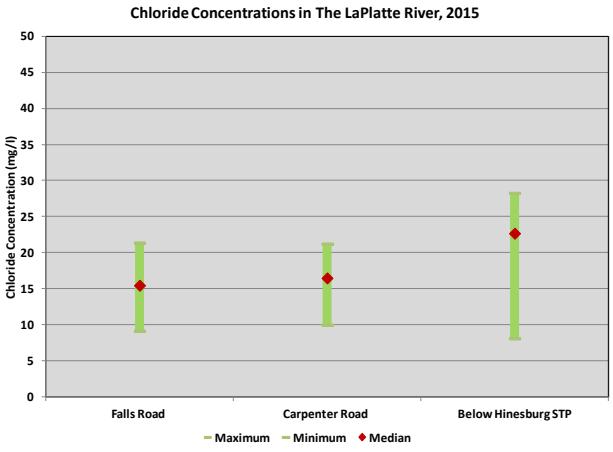
LaPlatte River Watershed
2015 Water Quality Summary
South Chittenden River Watch

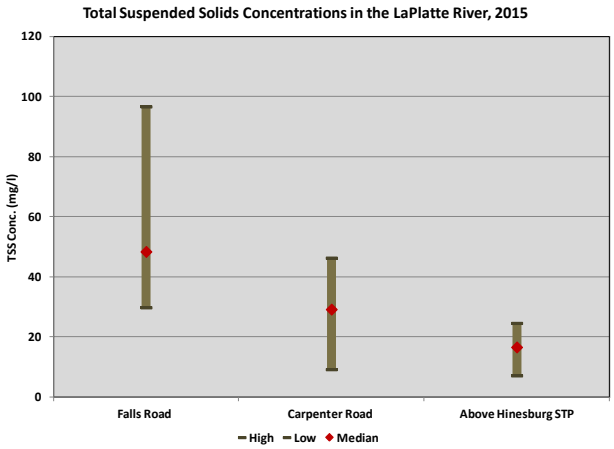
Water quality monitoring in 2015 took place at three "sentinel" stations in the LaPlatte River on six dates between April and October to monitor long-term water quality trends at a sub-watershed scale in the LaPlatte watershed system. The VT DEC LaRosa Program performed all lab services, and worked with SCRW to ensure that all work was in accordance with a joint EPA approved Quality Assurance Plan. All QA approved data were entered into the State and EPA Storet database. All South Chittenden River Watch sampling dates were considered high flow (greater than 75 cubic feet per second) except for the last sampling date in October, which was moderate flow. Sampling dates were determined based on weather forecasts and rainfall at the Shelburne Wastewater Treatment Facility and the USGS gaging station at Falls Road (LP3). Sampling station locations are at Falls Road in Shelburne (furthest downstream), Carpenter Road in Charlotte, and just upstream from the Hinesburg sewage treatment plant in Hinesburg (furthest upstream).

High flows have been targeted in recent years for several reasons. First, high flow events lead to the bulk of sediment and nutrient loading in Shelburne Bay and Lake Champlain. Second, sampling at only high flow events over multiple years makes for results that are more comparable. Third, high flows enhance the sensitivity of results to impacts affecting water quality and specific characteristics of the watershed that may benefit from more optimal management practices. Lastly, high flow events provide more complete data on the influence of upstream flow on the entire stream, whereas low and moderate flows are highly variable and are therefore not an accurate depiction of the whole system. It is important to note that water quality results taken at high flow rates are not comparable to results from prior to 2014 taken at random flow rates.

Chloride levels in the LaPlatte River were consistently low during 2014 and 2015. Chloride occurs in animal waste and road salts. A stream with natural levels of chloride that is unaffected by outside sources will range between 10 and 20 mg/l of chloride. The main source of chloride observed in the LaPlatte River is discharge from the Hinesburg wastewater treatment plant. Historically, the chloride concentrations would steadily get diluted downstream in low flow events. In 2015 when only high flow rates were sampled, the chloride concentrations were close to background levels, and did not reflect the historic pattern. This shift in monitoring methods makes measuring chloride less valuable, and should be dropped when targeting high flows.

