Creek 10	5.77	--	--
Munroe 10	9.72	--	--
Munroe 20	5.5	--	--
Morehouse 10	4.2	34.03	19.12
Muddy 10	18.7	--	--
Muddy 20	12.12	32.14	22.13
Muddy 30	6.67	--	--
Potash 10	4.59	--	--
Potash 20	4.27	19.27	11.77
Potash 30	5.91	--	--
Potash 40	4.54	--	--
Smith Hollow 10	7.35	--	--

Mean baseflow turbidity levels did not exceed the VT Water Quality standard for turbidity of 25 nephelometric units (NTU) for warm-water fish habitat in 2017. As suspected, turbidity concentrations were higher during rain events, and surpassed standards on Centennial, Muddy, and Morehouse Brooks. The only stream site of concern is Centennial 10, where averaged baseflow and highflow events showed results over twice the standard (82.26 NTU).

Turbidity Levels in Chittenden County Streams 2012-2017

Mean baseflow turbidity values only exceeded the VT standard for warm-water streams of 25 NTU in Centennial (in 2013) and Munroe Brooks (in 2013 and 2016) over the six year sampling period. Mean turbidity levels surpassed the 10 NTU standard for cold-water fish habitat in all streams from 2012 – 2017.



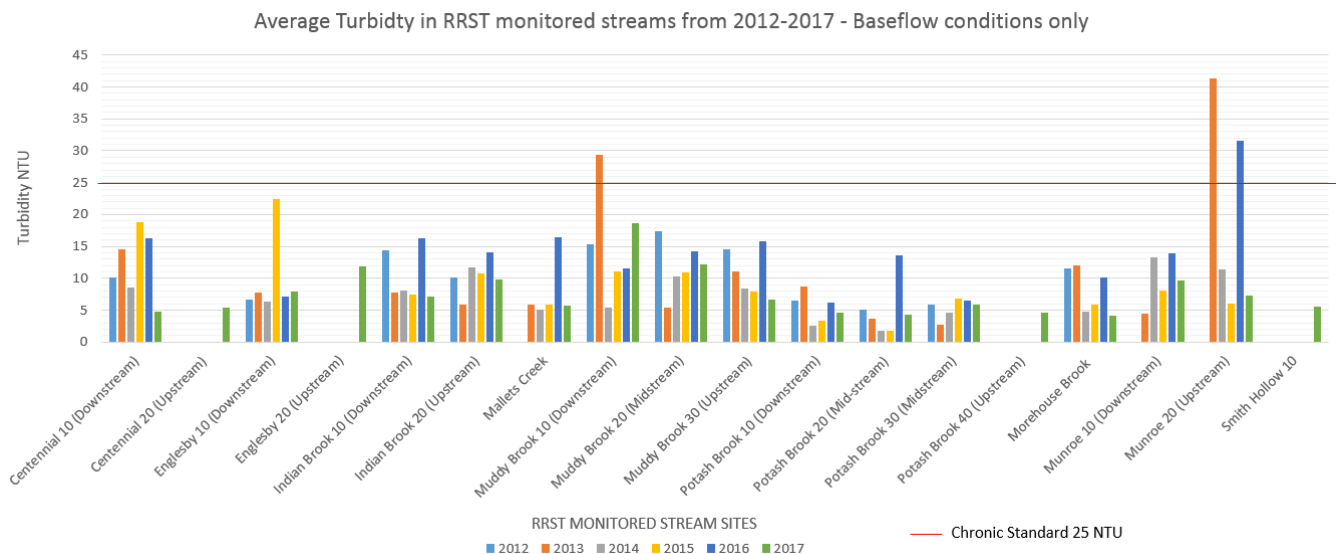


Figure 4 - Comparison of Mean Turbidity Levels 2012-2017 during Baseflow (dry) Conditions. The standard proposed by the State of Vermont for mean turbidity at baseflow in medium gradient, warm water streams (25 NTU) is indicated by the red line.

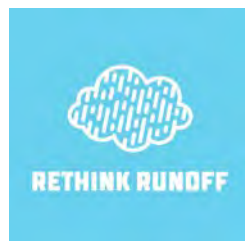
Conclusion

The Rethink Runoff Stream Team has monitored chloride, phosphorus, and turbidity in various stormwater-impaired streams in Chittenden County for the past six, consecutive years (2012-2017). The 2017 season’s results are similar to those obtained over the past six years, and indicate that all stream sites have sustained phosphorus levels well above the Vermont standard and that chloride is becoming a prevalent and growing concern.

