Water Quality in McCabe's Brook

Summary Report 2014-2015
March 10, 2016

Prepared for
VT DEC Watershed Management Division
Volunteer Water Quality Monitoring
LaRosa Analytical Services Partnerships

Prepared by
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Water quality monitoring in McCabe's Brook during 2014 and 2015 targeted high flows. Past investigations indicated that flow rates in McCabe's Brook tend to reflect those in the LaPlatte River at Falls Road in Shelburne. Targeting was based on rainfall forecasts, rainfall at the Shelburne Waste Treatment Facility adjacent to McCabe's Brook, and LaPlatte River discharge rates at Falls Road. Of 10 samples collected from the LaPlatte River at Falls Road during 2014-2015, nine were taken during periods of high flow, and one on October 4, 2015 when the flow was estimated to be moderate.

The SCRW monitoring program initiated targeting of high flows for two principal reasons. Firstly, it was the objective to sample within a range of discharge rates that would enhance the comparability of data from year to year and provide a sense of change in water quality over time, and more importantly, sediment and nutrient loadings to receiving waters. Secondly, a combination of high discharge rates and associated high sediment and phosphorus concentrations results in total loadings on the lake far exceed the total of those contributed at low and moderate flows. A third consideration specific to McCabe's Brook relates to the comparability of water quality results monitored at low and moderate flow rates.

McCabe's Brook is a complex stream, as demonstrated in a Phase II Fluvial Geomorphic study undertaken in 2011 and flow monitoring carried out in 2012-2013. The stretch of McCabe's Brook extending from the Vermont Teddy Bear access road to the School Street neighborhood (MB 02a) in Shelburne receives no agricultural drainage, and only limited urban drainage from roads and runoff from the Vermont Teddy Bear complex provides settling of storm water in a retention pond with overflow during periods of high rainfall. As a result, concentrations of nutrients tend to decrease steadily between Vermont Teddy Bear and the School Street neighborhood. The geomorphic condition of this section of the stream varies from good to poor, and its sensitivity from high to very high. On the other hand, this reach of the stream has characteristics which complicate simple interpretation of water quality and loading data in McCabe's Brook.

1. The stream may at times of low flow disappear and appears to flow under deposits of gravel downstream from the railroad culvert below Bostwick Road (MB 03).

This could provide filtration and removal of sediment and nutrients, reducing the influence of upstream flow and nutrient loads at downstream locations. Furthermore, at times there has been no flow at Bostwick Road (MB 03), while at the same time flow has been observed at upstream and downstream monitoring stations. On at least one occasion when no flow was observed at Bostwick Road, low water temperature in the plunge pool immediately below the culvert relative to temperatures measured at other monitoring locations suggested that flow out of the pool was supplied by ground water. Furthermore, farther downstream below the railroad bridge, as pointed out in the *Phase 2 Geomorphic Assessment and Corridor Planning McCabe's Brook Watershed Charlotte and Shelburne, Vermont* (Milone and McBroom, 2012), the channel is a losing stream, and appears to flow under large deposits of gravel and within underlying Champlain Sea deposits.

2. A further complicating feature of this section of McCabe's Brook is the floodplain upstream from Bostwick Road. At moderate to heavy flows, flooding in this area and retention of solids could explain in part higher phosphorus loading rates observed at the upstream Vermont Teddy Bear location than observed at the downstream Harbor Road location.

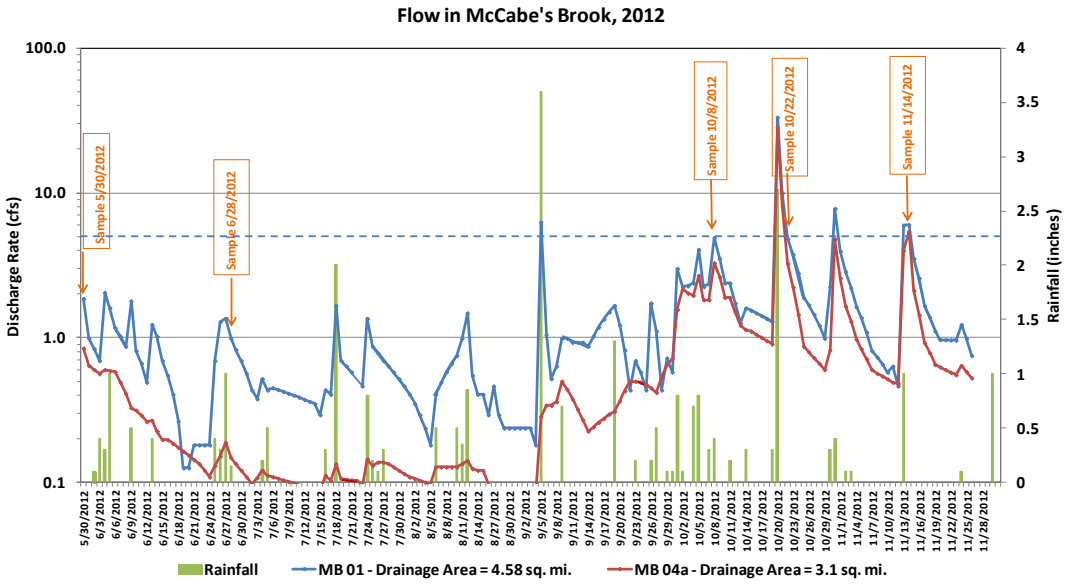
3. A third feature of the stream that at times impacts greatly on sediment and nutrient concentrations are massive bank failures. There are two such failures upstream from Route 7 (MB 04) and an additional four between Route 7 and Bostwick Road (MB 03).

The impacts on sediment and nutrient concentrations in McCabe's Brook have been observed on two occasions at Bostwick Road in July, 2004 and at Route 7 in August, 2010.

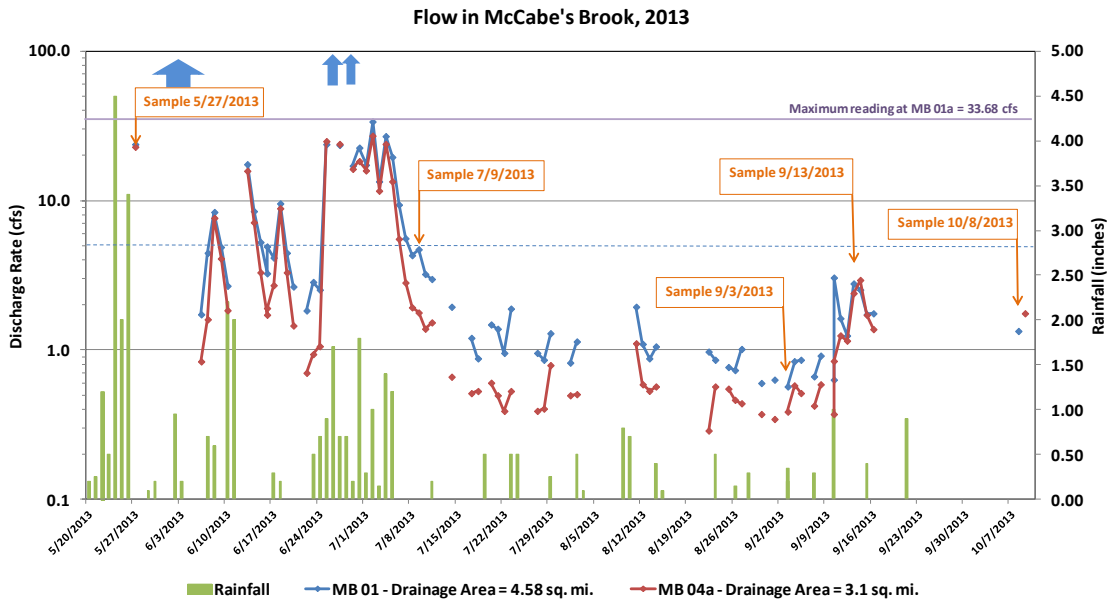
Comparison of results of flow monitoring above the Vermont Teddy Bear access road and below Harbor Road in 2012 reveals anomalies when flows fell below 1.5 cfs. In general, as illustrated in the graph of upstream and downstream flow rates during 2012, upstream flow from 3.13 sq. mi. drainage area measured at Vermont Teddy Bear were very low compared to those downstream from Harbor Road with a total drainage area 4.57 sq. mi. including that draining to Vermont Teddy Bear, contributing little to the flow at Harbor Road (22% of flow on

average from an upstream drainage area comprising 68.5% of the total watershed draining to Harbor Road). 2012 was an unusual year in that spring runoff was exceptionally low and spring rains were minimal. The upstream contribution was probably reduced by "loosing stream" losses of flow discussed in paragraph 1 above. Thus, most of the flow at Harbor Road in the spring of 2012 originated from 1.44 sq. miles draining directly into the segment of McCabe's Brook between Vermont Teddy Bear and Harbor Road plus parts of Shelburne Town lying outside the watershed but served by the town storm drainage system.

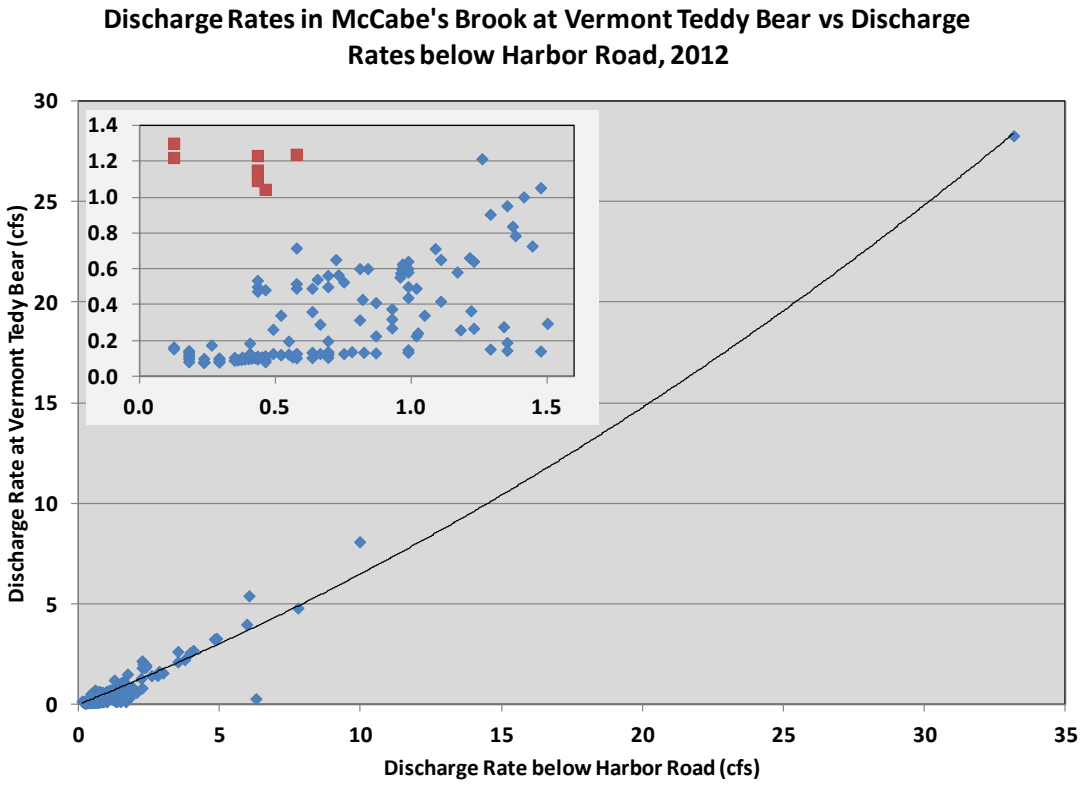
In contrast, as flow rates increased to levels above 1.5 cfs below Harbor Road beginning in the third week of September, the contribution of upstream flow to those at Harbor Road increased. On average, flow rates at Vermont Teddy Bear were 68% of those below Harbor Road, very close to the proportion of the watershed located upstream from Vermont Teddy Bear (68.5%).



A very different picture was presented in 2013 when spring rains were closer to normal. At flows exceeding 1.54 cfs at Harbor Road, the contribution from the upstream segment of the stream was more representative of its drainage area. As observed in 2012, the contribution of the upstream segment of the watershed to flow at Harbor Road was small compared to its area when discharge rates fell below 1.54 cfs at Harbor Road.



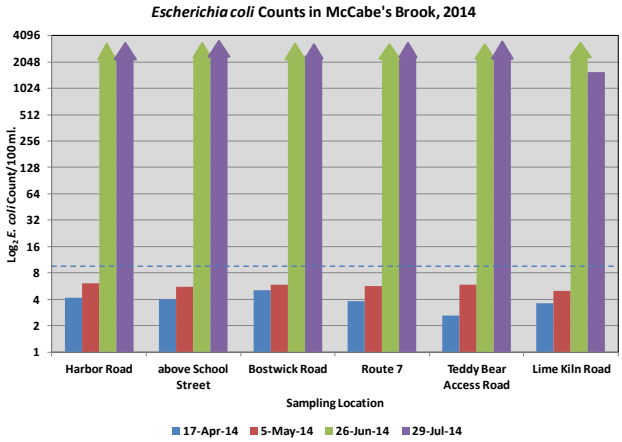
Viewed in another way, a comparison of flows at Vermont Teddy Bear with those below Harbor Road illustrates a relatively predictable relationship between the upstream and downstream discharge rates at high flows greater than about 2 cfs (SCRW has proposed target flow rates of 5 cfs). At low to moderate flow rates shown in the insert below, the contributions of flow from the upstream segment of McCabe's Brook are highly variable, and as indicated above, in general fall below the contribution to flow at Harbor Road expected based on its catchment area.



Thus, it is suggested that high flow monitoring provides a better picture of water quality in McCabe's Brook, not subject to poorly understood physical characteristics of the stream between Vermont Teddy Bear and Bostwick Road. When assessing and interpreting water quality results collected at high flows in 2014 and 2015, it is important, therefore, to bear in mind that these data are, in general, not comparable to earlier results collected at random flow rates ranging from very low to high without a knowledge of associated instantaneous flow rates.

Escherichia coli

Testing for *Escherichia coli* was included in the McCabe's Brook water quality monitoring program in 2014. Most probable numbers reported on April 17 and May 5 were low, falling well below the Vermont State Standard of 77 organisms/100 ml. In contrast, on June 26 and July 29, counts exceeded the limit of the test. The high counts in June and July are significant, suggesting the influence of sources of animal waste impacting the stream. The observation is



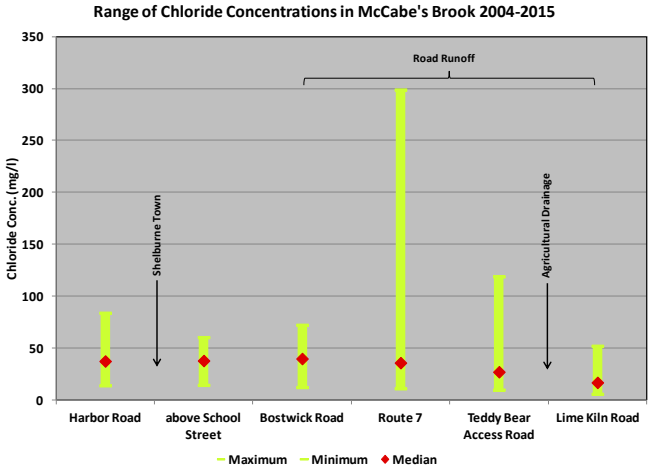
of particular significance in the context of results of dissolved phosphorus, and especially, total nitrogen and nitrate plus nitrite results reported on those dates. The *E. coli* results strongly reinforce the conclusion that runoff from agricultural fields and an animal watering pond caused significant increases in nutrient levels discussed below. Furthermore, they suggest that application of manure may have contributed to the high *E. coli* counts and the high levels of dissolved phosphorus and nitrogen, particularly nitrate plus nitrite.