Phosphorus levels in all eight streams have remained two to four times the Vermont water quality standard of 27 µg/L. Muddy Brook continues to maintain high levels of phosphorus; however, Centennial and Englesby Brooks showed even higher concentrations than Muddy Brook in 2017. The newly, added upstream site on Potash Brook also displayed high concentrations of phosphorus.

Chloride levels continue to surpass standards in several streams, most notably in Centennial Brook where the average chloride concentration in 2017 was more than double the Vermont chronic standard. The upstream site on Englesby also displayed high concentrations of chloride. As in previous years, chloride concentrations in Potash Brook surpassed standards in 2017, pointing to a growing concern in this watershed as well.

While turbidity has shown slight elevations in Munroe and Muddy Brooks over the past six years, this pollutant does not appear to be a concern in these Chittenden County streams.



As in previous years, concentrations of phosphorus tend to be higher during rain events, while chloride shows lower concentrations due to dilution. Going forward, RRST will continue to monitor and compare results between baseflow and high-flow conditions to better capture and understand the pollutant loads moving through these stream systems during and immediately after rainfall. Climatologists predict that the Northeast will continue to experience increased and more flashy rain events in future years, so it is important to understand how these stream systems will be affected.

After six years of showing minimal concern, turbidity will be abandoned at most locations in the 2018 season. In its place, additional sites will be added on new streams, to determine the spatial and temporal trends of phosphorus and chloride concentrations. Effort will also be made to identify suitable locations for source-bracket monitoring, to determine specific areas that may be contributing pollution.



Appendix A. Quality Assurance Measures for phosphorus, chloride, and turbidity in 2017

Site ID	Date	Sample Type	Relative Percent Difference Between Duplicate Pairs
Muddy 10	6/27/18	Chloride	1.6%
		Phosphorus	5.5%
		Turbidity	3.4%
Indian 10	7/11/18	Chloride	1.9%
		Phosphorus	0.57%
		Turbidity	14.4%
Potash 10	7/11/18	Chloride	0.78%
		Phosphorus	0.92%
		Turbidity	9.8%
Munroe 20	7/25/18	Chloride	0%
		Phosphorus	0.69%
		Turbidity	14%
Centennial 10	7/25/18	Chloride	1.2%
		Phosphorus	4.2%
		Turbidity	4.3%
Englesby 10	8/8/18	Chloride	1.5%
		Phosphorus	0.52%
		Turbidity	1.72%
Mallets 10	8/8/18	Chloride	2.1%
		Phosphorus	1.36%
		Turbidity	9.92%
Indian 10	8/22/18	Chloride	8.15%
		Phosphorus	6.13%
		Turbidity	16.3%
Muddy 30	8/22/18	Chloride	13.2%
		Phosphorus	2.2%
		Turbidity	3.2%
Centennial 10 (rain)	8/18/18	Chloride	4.9%
		Phosphorus	0.38%
		Turbidity	1.3%
Mean Relative Percent Difference		Chloride	3.53 %
		Phosphorus	2.25 %
		Turbidity	7.83 %

Target RPD for duplicate field samples:

Chloride $\leq 5\%$, Phosphorus $\leq 30\%$, Turbidity $\leq 15\%$,



Appendix B – 2017 Project Completeness

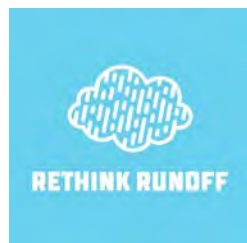
Parameter	Number of Samples Anticipated	Number of Valid Samples Collected & Analyzed	Percent Complete
Chloride	120	117	98
Total phosphorus	120	117	98
Turbidity	120	117	98