Chloride

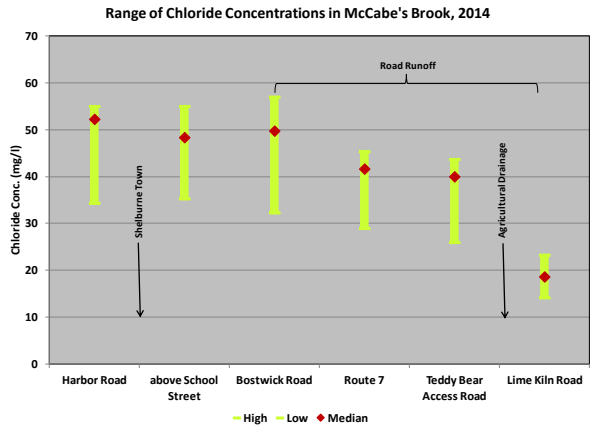
Chloride concentrations in streams may be influenced by human or animal wastes or by runoff from roads salted during the previous winter. In Champlain Valley streams unaffected by external sources of chloride, concentrations tend to vary between about 10 and 20 mg/l. Because chlorides occur in wastes and road salt, concentrations over and above background levels, they can serve as a useful indicator of external influences on water quality. Furthermore, because chloride is a non-reactive conservative element, it can serve also as a useful tool for

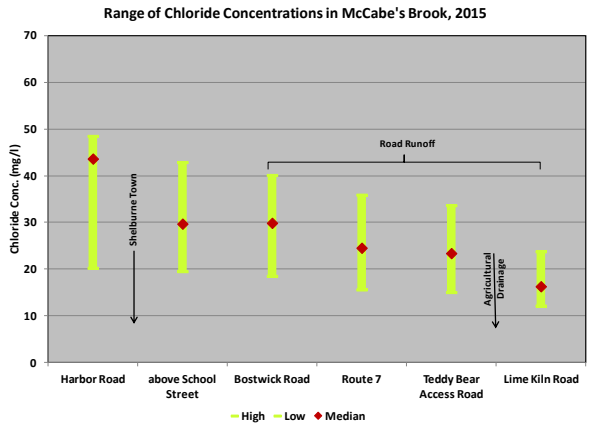
interpreting other water quality data. In surface waters severely impacted by runoff from heavily salted roads, concentrations can exceed those which can harm aquatic life. The USEPA limit for acute toxicity is 860 mg/l, and that for chronic toxicity is 230 mg/l.

Historical chloride levels have tended to increase from on average about 17 mg/l near background levels at Lime Kiln Road to about 27 mg/l at Vermont Teddy Bear, leveling out from Route 7 to Harbor Road at about 36 to 40 mg/l. An exceptionally high concentration of about 299 mg/l was observed above Route 7, exceeding the standard for chronic toxicity, on one occasion.

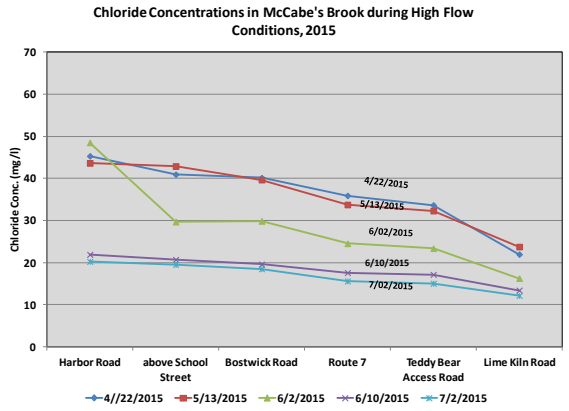


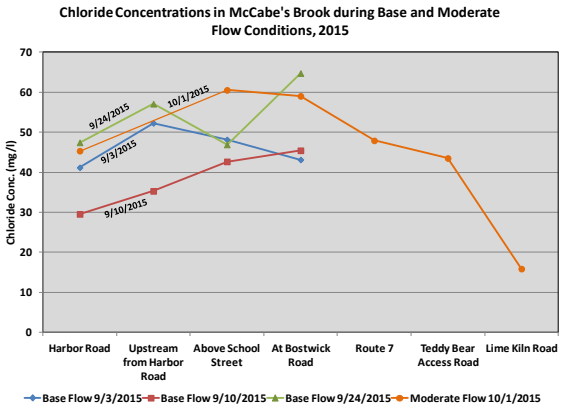
Chloride concentrations observed in 2014-2015 on average exceeded typical historical levels, increasing to slightly higher levels, especially at Harbor Road, in 2015, but to significantly higher levels between Bostwick Road and Harbor Road in 2014. Chloride levels may reflect the amount of salt applied to roads in the winter and previous rainfall (see discussion below), and can thus be somewhat variable from year to year, as illustrated by the difference between results reported in 2014 and 2015. The increase over the downstream reach adjacent to the School Street neighborhood in 2015 suggests the influence of storm drainage entering from outfalls in the School Street neighborhood and Shelburne Town (see discussion below).



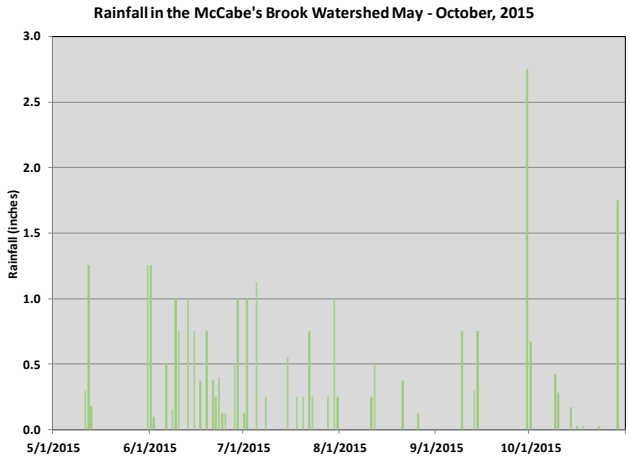


Chloride concentrations are subject to variation from spring to late summer. Typically, concentrations in urban and populated areas monitored by the SCRW-LWP such as McCabe's Brook and nearby Munroe Brook increase steadily downstream as drainage from salted roads and storm drains add continuously to the stream. As spring and summer progress, salt is washed off the roads, and the load entering the stream, and consequently the concentrations in the stream, decrease as illustrated in the graph on the left below.





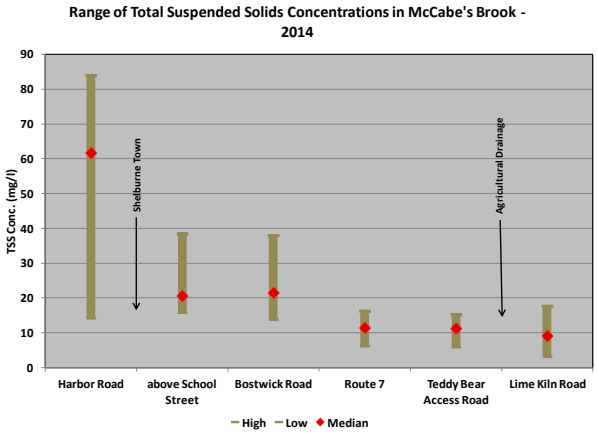
Interestingly, at base flows sampled in September, and at a moderate flow sampled on October 1, 2015, concentrations were higher than during high flows sampled in the spring and early summer, and decreased downstream from Bostwick Road. The higher concentrations reflect the low in-stream dilution at low flows. The higher concentrations, especially on October 1, 2015, reflect runoff following rains.

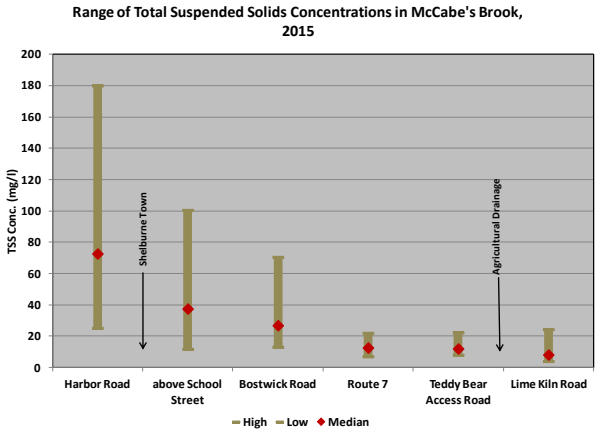


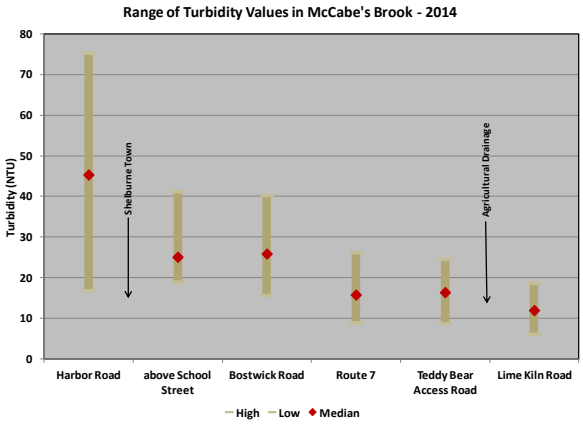
Suspended Sediment

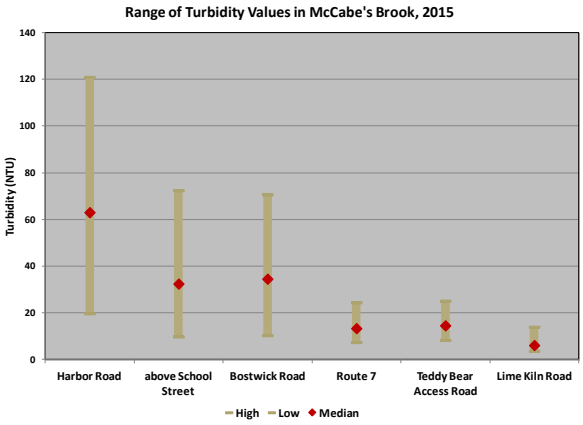
Suspended sediment behavior in McCabe's Brook is subject to numerous influences (see Milone and McBroom, 2012) which may also vary in significance with discharge rates. Solids concentrations observed in McCabe's Brook during 2014 and 2015 when high flows were targeted were on average low between Lime Kiln Road and Route 7, and fell within a relatively

narrow range. Between Route 7 and Bostwick Road levels increased reflecting bottom scour/incision, and perhaps also erosion at sites of stream bank failures over this highly vulnerable reach at the high flows monitored. As pointed out in the Phase 2 Geomorphic Study and Corridor Plan (Milone and McBroom, 2012), "A constriction of the river channel and floodplain by the Route 7 embankment has been identified to be contributing to channel destabilization and creation of mass failures of the valley wall". The report further recommended i) creation of a new compound channel and floodplain "to remove the constriction and restore natural river processes while protecting Route 7", and ii) replacement of the culvert under Route 7 because it "is undersized and created a sediment delta upstream, disrupting sediment supply to downstream reaches and potentially increasing incision downstream".





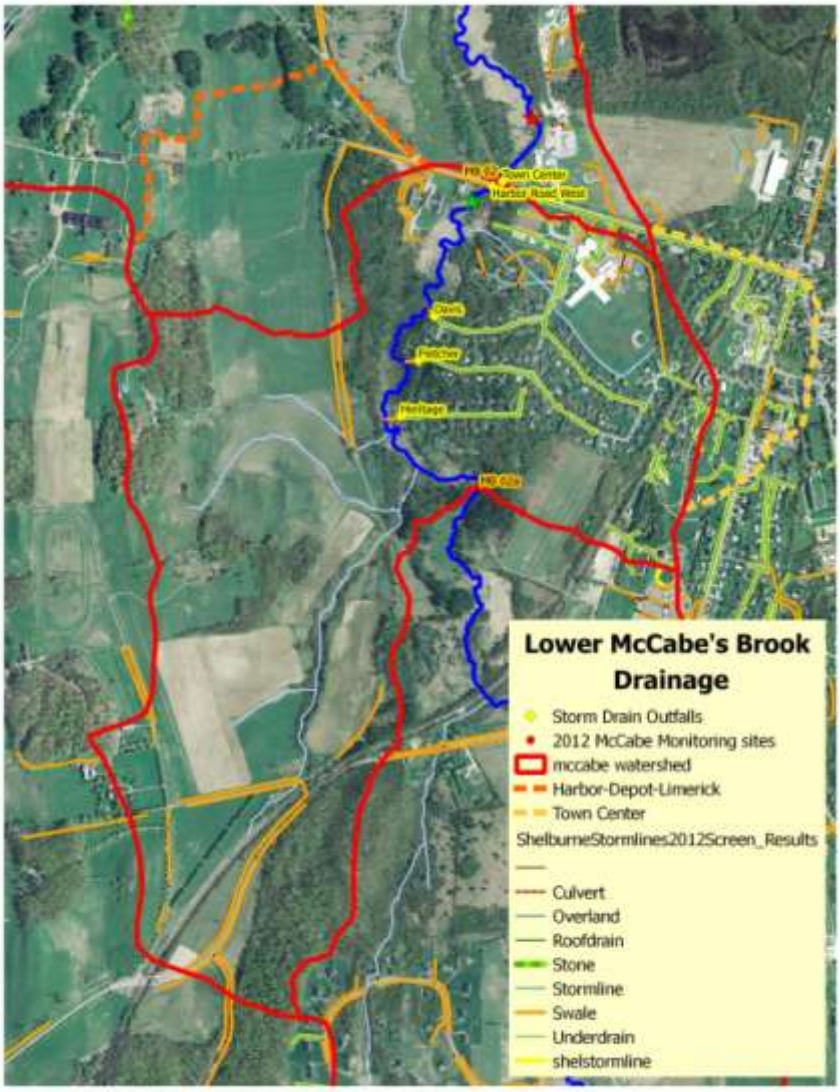




Between Bostwick Road and the School Street neighborhood in Shelburne, suspended sediment concentrations remained relatively constant on average, although high concentrations reached 100 mg/l in 2015 when the stream flow was very high.

The segment of McCabe's Brook adjacent to the School Street neighborhood in Shelburne experienced a significant increase in both median and maximum suspended sediment concentrations. Over this segment of the stream "The channel is in fair condition and is in stage II of the D channel evolution model. Slight incision has occurred, but there is still

good access to the floodplain. This reach has extreme sensitivity due to the sand bed and fair condition" (Milone and McBroom, 2012). Based on water quality monitoring results, this section of the stream has been identified as a "Hot Spot", subject to bottom scour/incision, stream bank erosion, and the influence of storm water discharges from the Shelburne town center and the School Street neighborhood as shown below:

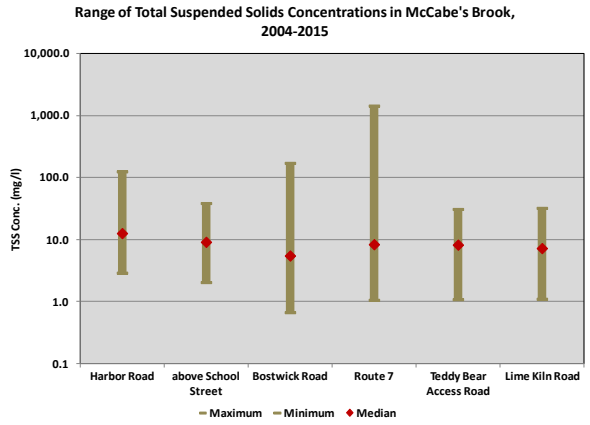


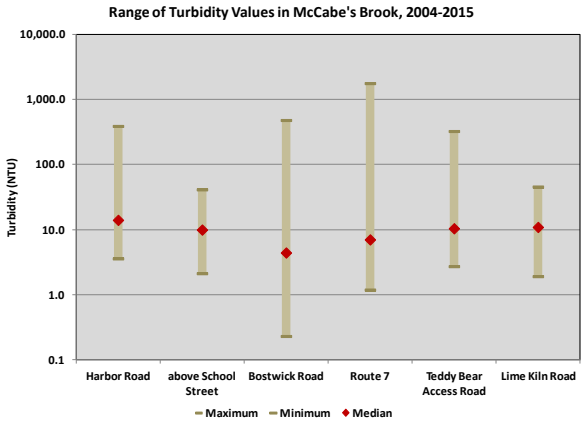
The Phase 2 Geomorphic Study and Corridor Plan (Milone and McBroom, 2012) recommended pro-active town planning to "reduce sources, increase storage, and decrease (sediment) transport," and outlined strategies to address drainage and stormwater management issues.

Median concentrations of suspended sediment observed in 2014 and 2015 were fairly consistent, reinforcing the concept of high flow monitoring. Maximum values provide additional evidence of the occurrence of events that add value to the high flow monitoring

program, for example, the increasing high concentrations at Bostwick Road, above School Street, and especially Harbor Road where the total suspended solids concentration reached 180 mg/l. The targeting of high flows should be continued at all McCabe's Brook stations to establish with greater confidence its long term value over random flow monitoring.

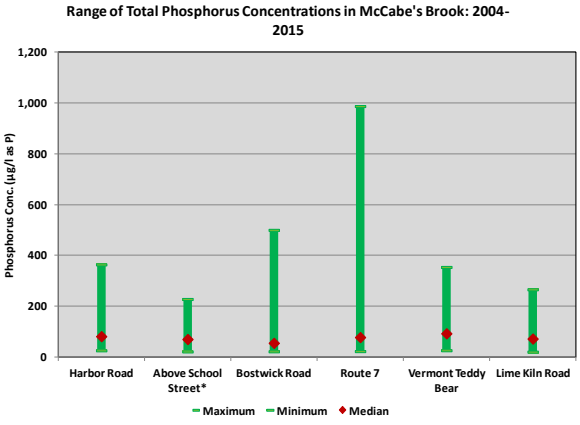
As with other parameters, the results of high flow monitoring are not consistent with those of historical random flow sampling. Whereas on average, levels of suspended sediment in 2014-2015 were consistent with historical medians between Lime Kiln Road and Route 7, they were significantly higher at downstream stations, increasing at a higher rate than historical median values. The extremely high maximum historical suspended sediment concentrations illustrated at Route 7 was caused by a massive stream bank collapse between Vermont Teddy Bear and Route 7 pictured in the introduction above.



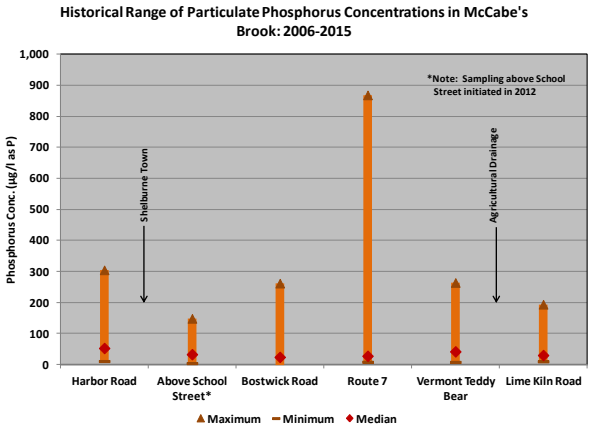


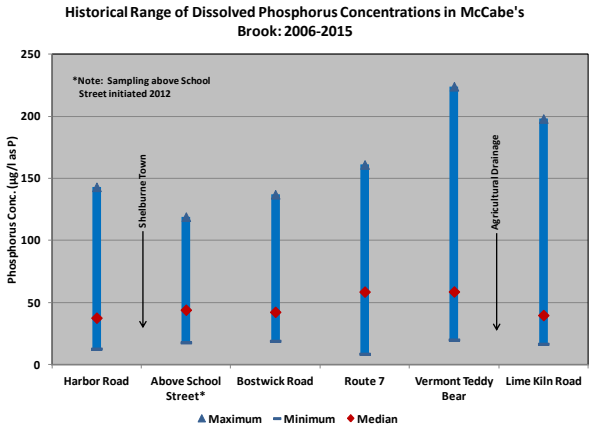
Phosphorus

Phosphorus Concentrations. Historical levels of total phosphorus have tended to fall below 100 µg/l. Most informative are high values. The highest concentration reported in the stream was 987 µg/l at Route 7 and was associated with a massive stream bank collapse located just upstream from Route 7 and downstream from Vermont Teddy Bear.



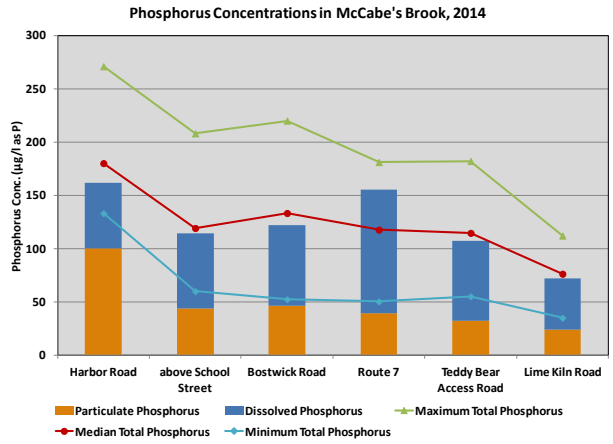
Determination of dissolved phosphorus was initiated in 2006, and has been important to interpreting and understanding results of monitoring in the McCabe's Brook watershed. Thus, the high concentration of total phosphorus observed at Route 7 was in large part attributable to a particulate phosphorus concentration of 950 µg/l associated with the stream bank collapse resulting in an exceptionally high suspended solids concentration. The historical record also reveals an increase in particulate phosphorus levels over the School Street segment of the stream associated with increases in the burden of suspended sediment.

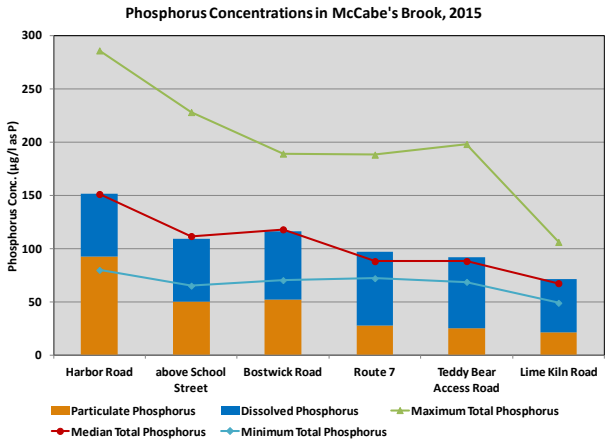




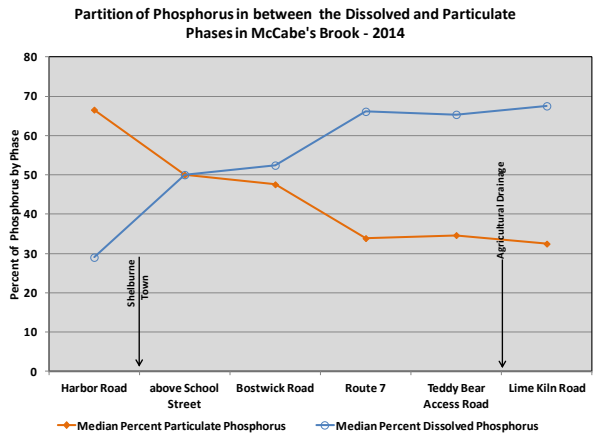
Dissolved phosphorus concentrations can also be informative, particularly when viewed in conjunction with particulate phosphorus. Thus, the general increase in levels of dissolved phosphorus, and in particular, its predominance, between Lime Kiln Road and Vermont Teddy Bear reflect the influence of agricultural runoff contributed over this segment of the stream. The predominance of agriculture in this upstream "Hot Spot" is evident in the following map:

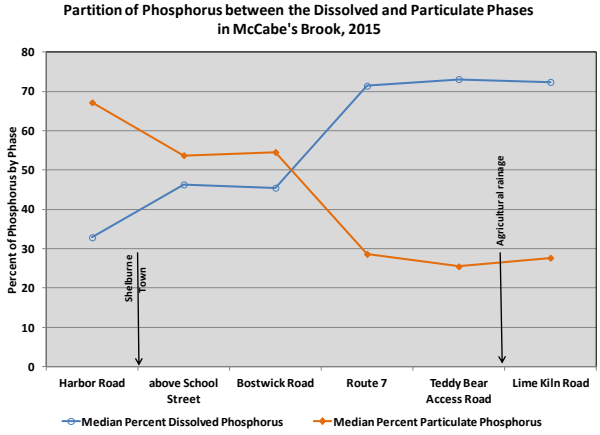
Concentrations of dissolved phosphorus tend to decrease downstream as a result of dilution at the same time that particulate phosphorus concentrations begin to increase, resulting in a predominance of particulate over dissolved phosphorus.



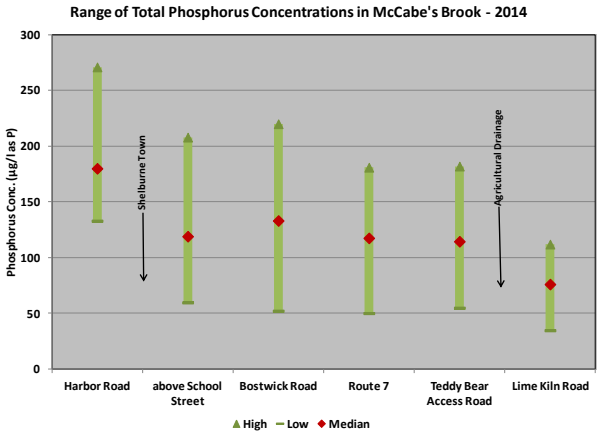


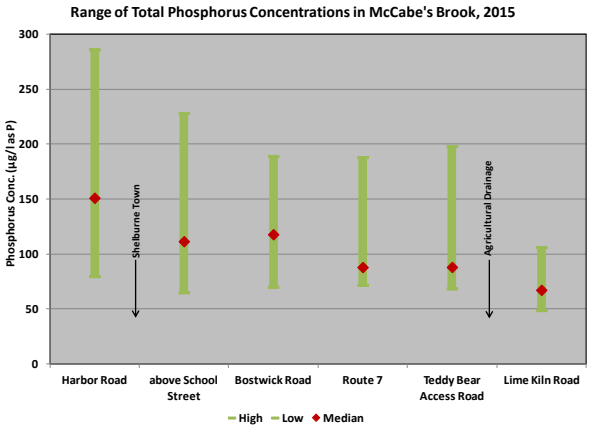
The upstream predominance of dissolved phosphorus and the change to a predominance of particulate phosphorus is illustrated in the following graphs:





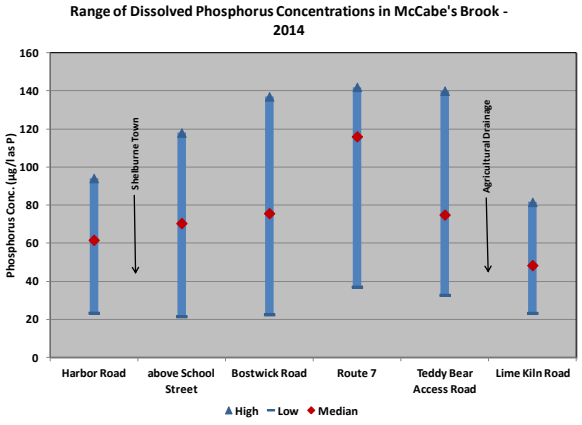
An overview of the ranges and medians of phosphorus results observed during high flow monitoring in 2014 and 2015 provides a clearer and more consistent picture of phosphorus in McCabe's Brook.

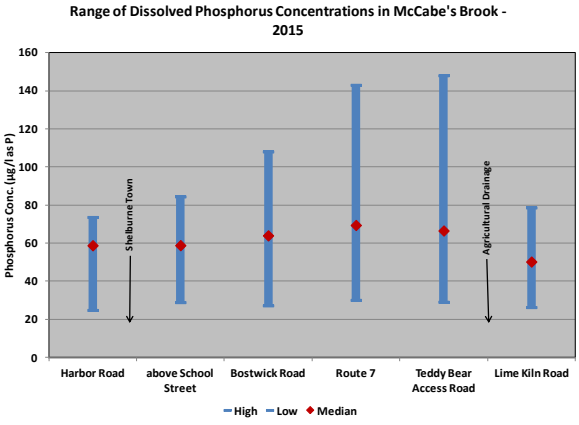




This almost identical year to year picture, and the sensitivity of results to factors impacting on water quality confer an advantage over random flow sampling supporting the continued targeting of high flows.

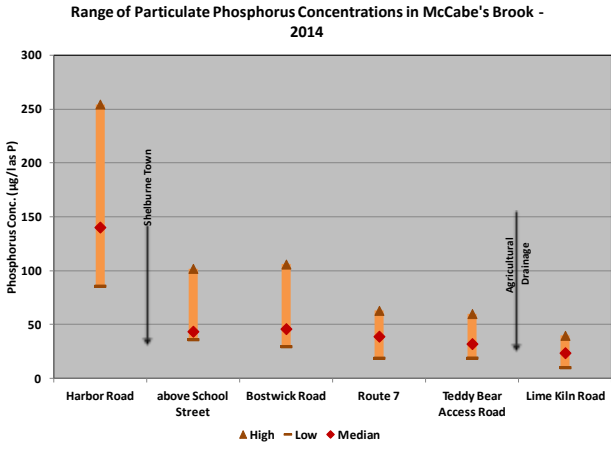
Dissolved and particulate phosphorus concentrations can be depicted individually to illustrate in greater detail the range of concentrations and median values, and are generally consistent from 2014 to 2015. Separation of dissolved and particulate phosphorus results provides a more informative picture. Again, dissolved phosphorus in the upstream segments of the stream influenced by agricultural runoff is almost alone responsible for the increase in total phosphorus concentrations between Lime Kiln Road and Vermont Teddy Bear. Dissolved phosphorus concentrations were particularly sensitive to events in the watershed. Thus high values and medians were influenced by events on June 26 and July 29, 2014 described in more detail in the discussion of *E. coli* above and the following discussion of nitrogen levels in McCabe's Brook. The levels of dissolved phosphorus, total nitrogen, and nitrate plus nitrite were higher in 2014 than in 2015 at upstream stations, and appear to be very sensitive to land management practices upstream from Vermont Teddy Bear.

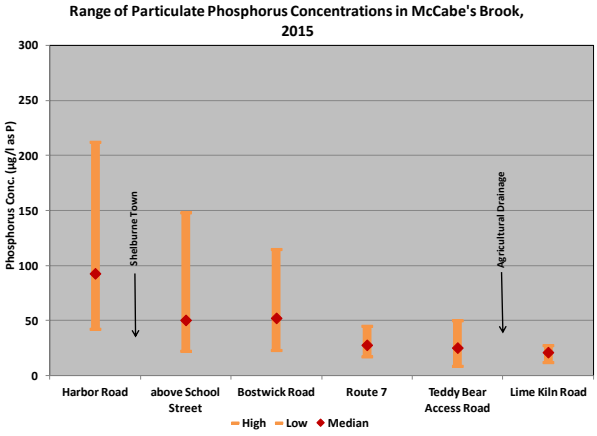




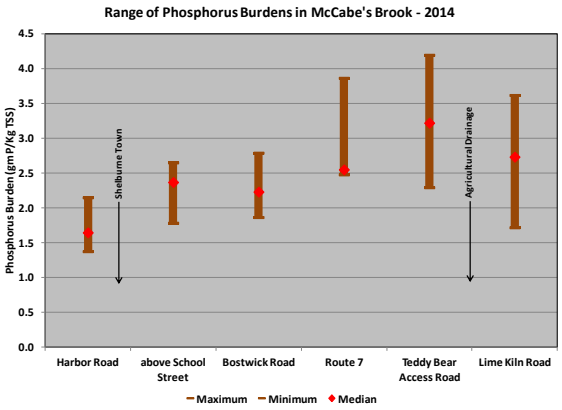
As the stream passed through Shelburne, particulate phosphorus predominated and was alone responsible for increases in total phosphorus concentrations as the stream passed

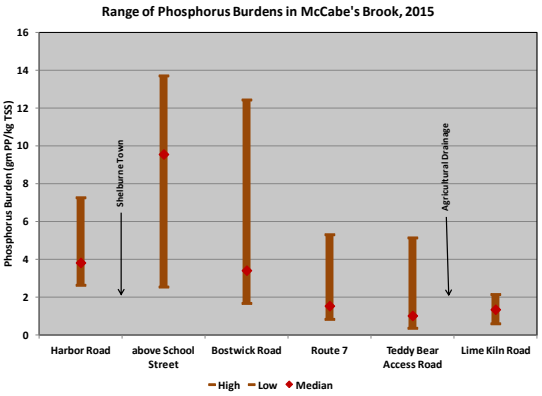
through Shelburne Town, receiving storm runoff and mobilizing bottom sediments. Particulate phosphorus results exhibited greater consistency.