Appendix C – 2017 Individual Sample Results

Sample Number	Location	Date	Chloride (mg/L)	TP(ug P/L)	Turbidity (NTU)
171194-20	Muddy 30 - Blank	08/22/2017	< 2	< 5	< 0.2
171194-19	Muddy 30 - Dup	08/22/2017	28.08	92.9	12.8
171194-03	Muddy 30	08/22/2017	24.6	90.9	12.4
171194-17	Malletts 10	08/22/2017	43.2	34.4	5.59
171194-16	Morehouse 10	08/22/2017	118	21.9	4.32
171194-15	Centennial 20	08/22/2017	206	75	3.69
171194-14	Centennial 10	08/22/2017	624	41.2	3.38
171194-13	Englesby 20	08/22/2017	398	163	4.31
171194-12	Englesby 10	08/22/2017	160	103	11.2
171194-11	Monroe 20	08/22/2017	38.1	43.7	6.92
171194-10	Monroe 10	08/22/2017	79.5	51.4	6.8
171194-09	Indian 20	08/22/2017	79.5	49.3	13.8
171194-08	Indian 10	08/22/2017	212	37	4.62
171194-21	Indian 10 - Dup	08/22/2017	230	34.8	5.44
171194-22	Indian 10 - Blank	08/22/2017	< 2	< 5	0.22
171194-07	Potash 40	08/22/2017	98.6	90	7.01
171194-06	Potash 30	08/22/2017	234	48.7	3.75
171194-05	Potash 20	08/22/2017	276	39.7	2.31
171194-04	Potash 10	08/22/2017	272	36.8	3.12
171194-02	Muddy 20	08/22/2017	113	75.3	15.7
171194-01	Muddy 10	08/22/2017	126	63.2	16.4
171174-22	Smith Hollow 10	08/08/2017	114	62.8	9.04
171174-21	Malletts 100	08/08/2017	39.4	37	7.28
171174-12	Malletts 10 - Dup	08/08/2017	38.6	36.5	8.04
171174-11	Malletts 10 - Blank	08/08/2017	< 2	< 5	< 0.2
171174-20	Morehouse 10	08/08/2017	77	32.3	5.06
171174-19	Centennial 20	08/08/2017	225	118	10.9
171174-18	Centennial 10	08/08/2017	420.5	62.3	6.97
171174-17	Englesby 20	08/08/2017	352.5	63.8	5.62



171174-16	Englesby 10	08/09/2017		266	57.8	7.02
171174-06	Englesby 10 - Dup	08/09/2017		270	58.1	6.9
171174-05	Englesby 10- Blank	08/09/2017	< 2		7.68	< 0.2
171174-15	Monroe 20	08/08/2017		32.2	52.2	12.1
171174-14	Monroe 10	08/08/2017		88.6	62.5	13.4
171174-13	Indian 20	08/08/2017		41.4	50.7	14.7
171174-10	Indian 10	08/08/2017		135	53.7	10.6
171174-09	Potash 40	08/08/2017		320	77.6	5.38
171174-08	Potash 30	08/08/2017		211	62.9	8.85
171174-07	Potash 20	08/08/2017		232	42.5	5.95
171174-04	Potash 10	08/08/2017		226	43.9	6.63
171174-03	Muddy 30	08/08/2017		27.4	79.5	6.32
171174-02	Muddy 20	08/08/2017		159	61.2	10.7
171174-01	Muddy 10	08/08/2017		135	67.8	17.9
170993-05	Centennial 10	07/17/2017		444	380	193.2
170993-04	Morehouse 10	07/17/2017		79.4	60.2	18.3
170993-03	Indian 10	07/17/2017		110	42.9	8.66
170993-02	Muddy 20	07/17/2017		73.5	54.2	10.7
170993-01	Potash 20	07/17/2017		322	44.9	11.3
170990-07	Potash 20 - Blank	08/18/2017	< 2		< 5	< 0.2
170990-06	Potash 20 - Dup	08/18/2017		268	78.9	38.9
170990-01	Potash 20	08/18/2017		255	79.2	38.4
170990-05	Centennial 10	08/18/2017		310	665	276.5
170990-04	Morehouse 10	08/18/2017		63	110.1	47.4
170990-03	Indian 10	08/18/2017		121	73.2	17.9
170990-02	Muddy 20	08/18/2017		83.1	152.7	77.3
170884-22	Monroe 20 - Blank	07/25/2017	< 2		< 5	< 0.2
170884-21	Monroe 20 - Dup	07/25/2017		62.5	58	13
170884-11	Monroe 20	07/25/2017		62.5	57.6	12.8
170884-20	Smith Hollow 10	07/25/2017		115	45.2	8.83
170884-19	Malletts 10	07/25/2017		30.8	27.3	3.61
170884-18	Morehouse 10	07/25/2017		89.4	85.4	36.4
170884-17	Centennial 20	07/25/2017		220	101	6.14
170884-16	Centennial 10-Blank	07/25/2017	< 2		< 5	< 0.2
170884-15	Centennial 10-Dup	07/25/2017		346	70.3	9.81
170884-14	Centennial 10	07/25/2017		350	73.3	9.4
Englesby	Englesby	07/25/2017		264	76.1	6.66
170884-12	Englesby 10	07/25/2017		157	133	25.7
170884-10	Monroe 10	07/25/2017		29.8	59.6	5.78