Phosphorus Burden. Although the phosphorus burden associated with suspended sediment is of little value as an indicator of water quality or change over time, it can enhance an understanding of the source of sediment carried in suspension by McCabe's Brook.



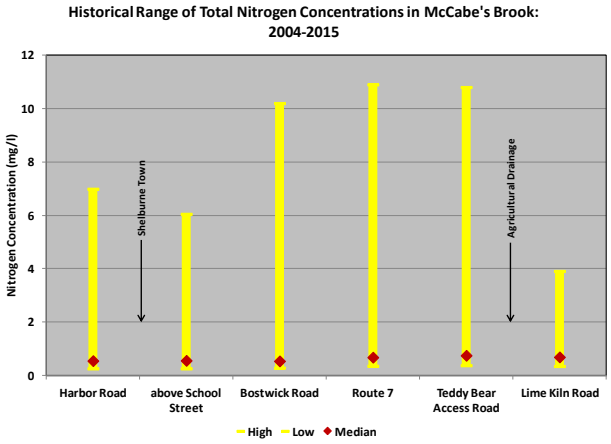


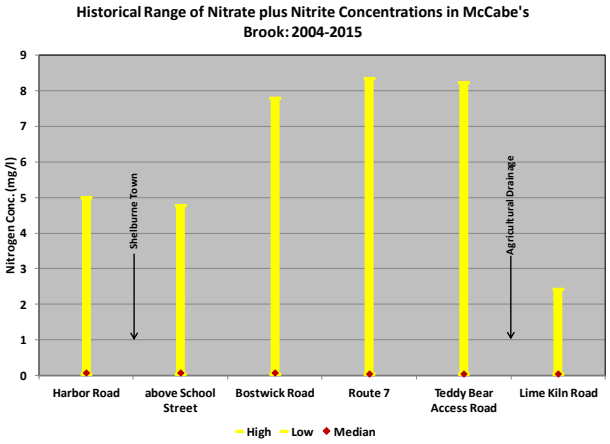
The picture presented in 2014 was of increasing level of phosphorus associated with suspended sediment between Lime Kiln Road and Vermont Teddy Bear, reflecting the impact of past application of fertilizers and manure to fields. Subsequently, the burden decreases steadily downstream as the suspended sediment load is increasingly composed of sediment of non-agricultural origin. This pattern is consistent with the historical picture in McCabe's Brook.

The pattern exhibited in 2015 was unusual, as were very high levels observed, especially at Bostwick Road and above School Street which occurred at very high flows, probably re-suspending sediments carried downstream from the upstream agricultural lands. Even so, the decrease over the School Street segment of the stream reflected the non-agricultural origin of the suspended sediment in this downstream reach.

Nitrogen

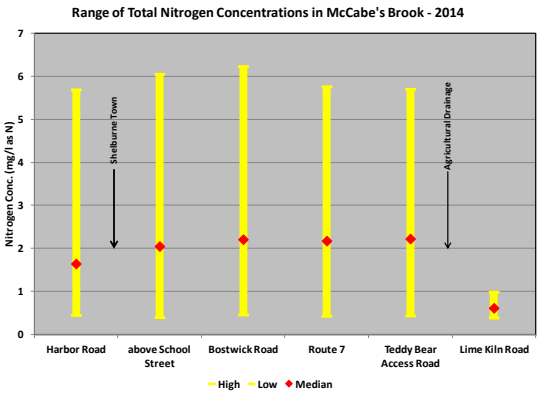
Total nitrogen and nitrate plus nitrite concentrations in McCabe's Brook under a random flow sampling regime have tended historically to be low and fairly consistent at all sampling stations. On the other hand, as illustrated below, exceptionally high levels have been observed

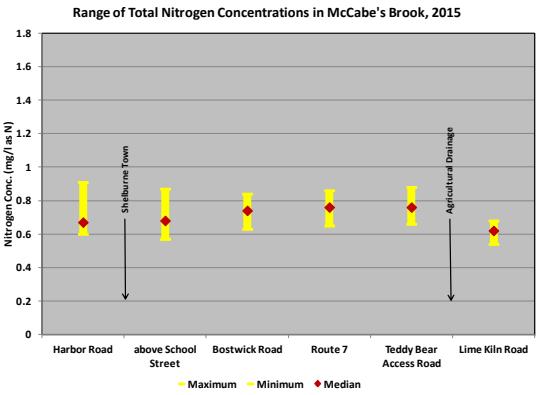


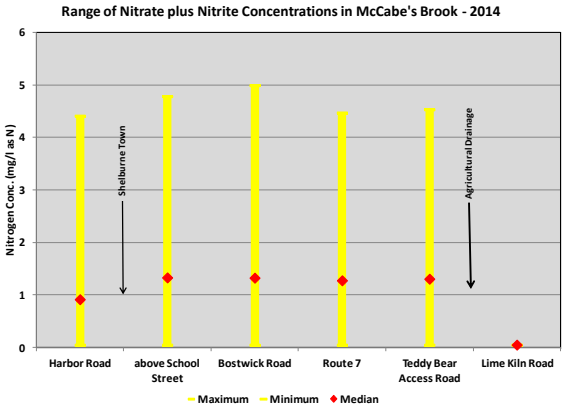


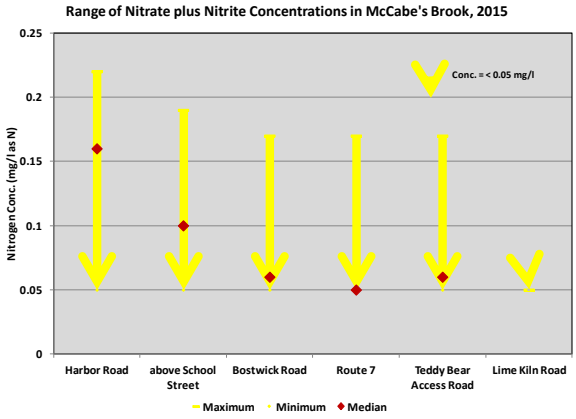
at high flows, originating between Lime Kiln Road and Vermont Teddy Bear, and persisting downstream. The high levels occurred during a period of high flow on July 10, 2007, accompanied by high levels of suspended sediment and phosphorus concentrations.

Concentrations of both total nitrogen and nitrate plus nitrite during high flows in 2014 and 2015 were both generally higher than historical random flow results, and more sensitive to the characteristics of the watershed. Similarly, while generally lower in 2015, concentrations of both total nitrogen and nitrate plus nitrite were again more sensitive to agricultural runoff and drainage from an animal watering pond and horse farm between Lime Kiln Road and Vermont Teddy Bear. Furthermore, an unusual, but very low level, increase in median nitrate plus nitrite concentrations between Bostwick and Harbor Roads occurred in 2015.

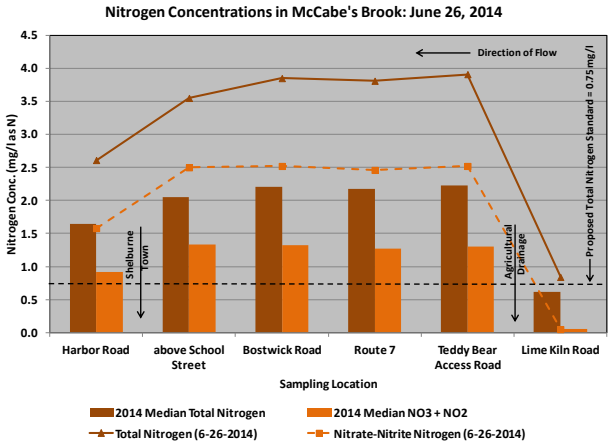


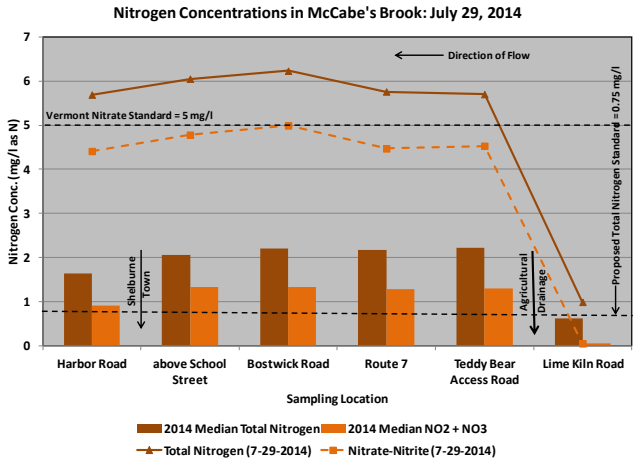






In general, levels of total nitrogen and nitrate plus nitrite reflected in median concentrations were relatively high in 2014. Of particular significance were high levels of both parameters observed on June 26 and July 29, 2014 which originated between Lime Kiln Road and Vermont Teddy Bear and which persisted downstream. These events were similar to that observed on July 10, 2007, but were not accompanied by the very high levels of suspended solids and particulate phosphorus observed during the 2007 event. On the other hand, solids levels were somewhat elevated, and dissolved phosphorus concentrations and *E. coli* counts experienced significant increases. Dissolved phosphorus appears to be a sensitive indicator of agricultural runoff, and the increased in the levels observed on June 26 and July 29 were consistent with the increases in nitrogen concentrations. The high *E. coli* counts strongly suggest the animal origin of the high nitrogen levels.





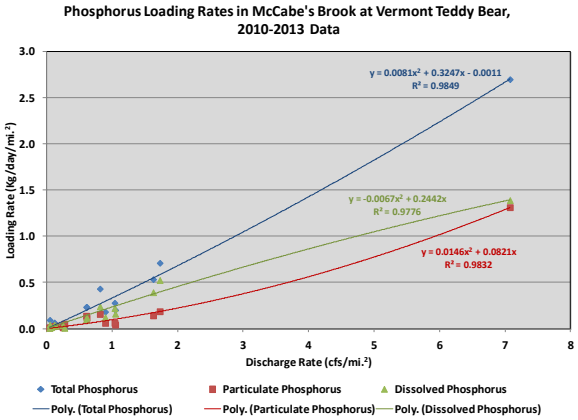
The segment of McCabe's Brook between Lime Kiln Road and Vermont Teddy Bear is a known "Hot Spot" discussed above impacted by runoff from agricultural fields, a cattle watering pond and a horse farm.

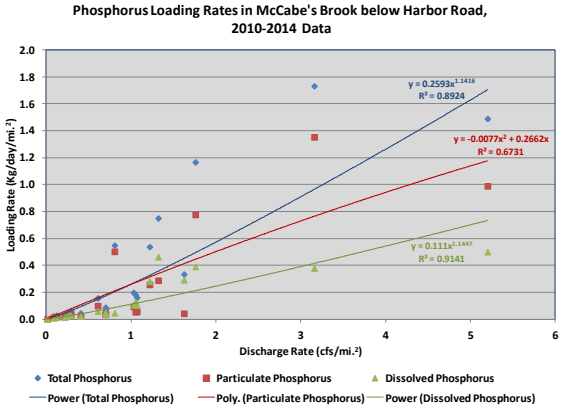
Random flow monitoring, like high flow monitoring, responds to events such as those observed on June 26 and July 29, but high flow monitoring is more likely to identify such events, and is thus more sensitive to their occurrence.

Flow and Loading Rates

It is difficult to make meaningful comparisons of nutrient and suspended sediment loadings at Vermont Teddy Bear and Harbor Road. This is because the segment of McCabe's Brook upstream from Vermont Teddy Bear functions in many respects as distinct from the segment between MB 02a located above the School Street neighborhood and Harbor Road in Shelburne (see discussion above). This leads to considerable variability among nutrient and suspended solids loadings at Harbor Road. It is meaningful, therefore, to consider loading rates at Vermont Teddy Bear and Harbor Road separately. In the following analysis of loading rates at Harbor Road, discharge rates are based on the total upstream watershed area (4.57 mi.^{2}). A further point of note, is that the highest discharge rates observed in McCabe's Brook at both Harbor Road and Vermont Teddy Bear (10.13 and 12.33 cfs/mi.^{2}, respectively) were around half those observed in the LaPlatte River (20.27 cfs/mi.^{2}) and in Thorp and Kimball Brooks (19.03 and 26.56 cfs/mi.^{2}, respectively).

Phosphorus loading rates in McCabe's Brook at Vermont Teddy Bear were fairly consistent and probably reflect fairly well actual loading rates based on the upstream drainage area. Up to a discharge rate of about 7 cfs/mi.^{2}, dissolved phosphorus constitutes the predominate source of phosphorus. It appears that particulate phosphorus appears to become a more important component of the total phosphorus load as the discharge rate increases.



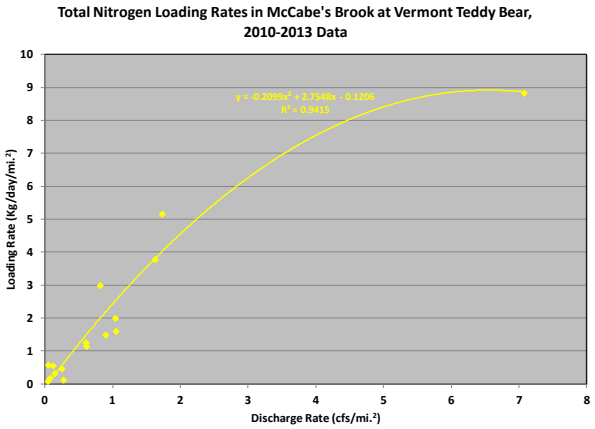


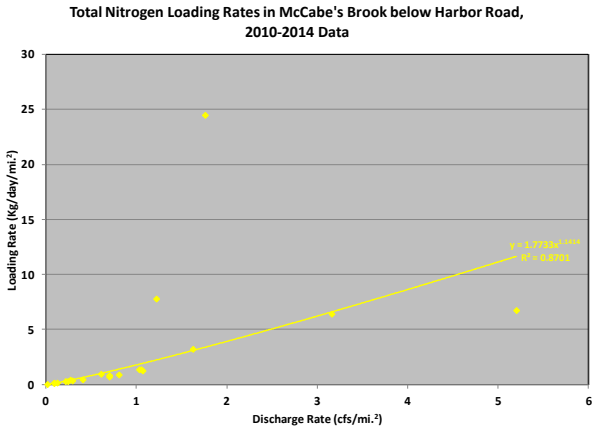
Phosphorus loading rates in McCabe's Brook below Harbor Road, in contrast to those at Vermont Teddy Bear, were highly variable, illustrating the highly variable contribution of flow from upstream from Bostwick Road discussed above, and complicating the analysis and interpretation of the data.

Of note, were relatively low high flow values based on watershed area that have been observed in McCabe's Brook relative to those in other small near lake watersheds of comparable size or the LaPlatte River. This may be related to peculiarities in the morphometry of McCabe's Brook and its watershed, and make comparisons with other rivers and streams

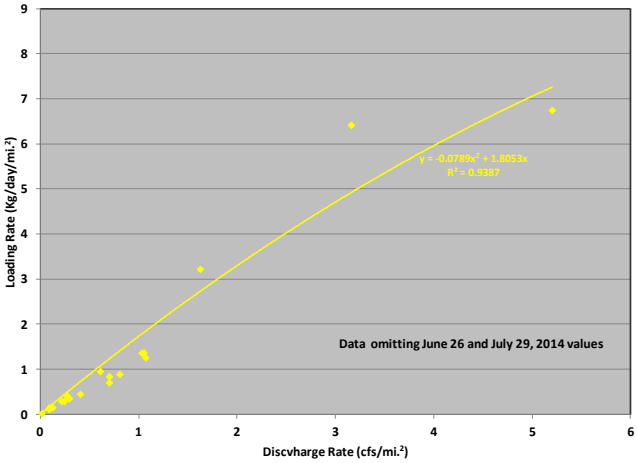
difficult. It may be anticipated that loading rates determined at Harbor Road would be more representative of the watershed as a whole during monitoring that targets high flows.

Total nitrogen loading rates in upper McCabe's Brook, like those for phosphorus, were fairly consistent. In contrast to phosphorus loadings, nitrogen loading rates observed at Harbor Road, were less variable when high nitrogen concentrations originating upstream on June 26 and July 29, 2014 impacted on concentrations at Harbor Road were ignored. The graphs below are not comparable, since the data available at Harbor Road include data from 2014.

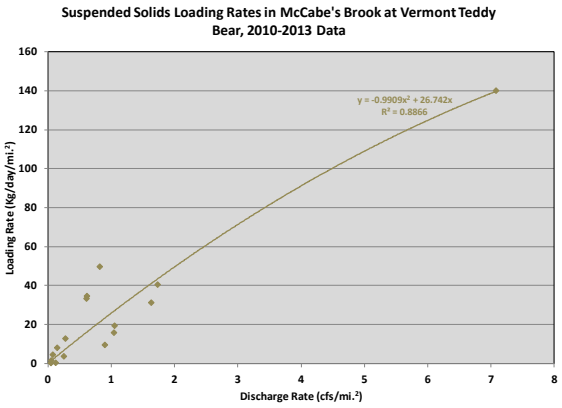


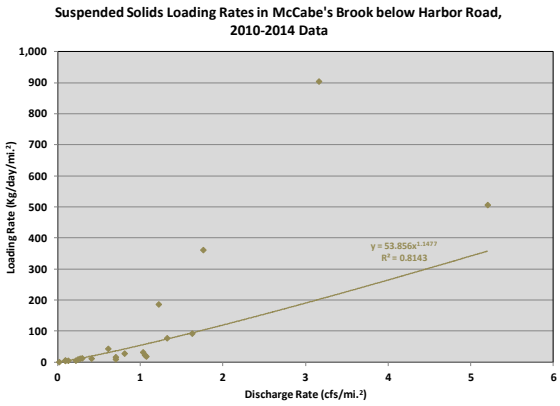


Omitting the June and July, 2014 values reveals a picture similar to that observed at Vermont Teddy Bear, but exhibiting slightly lower loading rates, which can be attributed to lack of sources of nitrogen in lower and mid McCabe's Brook comparable to the upstream agricultural sources.



Solids loading rates, like phosphorus loading rates, were more consistent, and very much lower, at Vermont Teddy Bear than at Harbor Road. High rates at Harbor Road reflect diverse sources of suspended sediment entering McCabe's Brook primarily within the town of Shelburne, and can be compared with loading rates in other streams discharging to Lake Champlain.


Suspended Solids Loading Rates in McCabe's Brook at Vermont Teddy Bear, 2010-2013 Data
y = -0.9909x² + 26.742x
R² = 0.8866
Loading Rate (Kg/day/mi.²)
Discharge Rate (cfs/mi.²)
0
20
40
60
80
100
120
140
160
0
1
2
3
4
5
6
7
8


Suspended Solids Loading Rates in McCabe's Brook below Harbor Road, 2010-2014 Data
y = 53.856x^1.1477
R² = 0.8143
Loading Rate (Kg/day/mi.²)
Discharge Rate (cfs/mi.²)
0
100
200
300
400
500
600
700
800
900
1,000
0
1
2
3
4
5
6

Conclusions

General

- Monitoring of water quality in McCabes Brook during 2014 and 2015 was carried out at 6 sites at strategic locations between Lime Kiln Road in Charlotte and Harbor Road in Shelburne
- Rainfall forecasts and stream flows in the adjacent LaPlatte River at Falls Road has been shown to be fairly reliable indicators of high flows in McCabe's Brook. Past assessments of flow indicated that targeted high flows tend to exceed 5 cfs at Harbor Road
- Targeting of high flows is important in McCabe's Brook because:
    - High flows constitute the main source of sediment and nutrients to Shelburne Bay and Lake Champlain
    - High flow sampling increases comparability of results over time
    - High flows enhance sensitivity of results to watershed characteristics and events impacting water quality
    - Downstream water quality results obtained at high flows represent the whole stream and reflect the effects of upstream influence and events. In contrast, at low and moderate flows, the influence of upstream flow is highly variable and results are not representative of the stream as a whole. This compromises the validity of random flow sampling
- McCabe's Brook includes three high risk "Hot Spots", one upstream subject to and impacted by agricultural and farm practices, one at the Teddy Bear access road and Rte 7 subject to undersized culverts and impacted by floodplain encroachment by the Rte 7 corridor, and one downstream subject to the effects of storm water discharges, bottom scour, and erosion.
- Concentrations of sediment and nutrients are higher at higher flow rates and on average are not comparable to those collected during random sampling.

Escherichia coli

- *Escherichia coli* were low in April and May, falling well below State standards.
- Counts increased to high levels in June and July sampled, suggesting that animal waste associated with runoff from agricultural fields were entering the stream. This reinforces the interpretation of increases in levels of dissolved phosphorus and nitrogen.

Chlorides

- Chloride concentrations were generally low upstream but increased steadily downstream reflecting the impact of road runoff.
- Levels of chloride measured at high flows decreased as the summer progressed.

Solids

- Suspended solids concentrations were low and varied little in the upper reaches of McCabe's Brook in 2014-2015. Concentrations increased generally downstream from Bostwick Road and most importantly as the stream flowed adjacent to the School Street neighborhood in Shelburne where it receives storm water discharges and is subject to bottom scour and stream bank erosion.
- Solids concentrations measured at high flows were sensitive to changes within the watershed.
- Suspended solids concentrations were on average very consistent in 2014 and 2015.
- Suspended solids constituted the prime source of increasing levels of phosphorus in thelower McCabe's Brook in Shelburne Town.

Conclusions (Cont'd)

Phosphorus

- In general, phosphorus levels in McCabe's Brook increased significantly over two reaches:
    - Upstream between Lime Kiln Road and Vermont Teddy Bear where it is impacted by agricultural farm runoff and erosion from the Rte 7 corridor encroachment.
    - Downstream adjacent to the School Street neighborhood where it is impacted by storm water discharges from Shelburne Town and bottom scour/incision and erosion.
- Upstream increases in levels of total phosphorus were caused by increases in dissolved phosphorus concentrations characteristic of, and attributable to, drainage from cultivated fields and drainage from an animal watering pond and horse farm
- Downstream increases in the level of total phosphorus were caused by increases in particulate phosphorus associated with suspended sediment related to storm drainage from Shelburne Town and bottom scour/incision and erosion
- Levels of dissolved phosphorus were particularly sensitive to upstream events affecting agricultural and farm runoff. Two upstream events observed in 2014 resulted in surges in levels of dissolved phosphorus which persisted downstream. These increases accompanied increases in total nitrogen and nitrate plus nitrite concentrations probably affected by agricultural and farm management practices.

Nitrogen

- Total nitrogen and nitrate plus nitrite concentrations were very sensitive indicators of factors and events affecting water quality in McCabe's Brook
- Increases in nitrate plus nitrite concentrations related to agricultural and farm runoff were observed on two occasions in 2014 approaching or reaching the Vermont State nitrate standard. High concentrations persisted downstream and were accompanied by elevated levels of dissolved phosphorus. A similar event was observed in 2007.

Loading Rates

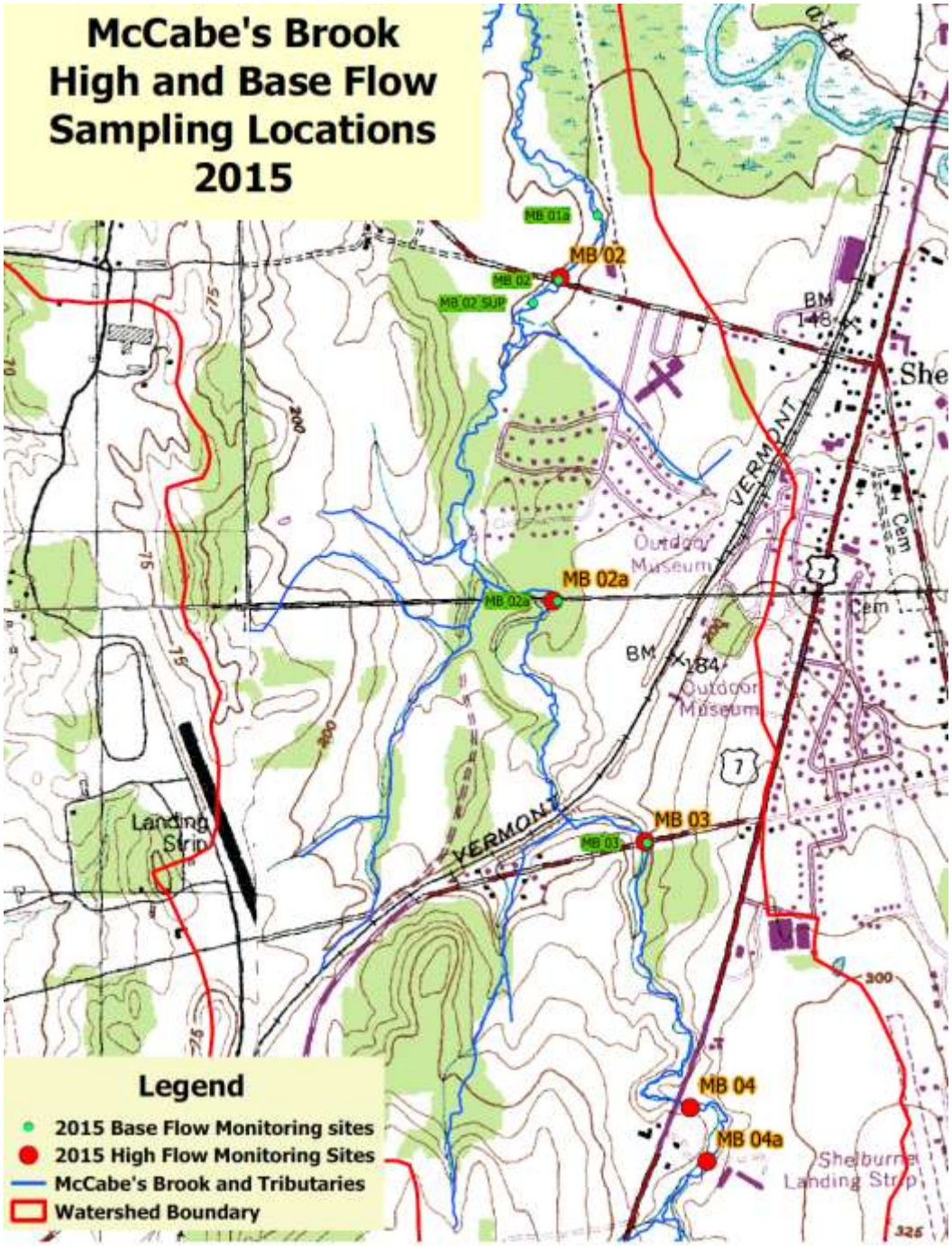
- Nutrient and solids loading rates were fairly consistent and can be compared with agricultural drainages in other watersheds, but are limited by the lack of high stream discharge rates.
- Phosphorus loading rates at Harbor Road were highly variable and probably are greatly affected by stream morphology when monitored at random flow rates.
- Consistency and representativeness of loading rates would be enhanced were high flows targeted.
- Nitrogen loading rates were consistent in the absence of events linked to management practices upstream.
- Suspended solids loading rates were consistent and low upstream, but were high, and highly variable at Harbor Road where they were impacted by in-stream scour and erosion as well as urban storm drainage.

Recommendations

- Monitoring of water quality in McCabe's Brook should be continued at all sampling sites in view of the complex factors affecting water quality and the importance of upstream and downstream "Hot Spots"
- Targeting of high flows should be continued because:
    - Results are consistent from year to year
    - Results are highly sensitive to factors affecting water quality and events in the watershed
    - High flows represent the whole watershed and stream in contrast to low and moderate flows at which downstream flows are influenced in highly variable ways by upstream flows, raising a question of the validity of random flow sampling
    - In general, there has been a high degree of consistency among monitoring results for solids, phosphorus, and nitrogen, suggesting that median concentrations determined at high flows may provide a useful tool for following trends and changes in water quality in response to mitigation efforts or other changes within the watershed
- The upstream "Hot Spot" influenced by agricultural and farm runoff should be targeted in an effort to improve best management practices to reduce nutrient flow to the stream originating from agricultural and farm runoff and vulnerability to high risk events
- Priority should be given to projects, such as the Rte 7 floodplain encroachment hot spot area recommended by Milone and McBroom (2012) to relieve exacerbating mass failure conditions in the stream which impact on flow characteristics, stream equilibrium conditions and water quality.
- The downstream "Hot Spot" should be targeted to identify i) specific sources of sediment and nutrients and ii) potential actions to reduce sources and their impact on the stream.
- The Town of Shelburne should implement water quality improvement strategies recommended in the Milone and McBroom (2012)report to address drainage and stormwater issues in the lower McCabe's Brook.

ANNEX I. Sampling Station Locations

Station No.	River Mile	Coordinates	Town	Description	Remarks
MB 02	LAP 0.34 MB 1.68	44.38305 -73.23853	Shelburne	McCabe's Brook, Harbor Rd. bridge. Left bank, 30 meters below bridge.	Surface drain channel enters from right bank about half way between the bridge and the sampling point. Upstream drainage 4.57 mi^2.
MB 02a	LAP 0.34 MB 2.465	44.37502 -73.23881	Shelburne	McCabe's Brook off path starting from the end of School Street in Shelburne. Right bank.	Upstream from the School Street neighborhood. Stream flows from Bostwick Road to sampling location along fields and through woods. Small tributary enters upstream from west.
MB 03 (LR 03)	LAP 0.34 MB 3.32	44.36892 -73.23586	Shelburne	McCabe's Brook, Bostwick Rd. Bridge. Left bank at downstream discharge from culvert.	
MB 04	LAP 0.34 MB 4.00	44.36230 -73.23461	Shelburne	McCabe's Brook, Route 7 bridge. Right bank at upstream end of bridge.	Upstream bank erosion. Vermont Teddy Bear storm drainage pond overflow immediately upstream on east drainage.
MB 04a	LAP 0.34 MB 4.20	44.36086 -73.23405	Shelburne	McCabe's Brook, Vermont Teddy Bear access road	Upstream Route 7 fill disposal on farm fields on east drainage. Upstream from disposal site, pasture and corn fields with manure spreading on west drainage. Upstream drainage 3.31 mi^2.
MB 05 (LR 05)	LAP 0.34 MB 6.04	44.34582 -73.22868	Charlotte	McCabe's Brook, Lime Kiln Rd. bridge. Downstream discharge from culvert.	Horses upstream, west (left) bank. Nordic Farm upstream west drainage.