170884-09	Indian 20	07/25/2017	16.7	49.4	10.6
170884-08	Indian 10	07/25/2017	95.3	47.6	7.67
170884-07	Potash 40	07/25/2017	98.6	91	2.29
170884-06	Potash 30	07/25/2017	229	60.8	6.04
170884-05	Potash 20	07/25/2017	249	55.3	8.12
170884-04	Potash 10	07/25/2017	214	57.3	8.45
170884-03	Muddy 30	07/25/2017	25.2	63.4	6.02
170884-02	Muddy 20	07/25/2017	99	59.2	8.41
170884-01	Muddy 10	07/25/2017	107	68.4	16.5
170885-22	Smith Hollow 10	07/11/2017	110	37.2	3.24
170885-21	Malletts 10	07/11/2017	22.1	28.2	3.82
170885-20	Morehouse 10	07/11/2017	105	27	4.33
170885-19	Centennial 20	07/11/2017	123	101	4.29
170885-18	Centennial 10	07/11/2017	510	50.5	4.28
170885-17	Englesby 20	07/11/2017	495.5	73.1	8.77
170885-16	Englesby 10	07/11/2017	193.6	63	7.58
170885-15	Monroe 20	07/11/2017	29.79	47	6.07
170885-14	Monroe 10	07/11/2017	68.5	46.8	11.5
170885-13	Indian 20	07/11/2017	19.8	46.9	7.16
170885-12	Indian 10 Dup	07/11/2017	106	35.2	6.06
170885-11	Indian 10 Blank	07/11/2017	< 2	< 5	< 0.2
170885-10	Indian 10	07/11/2017	104	35	7
170885-09	Potash 40	07/11/2017	76.5	151	5.2
170885-08	Potash 30	07/11/2017	187.2	49.3	5.31
170885-07	Potash 20	07/11/2017	240	43.4	4.25
170885-06	Potash 10 Dup	07/11/2017	258	43.5	4.16
170885-05	Potash 10 Blank	07/11/2017	< 2	< 5	< 0.2
170885-04	Potash 10	07/11/2017	256	43.9	3.77
170885-03	Muddy 30	07/11/2017	23.5	47.4	3.59
170885-02	Muddy 20	07/11/2017	61.5	55.2	8.59
170885-01	Muddy 10	07/11/2017	67.5	62.9	13.7
170842-20	Smith Hollow 10	06/27/2017	127	45.7	4.22
170842-19	Malletts 10	06/27/2017	25.6	31.3	6.37
170842-18	Morehouse 10	06/27/2017	98	23.9	3.09
170842-17	Centennial 20	06/27/2017	134	112	2.84
170842-16	Centennial 10	06/27/2017	438	52.1	4.6
170842-15	Englesby 20	06/27/2017	490	59.5	29
170842-14	Englesby 10	06/27/2017	206	61.4	5.72
170842-13	Monroe 20	06/27/2017	24.1	44.9	4.31



170842-12	Monroe 10	06/27/2017	49.9	46	7.19
170842-11	Indian 20	06/27/2017	19.9	28.3	3.47
170842-10	Indian 10	06/27/2017	85	33.8	6.17
170842-09	Potash 40	06/27/2017	81.8	63.2	0.57
170842-08	Potash 30	06/27/2017	177	47.7	5.72
170842-07	Potash 20	06/27/2017	290	46.9	4.56
170842-06	Potash 10	06/27/2017	310	46.8	4.82
170842-05	Muddy 30	06/27/2017	24.7	67.2	4.37
170842-04	Muddy 20	06/27/2017	69	70.8	13.5
170842-03	Muddy 10-Blank	06/27/2017	< 2	5.95	< 0.2
170842-02	Muddy 10-Dup	06/27/2017	68.4	99.4	25.9
170842-01	Muddy 10	06/27/2017	69.5	94.1	26.8