McCabe's Brook
High and Base Flow
Sampling Locations
2015
MB 01a
MB 02
MB 02
MB 02 SUP
MB 02a
MB 02a
MB 03
MB 03
MB 04
MB 04a
VERMONT
VERMONT
Outdoor Museum
Outdoor Museum
Landing Strip
Shelburne Landing Strip
BM 148
BM 184
Cem
Cem
Legend
2015 Base Flow Monitoring sites
2015 High Flow Monitoring Sites
McCabe's Brook and Tributaries
Watershed Boundary

ANNEX II. Monitoring Results

Most Probable Numbers of *Escherichia coli* per 100 ml in McCabe's Brook - 2014

	4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum	log2 Median	log2 Maximum	log2 Minimum
MB 02	18	65.65	>2419.6	>2419.6	1242.625	18	>2419.6	-	11.24	4.17
MB 02a	16	47.11	>2419.6	>2419.6	1233.355	16	>2419.6	-	11.24	4.00
MB 03	33	60.15	>2419.6	>2419.6	1239.875	33	>2419.6	-	11.24	5.04
MB 04	14	50.39	>2419.6	>2419.6	1234.995	14	>2419.6	-	11.24	3.81
MB 04a	6	60.15	>2419.6	>2419.6	1239.875	6	>2419.6	-	11.24	2.58
MB 05	12	31.45	>2419.6	1553.12	792.285	12	>2419.6	9.63	11.24	3.58

Chloride Concentrations in McCabe's Brook: 2014

Station No.	4/17/2014	5/5/2014	6/26/2014	7/29/2014	Maximum	Minimum	Median
MB 02	34.4	52	52.5	55	55	34.4	52.25
MB 02a	35.3	51.5	55	45.2	55	35.3	48.35
MB 03	32.3	51.5	57	48	57	32.3	49.75
MB 04	29	43.3	45.3	40	45.3	29	41.65
MB 04a	26	40.4	43.7	39.6	43.7	26	40.00
MB 05	20.4	23.3	16.9	14.2	23.3	14.2	18.65

Chloride Concentrations in McCabe's Brook: 2015

Station No.	4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Maximum	Minimum	Median
MB 02	45.3	43.62	48.49	21.91	20.24	48.49	20.24	43.62
MB 02a	40.94	42.89	29.69	20.71	19.52	42.89	19.52	29.69
MB 03	40.12	39.66	29.86	19.58	18.51	40.12	18.51	29.86
MB 04	35.9	33.75	24.53	17.59	15.6	35.9	15.6	24.53
MB 04a	33.65	32.3	23.38	17.16	15.04	33.65	15.04	23.38
MB 05	21.96	23.76	16.28	13.42	12.16	23.76	12.16	16.28

Chloride Concentrations in McCabe's Brook
2004-2015

	High	Low	Median
MB 02	84.00	14.10	37.40
MB 02a	55.00	14.50	35.60
MB 03	72.40	12.40	39.66
MB 04	299.00	11.20	35.85
MB 04a	119.00	9.94	26.40
MB 05	52.20	5.90	17.00

Solids Concentrations in McCabe's Brook - 2014

	Station No.	4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
TSS	MB 02	61	14.3	62.5	84	61.75	14.30	84.00
	MB 02a	20.3	15.9	21	38.5	20.65	15.90	38.50
	MB 03	17.7	13.9	25.4	38	21.55	13.90	38.00
	MB 04	7.67	6.27	15.3	16.3	11.49	6.27	16.30
	MB 04a	8.33	6.01	15.3	14.3	11.32	6.01	15.30
	MB 05	7.33	3.23	17.7	11	9.17	3.23	17.70
Turbidity	MB 02	43.8	16.9	46.9	75.3	45.35	16.90	75.30
	MB 02a	26.9	19	23.3	41.2	25.10	19.00	41.20
	MB 03	19.5	15.7	32.3	40.4	25.90	15.70	40.40
	MB 04	12.4	8.95	19.2	26.2	15.80	8.95	26.20
	MB 04a	12.9	8.82	19.9	24.6	16.40	8.82	24.60
	MB 05	7.37	6.13	18.7	16.6	11.99	6.13	18.70
Specific Turbidity	MB 02	0.72	1.18	0.75	0.90	0.82	0.72	1.18
	MB 02a	1.33	1.19	1.11	1.07	1.15	1.07	1.33
	MB 03	1.10	1.13	1.27	1.06	1.12	1.06	1.27
	MB 04	1.62	1.43	1.25	1.61	1.52	1.25	1.62
	MB 04a	1.55	1.47	1.30	1.72	1.51	1.30	1.72
	MB 05	1.01	1.90	1.06	1.51	1.28	1.01	1.90
PP	MB 02	100.3	254.6	85.9	180.4	140.35	85.90	254.60
	MB 02a	36.2	38.2	49	102.0	43.60	36.20	102.00
	MB 03	33	29.7	59	106.0	46.00	29.70	106.00
	MB 04	19		39	63.0	39.00	19.00	63.00
	MB 04a	19.1	22.2	42	60.0	32.10	19.10	60.00
	MB 05	16.9	10.2	30.4	39.8	23.65	10.20	39.80
PP/TSS	MB 02	1.64	17.80	1.37	2.15	1.90	1.37	17.80
	MB 02a	1.78	2.40	2.33	2.65	2.37	1.78	2.65
	MB 03	1.86	2.14	2.32	2.79	2.23	1.86	2.79
	MB 04	2.48		2.55	3.87	2.55	2.48	3.87
	MB 04a	2.29	3.69	2.75	4.20	3.22	2.29	4.20
	MB 05	2.31	3.16	1.72	3.62	2.73	1.72	3.62

Solids Concentrations in McCabe's Brook - 2015

	Station No.	4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Maximum	Minimum	Median
TSS	MB 02	180	25.2	72.67	160	44.75	180.00	25.20	72.67
	MB 02a	75.5	11.8	37.5	100.5	25.67	100.50	11.80	37.50
	MB 03	70.5	13.2	26.86	65	22	70.50	13.20	26.86
	MB 04	22	7	9.02	15	12.6	22.00	7.00	12.60
	MB 04a	22.33	8	9.33	13.5	12	22.33	8.00	12.00
	MB 05	10.2	4	5.47	24.33	8.13	24.33	4.00	8.13
Turbidity	MB 02	81.5	19.7	63	121	32.5	121.00	19.70	63.00
	MB 02a	59.2	9.77	32.4	72.4	17.2	72.40	9.77	32.40
	MB 03	63	10.3	34.5	70.6	15.3	70.60	10.30	34.50
	MB 04	24.4	7.33	13.3	20.1	11.2	24.40	7.33	13.30
	MB 04a	25.1	8.22	14.5	20.6	11.1	25.10	8.22	14.50
	MB 05	7.65	3.58	6.05	13.9	5.47	13.90	3.58	6.05
Specific Turbidity	MB 02	0.45	0.78	0.87	0.76	0.73	0.87	0.45	0.76
	MB 02a	0.78	0.83	0.86	0.72	0.67	0.86	0.67	0.78
	MB 03	0.89	0.78	1.28	1.09	0.70	1.28	0.70	0.89
	MB 04	1.11	1.05	1.47	1.34	0.89	1.47	0.89	1.11
	MB 04a	1.12	1.03	1.55	1.53	0.93	1.55	0.93	1.12
	MB 05	0.75	0.90	1.11	0.57	0.67	1.11	0.57	0.75
PP	MB 02	152.2	42.3	122.9	212.3	47.6	212.30	42.30	122.90
	MB 02a	79.1	22.3	65	148.1	35.7	148.10	22.30	65.00
	MB 03	65.4	23	78	114.8	29	114.80	23.00	65.40
	MB 04	43.6	22.5	19.9	32.9	17.2	43.60	17.20	22.50
	MB 04a	41.7	8.6	24.5	25.2		41.70	8.60	24.85
	MB 05	22.5	12	19.6	24.6	12.4	24.60	12.00	19.60
PP/TSS	MB 02	0.85	1.68	1.69	1.33	1.06	1.69	0.85	1.50
	MB 02a	1.05	1.89	1.73	1.47	1.39	1.89	1.05	1.60
	MB 03	0.93	1.74	2.90	1.77	1.32	2.90	0.93	1.75
	MB 04	1.98	3.21	2.21	2.19	1.37	3.21	1.98	2.20
	MB 04a	1.87	1.08	2.63	1.87		2.63	1.08	1.87
	MB 05	2.21	3.00	3.58	1.01	1.53	3.58	1.01	2.60

Solids Concentrations in McCabe's Brook

2004-2015

		Maximum	Minimum	Median
TSS	MB 02	124.72	2.90	12.60
	MB 02a	38.50	2.04	9.10
	MB 03	171.4	0.67	5.47
	MB 04	1440	1.06	8.34
	MB 04a	30.90	1.08	8.20
	MB 05	32.20	1.10	7.22
Turbidity	MB 02	389.00	3.58	14.00
	MB 02a	41.20	2.12	9.93
	MB 03	480	0.23	4.41
	MB 04	1770	1.19	7.01
	MB 04a	325.00	2.72	10.40
	MB 05	45.60	1.91	10.90

Phosphorus Concentrations in McCabe's Brook - 2014

	Station No.	4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
TP	MB 02	133		180	271	180	133	271
	MB 02a	71.1	59.7	167	208	119.05	59.7	208
	MB 03	70.3	52.2	196	220	133.15	52.2	220
	MB 04	56.1	50.1	181	179	117.55	50.1	181
	MB 04a	54.9	55	182	174	114.5	54.9	182
	MB 05	40.2	34.7	112	112	76.1	34.7	112
		4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
PP	MB 02	100.3		85.9	180.4	100.3	85.9	180.4
	MB 02a	36.2	38.2	49	102	43.6	36.2	102
	MB 03	33	29.7	59	106	46	29.7	106
	MB 04	19		39	63	39	19	63
	MB 04a	19.1	22.2	42	60	32.1	19.1	60
	MB 05	16.9	10.2	30.4	39.8	23.65	10.2	39.8
		4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
DP	MB 02	32.7	23.4	94.1	90.6	61.65	23.4	94.1
	MB 02a	34.9	21.5	118	106	70.45	21.5	118
	MB 03	37.3	22.5	137	114	75.65	22.5	137
	MB 04	37.1		142	116	116	37.1	142
	MB 04a	35.8	32.8	140	114	74.9	32.8	140
	MB 05	23.3	24.5	81.6	72.2	48.35	23.3	81.6
		4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
% DP	MB 02	24.59		52.28	33.43	33.4	24.59	52.28
	MB 02a	49.09	36.01	70.66	50.96	50.0	36.01	70.66
	MB 03	53.06	43.10	69.90	51.82	52.4	43.10	69.90
	MB 04	66.13		78.45	64.80	66.1	64.80	78.45
	MB 04a	65.21	59.64	76.92	65.52	65.4	59.64	76.92
	MB 05	57.96	70.61	72.86	64.46	67.5	57.96	72.86
		4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
% PP	MB 02	75.41		47.72	66.57	66.6	47.72	75.41
	MB 02a	50.91	63.99	29.34	49.04	50.0	29.34	63.99
	MB 03	46.94	56.90	30.10	48.18	47.6	30.10	56.90
	MB 04	33.87		21.55	35.20	33.9	21.55	35.20
	MB 04a	34.79	40.36	23.08	34.48	34.6	23.08	40.36
	MB 05	42.04	29.39	27.14	35.54	32.5	27.14	42.04

Phosphorus Concentrations in McCabe's Brook - 2015

	Station No.	4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Median	Minimum	Maximum
TP	MB 02	177	79.7	183	285.9	105	177	79.7	285.9
	MB 02a	108	64.9	121	228	97.3	108	64.9	228
	MB 03	92.6	70.1	143	189	91.9	92.6	70.1	189
	MB 04	73.7	71.9	91.6	115	84.3	84.3	71.9	115
	MB 04a	70.8	68.5	91	105	85.1	85.1	68.5	105
	MB 05	48.8	59.9	70.9	73.8	63.6	63.6	48.8	73.8
		4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Median	Minimum	Maximum
PP	MB 02	152.2	42.3	122.9	212.3	47.6	122.9	42.3	212.3
	MB 02a	79.1	22.3	65	148.1	35.7	65	22.3	148.1
	MB 03	65.4	23	78	114.8	29	65.4	23	114.8
	MB 04	43.6	22.5	19.9	32.9	17.2	22.5	17.2	43.6
	MB 04a	41.7	8.6	24.5	25.2		24.85	8.6	41.7
	MB 05	22.5	12	19.6	24.6	12.4	19.6	12	24.6
		4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Median	Minimum	Maximum
DP	MB 02	24.8	37.4	60.1	73.6	57.4	57.4	24.8	73.6
	MB 02a	28.9	42.6	56	79.9	61.6	56	28.9	79.9
	MB 03	27.2	47.1	65	74.2	62.9	62.9	27.2	74.2
	MB 04	30.1	49.4	71.7	82.1	67.1	67.1	30.1	82.1
	MB 04a	29.1	59.9	66.5	79.8		63.2	29.1	79.8
	MB 05	26.3	47.9	51.3	49.2	51.2	49.2	26.3	51.3
		4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Median	Minimum	Maximum
% DP	MB 02	14.01	46.93	32.84	25.74	54.67	32.8	14.01	54.67
	MB 02a	26.76	65.64	46.28	35.04	63.31	46.3	26.76	65.64
	MB 03	29.37	67.19	45.45	39.26	68.44	45.5	29.37	68.44
	MB 04	40.84	68.71	78.28	71.39	79.60	71.4	40.84	79.60
	MB 04a	41.10	87.45	73.08	76.00	0.00	73.1	0.00	87.45
	MB 05	53.89	79.97	72.36	66.67	80.50	72.4	53.89	80.50
		4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Median	Minimum	Maximum
% PP	MB 02	85.99	53.07	67.16	74.26	45.33	67.2	45.33	85.99
	MB 02a	73.24	34.36	53.72	64.96	36.69	53.7	34.36	73.24
	MB 03	70.63	32.81	54.55	60.74	31.56	54.5	31.56	70.63
	MB 04	59.16	31.29	21.72	28.61	20.40	28.6	20.40	59.16
	MB 04a	58.90	12.55	26.92	24.00		25.5	12.55	58.90
	MB 05	46.11	20.03	27.64	33.33	19.50	27.6	19.50	46.11

Phosphorus Concentrations in McCabe's Brook
2004-2015

TP 2004-2015		Maximum	Minimum	Median
	MB 02	364	26	81.6
	MB 02a	228	21.6	70.45
	MB 03	500	22.1	55.45
	MB 04	987	22.9	78.1
	MB 04a	354	26.3	92.9
	MB 05	266	20.9	72.25

PP 2006-2015		Maximum	Minimum	Median
	MB 02	304.3	10.6	52.6
	MB 02a	148.1	3.9	32.75
	MB 03	261.5	-1.5	23.9
	MB 04	868	8.3	27.5
	MB 04a	263.7	7.8	41.7
	MB 05	193.6	9.8	29.9

DP 2006-2015		Maximum	Minimum	Median
	MB 02	143	12.7	37.6
	MB 02a	119	17.7	44
	MB 03	137	19	42.3
	MB 04	161	8.57	58.6
	MB 04a	224	20	58.7
	MB 05	198	16.6	39.7

Nitrogen Concentrations in McCabe's Brook - 2014

	Station No.	4/17/2014	5/5/2014	6/26/2014	7/29/2014	Median	Minimum	Maximum
TN	MB 02	0.68	0.45	2.61	5.69	1.65	0.45	5.69
	MB 02a	0.55	0.4	3.55	6.05	2.05	0.4	6.05
	MB 03	0.57	0.46	3.85	6.23	2.21	0.46	6.23
	MB 04	0.54	0.43	3.81	5.76	2.18	0.43	5.76
	MB 04a	0.54	0.44	3.91	5.7	2.23	0.44	5.7
	MB 05	0.39	0.39	0.84	0.99	0.62	0.39	0.99
NOx	MB 02	0.25	<0.05	1.58	4.41	0.92	<0.05	4.41
	MB 02a	0.16	<0.05	2.5	4.78	1.33	<0.05	4.78
	MB 03	0.13	<0.05	2.52	4.99	1.33	<0.05	4.99
	MB 04	0.09	<0.05	2.46	4.47	1.28	<0.05	4.47
	MB 04a	0.09	<0.05	2.52	4.53	1.31	<0.05	4.53
	MB 05	<0.05	<0.05	0.05	0.05	0.05	<0.05	0.05

Nitrogen Concentrations in McCabe's Brook - 2015

	Station No.	4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Maximum	Minimum	Median
TN	MB 02	0.87	0.6	0.91	0.66	0.67	0.91	0.6	0.67
	MB 02a	0.78	0.57	0.87	0.68	0.65	0.87	0.57	0.68
	MB 03	0.74	0.63	0.84	0.81	0.65	0.84	0.63	0.74
	MB 04	0.76	0.65	0.86	0.86	0.67	0.86	0.65	0.76
	MB 04a	0.76	0.66	0.87	0.88	0.69	0.88	0.66	0.76
	MB 05	0.54	0.62	0.59	0.68	0.68	0.68	0.54	0.62

		4/22/2015	5/13/2015	6/2/2015	6/10/2015	7/2/2015	Maximum	Minimum	Median
NOx	MB 02	0.18	0.07	0.22	0.14	<0.05	0.22	<0.05	0.16
	MB 02a	0.15	<0.05	0.19	0.1	<0.05	0.19	<0.05	0.10
	MB 03	0.16	<0.05	0.17	0.06	<0.05	0.17	<0.05	0.06
	MB 04	0.15	<0.05	0.17	0.05	<0.05	0.17	<0.05	0.05
	MB 04a	0.15	<0.05	0.17	0.06	<0.05	0.17	<0.05	0.06
	MB 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Nitrogen Concentrations in McCabe's Brook, 2004-2015

		Maximum	Low	Median
TN 2004-2015	MB 02	6.99	0.26	0.55
	MB 02a	6.05	0.26	0.56
	MB 03	10.2	0.29	0.54
	MB 04	10.9	0.36	0.68
	MB 04a	10.8	0.38	0.75
	MB 05	3.91	0.35	0.69

		Maximum	Low	Median
NOx 2004-2015	MB 02	5	<0.05	0.08
	MB 02a	4.78	<0.05	0.08
	MB 03	7.8	<0.05	0.08
	MB 04	8.35	<0.05	<0.05
	MB 04a	8.24	<0.05	<0.05
	MB 05	2.43	<0.05	<0.05

ANNEX III. Quality Assurance

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Chloride	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	20.4	mg/L	0.6000	0.6000	20.1000	2.9851
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	19.8	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	18.5	mg/L	-0.7000	0.7000	18.8500	3.7135
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	19.2	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	40.4	mg/L	-0.3000	0.3000	40.5500	0.7398
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	40.7	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	23.3	mg/L	0.5000	0.5000	23.0500	2.1692
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	22.8	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	21.4	mg/L	-0.1000	0.1000	21.4500	0.4662
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	21.5	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	57	mg/L	3.0000	3.0000	55.5000	5.4054
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	54	mg/L				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	17.8	mg/L	0.0000	0.0000	17.8000	0.0000
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	17.8	mg/L				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	35.8	mg/L	0.4000	0.4000	35.6000	1.1236
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	35.4	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	48	mg/L	0.0000	0.0000	48.0000	0.0000
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	48	mg/L				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	23.4	mg/L	-0.3000	0.3000	23.5500	1.2739
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	23.7	mg/L				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	31.5	mg/L	1.2000	1.2000	30.9000	3.8835
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	30.3	mg/L				

Mean	1.98
Target	10%

Total N	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	0.39	mg/L	0.0000	0.0000	0.3900	0.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	0.39	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	0.59	mg/L	-0.0200	0.0200	0.6000	3.3333
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	0.61	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	0.44	mg/L	0.0000	0.0000	0.4400	0.0000
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	0.44	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	0.39	mg/L	0.0200	0.0200	0.3800	5.2632
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	0.37	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	0.38	mg/L	-0.0200	0.0200	0.3900	5.1282
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	0.4	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	3.85	mg/L	0.0000	0.0000	3.8500	0.0000
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	3.85	mg/L				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	0.98	mg/L	-0.0500	0.0500	1.0050	4.9751
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	1.03	mg/L				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	1.47	mg/L	0.0400	0.0400	1.4500	2.7586
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	1.43	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	6.23	mg/L	-0.1100	0.1100	6.2850	1.7502
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	6.34	mg/L				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	1.5	mg/L	-0.1000	0.1000	1.5500	6.4516
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	1.6	mg/L				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	2.71	mg/L	-0.0600	0.0600	2.7400	2.1898
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	2.77	mg/L				

Mean	2.90
Target	15%

NOx	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	0.05	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	0.18	mg/L	-0.0300	0.0300	0.1950	15.3846
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	0.21	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	0.05	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	0.05	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	0.09	mg/L	0.0000	0.0000	0.0900	0.0000
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	0.09	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	2.52	mg/L	0.0000	0.0000	2.5200	0.0000
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	2.52	mg/L				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	0.15	mg/L	-0.0200	0.0200	0.1600	12.5000
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	0.17	mg/L				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	0.75	mg/L	0.0000	0.0000	0.7500	0.0000
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	0.75	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	4.99	mg/L	0.0000	0.0000	4.9900	0.0000
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	4.99	mg/L				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	0.44	mg/L	-0.0100	0.0100	0.4450	2.2472
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	0.45	mg/L				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	1.49	mg/L	0.0000	0.0000	1.4900	0.0000
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	1.49	mg/L				

Mean	2.74
Target	10%

Total P	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	104	µg P/L	-25.0000	25.0000	116.5000	21.4592
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	129	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	40.2	µg P/L	0.9000	0.9000	39.7500	2.2642
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	39.3	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	34.7	µg P/L	-0.2000	0.2000	34.8000	0.5747
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	34.9	µg P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	55	µg P/L	6.7000	6.7000	51.6500	12.9719
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	48.3	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	46.5	µg P/L	1.5000	1.5000	45.7500	3.2787
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	45	µg P/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	196	µg P/L	1.0000	1.0000	195.5000	0.5115
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	195	µg P/L				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	149	µg P/L	-3.0000	3.0000	150.5000	1.9934
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	152	µg P/L				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	140	µg P/L	-4.0000	4.0000	142.0000	2.8169
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	144	µg P/L				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	220	µg P/L	-2.0000	2.0000	221.0000	0.9050
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	222	µg P/L				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	184	µg P/L	-3.0000	3.0000	185.5000	1.6173
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	187	µg P/L				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	151	µg P/L	-1.0000	1.0000	151.5000	0.6601
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	152	µg P/L				
	K02 - Kimball Brook at Greenbush Road	7/29/2014	162	ug P/L	-1.0000	1.0000	162.5000	0.6154
	K02 DUP - Kimball Brook at Greenbush Road	7/29/2014	163	ug P/L				

Mean	4.14
Target	15%

Dissolved P	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	23.3	µg P/L	-0.4000	0.4000	23.5000	1.7021
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	23.7	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	24.4	µg P/L	0.6000	0.6000	24.1000	2.4896
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	23.8	µg P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	32.8	µg P/L	-0.1000	0.1000	32.8500	0.3044
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	32.9	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	19.2	µg P/L	-0.4000	0.4000	19.4000	2.0619
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	19.6	µg P/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	137	µg P/L	-2.0000	2.0000	138.0000	1.4493
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	139	µg P/L				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	79.2	µg P/L	-4.6000	4.6000	81.5000	5.6442
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	83.8	µg P/L				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	63.1	µg P/L	1.8000	1.8000	62.2000	2.8939
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	61.3	µg P/L				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	68.3	µg P/L	2.4000	2.4000	67.1000	3.5768
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	65.9	µg P/L				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	114	µg P/L	0.0000	0.0000	114.0000	0.0000
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	114	µg P/L				
	K02 - Kimball Brook at Greenbush Road	7/29/2014	108	ug P/L	-4.0000	4.0000	110.0000	3.6364
	K02 DUP - Kimball Brook at Greenbush Road	7/29/2014	112	ug P/L				

Mean	2.38
Target	15%

TSS	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	31.7	mg/L	-2.3000	2.3000	32.8500	7.0015
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	34	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	7.33	mg/L	0.3300	0.3300	7.1650	4.6057
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	7	mg/L				
	MB 04 - McCabes Brook at Route 7	5/5/2014	6.27	mg/L	-0.1000	0.1000	6.3200	1.5823
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	6.37	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	3.23	mg/L	0.2700	0.2700	3.0950	8.7237
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	2.96	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	13.2	mg/L	-0.8000	0.8000	13.6000	5.8824
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	14	mg/L				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	25.4	mg/l	-2.3000	2.3000	26.5500	8.6629
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	27.7	mg/l				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	49	mg/l	-5.7000	5.7000	51.8500	10.9932
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	54.7	mg/l				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	70	mg/l	-2.3000	2.3000	71.1500	3.2326
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	72.3	mg/l				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	38	mg/l	0.0000	0.0000	38.0000	0.0000
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	38	mg/l				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	67	mg/l	-5.0000	5.0000	69.5000	7.1942
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	72	mg/l				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	63	mg/l	3.0000	3.0000	61.5000	4.8780
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	60	mg/l				

Mean	5.71
Target	15%

Turbidity	MB 05 - McCabes Brook at Lime Kiln Road	4/17/2014	7.37	NTU	-0.1200	0.1200	7.4300	1.6151
	MB 05 DUP - McCabes Brook at Lime Kiln Road	4/17/2014	7.49	NTU				
	LP 05 - LaPlatte River at Carpenter Road	4/17/2014	31.9	NTU	0.0000	0.0000	31.9000	0.0000
	LP 05 Dup - LaPlatte River at Carpenter Road	4/17/2014	31.9	NTU				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	8.82	NTU	-0.0300	0.0300	8.8350	0.3396
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	8.85	NTU				
	LP 05 - LaPlatte River at Carpenter Road	5/5/2014	12.9	NTU	-1.0000	1.0000	13.4000	7.4627
	LP 05 DUP - LaPlatte River at Carpenter Road	5/5/2014	13.9	NTU				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	32.3	NTU	4.2000	4.2000	30.2000	13.9073
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	28.1	NTU				
	LP 03 - LaPlatte River at Falls Road	6/26/2014	46.3	NTU	-1.9000	1.9000	47.2500	4.0212
	LP 03 - DUP - LaPlatte River at Falls Road	6/26/2014	48.2	NTU				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	74	NTU	-0.6000	0.6000	74.3000	0.8075
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	74.6	NTU				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	40.4	NTU	-4.7000	4.7000	42.7500	10.9942
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	45.1	NTU				
	LP 03 - LaPlatte River at Falls Road	7/29/2014	67.2	NTU	-4.2000	4.2000	69.3000	6.0606
	LP 03 DUP - LaPlatte River at Falls Road	7/29/2014	71.4	NTU				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	75.8	NTU	1.0000	1.0000	75.3000	1.3280
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	74.8	NTU				

Mean	2.49
Target	15%

E. coli	MB 04a - McCabes Brooka tTeddy Bear Access Road	4/17/2014	6	MPN/100 ml	-13.0000	13.0000	12.5000	104.0000
	MB 04a DUP - McCabes Brook at Teddy Bear Access R	4/17/2014	19	MPN/100 ml				
	MB 04a - McCabes Brook at Teddy Bear Access Road	5/5/2014	60	MPN/100 ml	5.0000	5.0000	57.5000	8.6957
	MB 04a DUP - McCabes Brook at Teddy Bear Access Ro	5/5/2014	55	MPN/100 ml				
	MB 05 - McCabes Brook at Lime Kiln Road	5/5/2014	31	MPN/100 ml	8.0000	8.0000	27.0000	29.6296
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/5/2014	23	MPN/100 ml				
	MB 03 - McCabes Brook at Bostwick Road	6/26/2014	2419.6	MPN/100 ml	0.0000	0.0000	2419.6000	0.0000
	MB 03 DUP - McCabes Brook at Bostwick Road	6/26/2014	2419.6	MPN/100 ml				
	T 01 - Thorp Brook at Greenbush Road	6/26/2014	2419.6	MPN/100 ml	0.0000	0.0000	2419.6000	0.0000
	T 01 DUP - Thorp Brook at Greenbush Road	6/26/2014	2419.6	MPN/100 ml				
	MB 03 - McCabes Brook at Bostwick Road	7/29/2014	2419.6	MPN/100 ml	0.0000	0.0000	2419.6000	0.0000
	MB 03 DUP - McCabes Brooka t Bostwick Road	7/29/2014	2419.6	MPN/100 ml				
	T01 - Thorp Brook at Greenbush Road	7/29/2014	2419.6	MPN/100 ml	0.0000	0.0000	2419.6000	0.0000
	T01 DUP - Thorp Brook at Greenbush Road	7/29/2014	2419.6	MPN/100 ml				

Mean	23.72
Target	100%

Sampling Targets

	No. of Stations	Date	No. of Stations Sampled	Chloride	Turbidity	TSS	Total P	DP	TN	NOx	*E. coli*
No. Scheduled	66		66	66	66	66	66	66	66	66	32
	11	4/17/2014	11	11	11	11	11	11	11	11	6
	11	5/5/2014	11	11	11	11	10	8	11	11	8
	11	6/26/2014	11	11	11	11	11	11	11	11	8
	11	7/29/2014	11	11	11	11	11	11	11	11	8
Total No. of Stations	44		44	44	44	44	43	41	44	44	30
Percent	66.67		66.67	66.67	66.67	66.67	65.15	62.12	66.67	66.67	93.75
Target Percent				≥80%	≥80%	≥80%	≥80%	≥80%	≥80%	≥80%	≥80%

Summary of Blanks

	Chloride	TSS	Turbidity	TP	DP	TN	NOx	*E. coli*
4/17/2014	<2	<1	<0.2	<5	5.25	<0.1	<0.05	-
5/5/2014	-	-	-	-	-	-	-	-
6/26/2014	<2	<1	<0.2	<5	9.91	<0.1	<0.05	<1
7/29/2014	<2	<1	0.2	-	-	<0.1	<0.05	-

Summary of Duplicates

	Chloride	TSS	Turbidity	TP	DP	TN	NOx	*E. coli*
Number of Duplicates	11	11	10	12	10	11	11	7
Percent of Total	20.0	20.0	18.5	21.8	19.6	20.0	20.0	18.9
Target Percent	10%	10%	10%	10%	10%	10%	10%	10%

Summary of RPD Results

	Chloride	Turbidity	TSS	Total P	Diss. P	Total N	NOx	E. coli
Mean RPD	1.98	2.49	5.71	4.14	2.38	7.28	2.74	23.72
Target Precision	10%	15%	15%	15%	15%	15%	10%	100%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Chloride	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	40.12	mg/L	-0.0200	0.0200	40.1300	0.0498
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	40.14	mg/L				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	21.37	mg/L	1.5700	1.5700	20.5850	7.6269
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	19.8	mg/L				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	45.09	mg/L	-0.3000	0.3000	45.2400	0.6631
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	45.39	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	32.3	mg/L	0.0800	0.0800	32.2600	0.2480
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	32.22	mg/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	35.54	mg/L	14.9600	14.9600	28.0600	53.3143
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	20.58	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	23.38	mg/L	0.3200	0.3200	23.2200	1.3781
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	23.06	mg/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	23.83	mg/L	0.3700	0.3700	23.6450	1.5648
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	23.46	mg/L				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	21.91	mg/L	0.3800	0.3800	21.7200	1.7495
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	21.53	mg/L				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	20.24	mg/L	0.1900	0.1900	20.1450	0.9432
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	20.05	mg/L				

Mean	7.50
Target	10%

Total P	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	92.6	ug P/L	2.5000	2.5000	91.3500	2.7367
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	90.1	ug P/L				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	147	ug P/L	-3.0000	3.0000	148.5000	2.0202
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	150	ug P/L				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	184	ug P/L	-2.0000	2.0000	185.0000	1.0811
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	186	ug P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	68.5	ug P/L	0.4000	0.4000	68.3000	0.5857
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	68.1	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	47.9	ug P/L	4.4000	4.4000	45.7000	9.6280
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	43.5	ug P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	91	ug P/L	-3.9000	3.9000	92.9500	4.1958
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	94.9	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	56.7	ug P/L	-0.2000	0.2000	56.8000	0.3521
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	56.9	ug P/L				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	285.9	ug P/L	-7.2000	7.2000	289.5000	2.4870
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	293.1	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/10/2015	167	ug P/L	7.0000	7.0000	163.5000	4.2813
	LP 09 DUP - LaPlatte River above Hinesburg STP Out	6/10/2015	160	ug P/L				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	105	ug P/L	-20.0000	20.0000	115.0000	17.3913
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	125	ug P/L				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	57	ug P/L	4.9000	4.9000	54.5500	8.9826
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	52.1	ug P/L				

Mean	4.89
Target	15%

Dissolved P	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	27.2	ug P/L	-1.6000	1.6000	28.0000	5.7143
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	28.8	ug P/L				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	28.5	ug P/L	-2.6000	2.6000	29.8000	8.7248
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	31.1	ug P/L				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	17	ug P/L	0.8000	0.8000	16.6000	4.8193
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	16.2	ug P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	68.5	ug P/L	0.4000	0.4000	68.3000	0.5857
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	68.1	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	47.9	ug P/L	4.4000	4.4000	45.7000	9.6280
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	43.5	ug P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	66.5	ug P/L	0.3000	0.3000	66.3500	0.4521
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	66.2	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	15.6	ug P/L	-8.0000	8.0000	19.6000	40.8163
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	23.6	ug P/L				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	73.6	ug P/L	0.4000	0.4000	73.4000	0.5450
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	73.2	ug P/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/10/2015	141	ug P/L	1.0000	1.0000	140.5000	0.7117
	LP 09 DUP - LaPlatte River above Hinesburg STP Out	6/10/2015	140	ug P/L				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	57.4	ug P/L	-1.3000	1.3000	58.0500	2.2394
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	58.7	ug P/L				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	28	ug P/L	1.2000	1.2000	27.4000	4.3796
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	26.8	ug P/L				

Mean	7.15
Target	15%

Total N	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	0.74	mg/L	0.0000	0.0000	0.7400	0.0000
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	0.74	mg/L				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	0.79	mg/L	0.0000	0.0000	0.7900	0.0000
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	0.79	mg/L				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	0.91	mg/L	-0.0100	0.0100	0.9150	1.0929
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	0.92	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	0.66	mg/L	0.0100	0.0100	0.6550	1.5267
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	0.65	mg/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	0.4	mg/L	0.0000	0.0000	0.4000	0.0000
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	0.4	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	0.87	mg/L	-0.0100	0.0100	0.8750	1.1429
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	0.88	mg/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	0.5	mg/L	0.0300	0.0300	0.4850	6.1856
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	0.47	mg/L				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	0.66	mg/L	-0.2400	0.2400	0.7800	30.7692
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	0.9	mg/L				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/10/2015	0.89	mg/L	0.0100	0.0100	0.8850	1.1299
	LP 09 DUP - LaPlatte River above Hinesburg STP Out	6/10/2015	0.88	mg/L				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	0.67	mg/L	0.0100	0.0100	0.6650	1.5038
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	0.66	mg/L				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	0.41	mg/L	0.0100	0.0100	0.4050	2.4691
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	0.4	mg/L				

Mean	4.17
Target	15%

NOx	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	0.16	mg-N/l	0.0300	0.0300	0.1450	20.6897
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	0.13	mg-N/l				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	0.18	mg-N/l	-0.0300	0.0300	0.1950	15.3846
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	0.21	mg-N/l				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	0.45	mg-N/l	0.0000	0.0000	0.4500	0.0000
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	0.45	mg-N/l				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	0.05	mg-N/l	0.0000	0.0000	0.0500	0.0000
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	0.05	mg-N/l				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	0.09	mg-N/l	0.0000	0.0000	0.0900	0.0000
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	0.09	mg-N/l				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	0.17	mg-N/l	0.0000	0.0000	0.1700	0.0000
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	0.17	mg-N/l				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	0.08	mg-N/l	0.0000	0.0000	0.0800	0.0000
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	0.08	mg-N/l				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	0.14	mg-N/l	0.0000	0.0000	0.1400	0.0000
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	0.14	mg-N/l				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/10/2015	0.05	mg-N/l	0.0000	0.0000	0.0500	0.0000
	LP 09 DUP - LaPlatte River above Hinesburg STP Out	6/10/2015	0.05	mg-N/l				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	0.05	mg-N/l	0.0000	0.0000	0.0500	0.0000
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	0.05	mg-N/l				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	0.05	mg-N/l	0.0000	0.0000	0.0500	0.0000
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	0.05	mg-N/l				

Mean	3.28
Target	10%

TSS	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	70.5	mg/l	-11.0000	11.0000	76.0000	14.4737
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	81.5	mg/l				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	70	mg/l	-6.5000	6.5000	73.2500	8.8737
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	76.5	mg/l				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	146	mg/l	-3.0000	3.0000	147.5000	2.0339
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	149	mg/l				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	8	mg/l	1.2000	1.2000	7.4000	16.2162
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	6.8	mg/l				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	16.6	mg/l	-0.4000	0.4000	16.8000	2.3810
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	17	mg/l				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	9.33	mg/l	-4.0000	4.0000	11.3300	35.3045
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	13.33	mg/l				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	13.79	mg/l	-0.9600	0.9600	14.2700	6.7274
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	14.75	mg/l				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	160	mg/l	10.0000	10.0000	155.0000	6.4516
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	150	mg/l				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	44.75	mg/l	2.5500	2.5500	43.4750	5.8654
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	42.2	mg/l				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	19.6	mg/l	1.0000	1.0000	19.1000	5.2356
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	18.6	mg/l				

Mean	23.97
Target	15%

Turbidity	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	63	NTU	2.2000	2.2000	61.9000	3.5541
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	60.8	NTU				
	LP 03 - LaPlatte River at Falls Road	4/22/2015	58.5	NTU	-0.4000	0.4000	58.7000	0.6814
	LP 03 - DUP - LaPlatte River at Falls Road	4/22/2015	58.9	NTU				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	175	NTU	-14.8000	14.8000	182.4000	8.1140
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	189.8	NTU				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	8.22	NTU	0.2400	0.2400	8.1000	2.9630
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	7.98	NTU				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	5/13/2015	11.9	NTU	0.4000	0.4000	11.7000	3.4188
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	5/13/2015	11.5	NTU				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	14.5	NTU	3.9000	3.9000	12.5500	31.0757
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	10.6	NTU				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/2/2015	9.24	NTU	-0.4500	0.4500	9.4650	4.7544
	LP 09 DUP - LaPlatte R above Hinesburg STP Outfall	6/2/2015	9.69	NTU				
	MB 02 - McCabes Brook at Harbor Road	6/10/2015	121	NTU	9.8000	9.8000	116.1000	8.4410
	MB 02 DUP - McCabes Brook at Harbor Road	6/10/2015	111.2	NTU				
	LP 09 - LaPlatte River above Hinesburg STP Outfall	6/10/2015	12.2	NTU	0.2000	0.2000	12.1000	1.6529
	LP 09 DUP - LaPlatte River above Hinesburg STP Out	6/10/2015	12	NTU				
	MB 02 - McCabes Brook at Harbor Road	7/2/2015	32.5	NTU	-0.1000	0.1000	32.5500	0.3072
	MB 02 DUP - McCabes Brook at Harbor Road	7/2/2015	32.6	NTU				
	LP09 - laPlatte River above Hinesburg STP Outfall	7/2/2015	8.95	NTU	0.0700	0.0700	8.9150	0.7852
	LP09 DUP - LaPlatte River above Hinesburg STP Outf	7/2/2015	8.88	NTU				

Mean	5.98
Target	15%

E. coli	MB 03 - McCabes Brook at Bostwick Road	4/22/2015	47.11	mpn/100ml	-2.4800	2.4800	48.3500	5.1293
	MB 03 DUP - McCabes Brook at Bostwick Road	4/22/2015	49.59	mpn/100ml				
	T 01 - Thorp Brook at Greenbush Road	4/22/2015	198.9	mpn/100ml	-73.4000	73.4000	235.6000	31.1545
	T 01 DUP - Thorp Brook at Greenbush Road	4/22/2015	272.3	mpn/100ml				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	5/13/2015	141.37	mpn/100ml	-54.2200	54.2200	168.4800	32.1819
	MB 04a DUP - McCabes Brook at Teddy Bear Access Rd	5/13/2015	195.59	mpn/100ml				
	MB 04a - McCabes Brook at Teddy Bear Access Rd	6/2/2015	524.73	mpn/100ml	-161.9400	161.9400	605.7000	26.7360
	MB 04a CUP - McCabes Brook at Teddy Bear Access Rd	6/2/2015	686.67	mpn/100ml				

Mean	23.80
Target	100%

Sampling Targets

	No. of Stations	Date	No. of Stations Sampled	Chloride	Turbidity	TSS	Total P	DP	TN	NOx	*E. coli*
No. Scheduled	66		55	66	66	66	66	66	66	66	48
	11	4/22/2015	11	11	11	11	11	11	11	11	6
	11	5/13/2015	11	12	11	11	11	10	11	11	5
	11	6/2/2015	11	11	11	11	11	11	11	11	8
	11	6/10/2015	11	11	11	11	11	11	11	11	-
	11	7/2/2015	11	11	11	11	11	9	11	11	-
Total No. of Stations	55		55	56	55	55	55	52	55	55	19
Percent	83.33		100.00	84.85	83.33	83.33	83.33	78.79	83.33	83.33	39.58
Target Percent				≥80%	≥80%	≥80%	≥80%	≥80%	≥80%	≥80%	≥80%

Summary of Blanks

	Chloride	TSS	Turbidity	TP	DP	TN	NOx	*E. coli*
4/22/2015	<2 mg/l	<1 mg/l	<0.2 NTU	<5 ug/l	<5 ug/l	<0.1 mg/l	<0.05 mg/l	<1
5/13/2015	<2 mg/l	<1 mg/l	<0.2 NTU	<5 ug/l	10.7 ug/l	<0.1 mg/l	<0.05 mg/l	-
6/2/2015	<2 mg/l	<1 mg/l	<0.2 NTU	<5 ug/l	<5 ug/l	<0.1 mg/l	<0.05 mg/l	-
6/10/2015	<2 mg/l	<1 mg/l	<0.2 NTU	<5 ug/l	<5 ug/l	<0.1 mg/l	<0.05 mg/l	-
7/2/2015	<2 mg/l	<1 mg/l	<0.2 NTU	<5 ug/l	<5 ug/l	<0.1 mg/l	<0.05 mg/l	-

Summary of Duplicates

	Chloride	TSS	Turbidity	TP	DP	TN	NOx	*E. coli*
Number of Duplicates	9	11	11	11	11	11	11	4
Percent of Total	75.0	50.0	50.0	50.0	52.4	50.0	50.0	44.4
Target Percent	10%	10%	10%	10%	10%	10%	10%	10%

Summary of RPD Results

	Chloride	Turbidity	TSS	Total P	Diss. P	Total N	NOx	*E. coli*
Mean RPD	1.26	5.98	23.97	4.89	7.15	4.17	3.28	23.80
Target Precision	10%	15%	15%	15%	15%	15%	10%	100%

ANNEX IV

Nutrient and Sediment Loadings

Nutrient and Sediment Loading Rates in McCabe's Brook at Harbor Road

Date	Flow (cfs)	Flow per mi^2	TP Load ($kg/day/mi^2$)	PP Load ($kg/day/mi^2$)	DP Load ($kg/day/mi^2$)	TN Load ($kg/day/mi^2$)	TSS Load ($kg/day/mi^2$)
27-May-13	23.77	5.20	1.49	0.99	0.50	6.75	506.63
4-Aug-10	14.44	3.16	1.73	1.35	0.38	6.42	904.49
29-Jul-14	8.04	1.76	1.17	0.78	0.39	24.50	361.63
1-Jun-11	7.43	1.63	0.33	0.04	0.29	3.22	92.65
14-Nov-12	6.04	1.32	0.75	0.29	0.46		77.61
26-Jun-14	5.58	1.22	0.54	0.26	0.28	7.79	186.60
8-Oct-12	4.89	1.07	0.16	0.06	0.10	1.26	18.85
22-Oct-12	4.81	1.05	0.18	0.05	0.13	1.36	23.18
9-Jul-13	4.71	1.03	0.20	0.09	0.11	1.36	32.28
5-May-14	3.69	0.81	0.55	0.50	0.05	0.89	28.23
4-Nov-10	3.20	0.70	0.07	0.03	0.04	0.70	16.63
26-Oct-11	3.20	0.70	0.09	0.04	0.05	0.84	9.77
13-Sep-13	2.78	0.61	0.16	0.10	0.06	0.95	43.51
30-May-12	1.86	0.41	0.04	0.02	0.02	0.45	12.05
8-Oct-13	1.34	0.29	0.06	0.03	0.03	0.35	12.90
6-Oct-10	1.23	0.27	0.05	0.02	0.03	0.41	11.87
13-Jul-11	1.11	0.24	0.04	0.02	0.02	0.29	9.51
28-Jun-12	0.99	0.22	0.03	0.02	0.01	0.29	5.67
3-Sep-13	0.57	0.12	0.03	0.02	0.01	0.15	5.25
7-Jul-10	0.41	0.09	0.02			0.15	6.25
1-Sep-10	0.41	0.09	0.02	0.01	0.01	0.11	4.53
3-Aug-11	0.07	0.02	0.00	0.00	0.00	0.02	0.87

Nutrient and Sediment Loading Rates in McCabe's Brook at Vermont Teddy Bear

	Flow (cfs)	Flow per mi^2	TP Load ($kg/day/mi^2$)	PP Load ($kg/day/mi^2$)	DP Load ($kg/day/mi^2$)	TN Load ($kg/day/mi^2$)	TSS Load ($kg/day/mi^2$)
27-May-13	22.15	7.08	2.70	1.31	1.39	8.83	140.22
14-Nov-12	5.41	1.73	0.71	0.19	0.52	5.16	40.60
1-Jun-11	5.09	1.63	0.53	0.14	0.39	3.78	31.34
22-Oct-12	3.28	1.05	0.20	0.04	0.16	1.60	19.49
8-Oct-12	3.25	1.04	0.28	0.06	0.22	2.00	15.93
26-Oct-11	2.80	0.89	0.18	0.06	0.12	1.49	9.63
13-Sep-13	2.55	0.81	0.43	0.16	0.24	2.99	49.81
9-Jul-13	1.91	0.61	0.23	0.12	0.12	1.15	34.72
8-Oct-13	1.89	0.60	0.23	0.14	0.10	1.26	33.43
28-Jun-12	0.85	0.27	0.02	0.05	0.01	0.12	12.89
6-Oct-10	0.77	0.25	0.05	0.01	0.04	0.46	3.77
4-Aug-10	0.58	0.19					
3-Sep-13	0.44	0.14	0.02	0.03	0.03	0.32	8.17
13-Jul-11	0.37	0.12	0.06	0.03	0.04	0.56	0.44
7-Jul-10	0.23	0.07	0.03	0.02	0.01	0.18	4.62
30-May-12	0.15	0.05	0.09	0.01	0.04	0.58	1.64
1-Sep-10	0.13	0.04	0.01	0.01	0.01	0.08	0.33