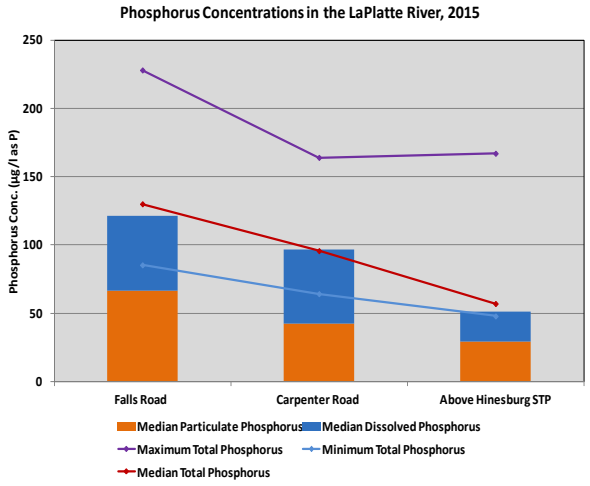


Suspended Sediment levels were high in 2014 and higher in 2015 when flows greater than 75 cfs likely increased erosion and bottom scour. Both total suspended sediment and turbidity levels were monitored.



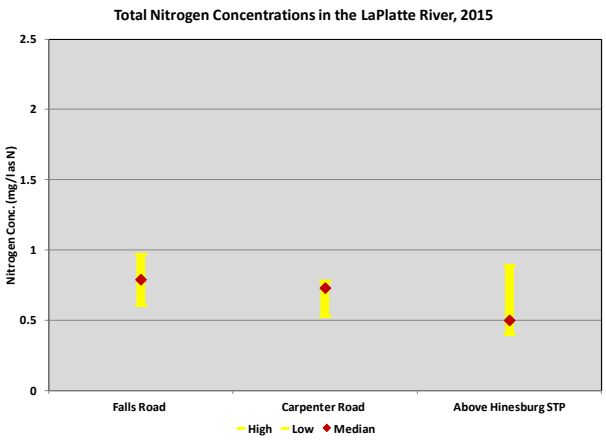
Since flows exceeded the "critical" level (>75cfs), bottom sediment was mobilized and solids from stream channel erosion steadily increased downstream. The increased suspended sediment concentrations are strongly correlated with increased particulate phosphorus concentrations observed since measuring only high flow events.

Phosphorus median concentrations in 2014 and 2015 were similar. Concentrations were directly related to variations in particulate phosphorus concentrations, which are tied to suspended sediment levels and dissolved phosphorus levels. Both total and dissolved phosphorus concentrations were monitored.



There was an increase in phosphorus between the Hinesburg wastewater treatment plant and Carpenter Road, reflecting the effects of stream-bank erosion and bottom scour at this stretch of the LaPlatte River. Phosphorus levels increased again between Carpenter and Falls Road in 2015, which is different from the historic record where phosphorus decreased between Carpenter and Falls Road reflecting the sediment settling out within this stretch of stream at lower flows.

Overall, phosphorus concentrations in the LaPlatte River are directly related to flow rates, and in particular, to the behavior of suspended sediment in response to flow. While about 87% of phosphorus loading from the LaPlatte River occurs during high flows, the state phosphorus standard for LaPlatte low flow conditions is 27ug/L. This low flow standard was established to protect in stream biology and recreation related aesthetics.



Nitrogen levels monitored at high flow rates in 2014 and 2015 were similar to historical levels. Nitrogen enters the

LaPlatte River via runoff and discharge from the Hinesburg waste water treatment plant. Historically, nitrogen levels have been low, with higher levels between the Hinesburg wastewater treatment plant and Carpenter Road, and decreased levels between Carpenter Road and Falls Road from dilution. In 2014/2015 when measured at high flow, nitrogen levels increased from the Hinesburg waste water treatment facility to Carpenter Road, and increased again from Carpenter Road to Falls Road, reflecting the increased runoff during periods of high flow. Nitrogen concentrations can also suggest fertilizer runoff, especially when correlated to dissolved phosphorus concentration levels.

Loading Rates of total phosphorus and suspended solids on samples collected at Falls Road by SCRW and the State Long Term Monitoring group were compared and revealed nearly identical results. Interestingly, total phosphorus loading rates in the McCabe's and LaPlatte watersheds are were also nearly identical. In contrast, suspended sediment loadings were in general higher in the small direct-to-lake Thorp and Kimball watersheds, and at times of high flows, reached more than 250 times those in the LaPlatte River.

Recommendations and Follow-up Actions

- There was a high degree of consistency among monitoring results for solids, phosphorus, and nitrogen from 2014 to 2015, 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
- Monitoring of water quality should continue to target high flows
- Drop monitoring of chlorides in the LaPlatte River when targeting high flows
- Promote regulatory and non regulatory water quality improvement projects in subsheds with high nutrient and sediment loading impacts to the stream system and Lake Champlain.

The South Chittenden River Watch is funded in part by the Towns of Shelburne and Charlotte. The 2015 SCRW team included: Bill Hoadley, Susan Moegenburg, Thomas Newcomb, Judy Raven, Bob Hyams, Myra Handy, Joannah Ralston, Ray Mainer, Ed Sengle, Jon Trefry, Andrea Morgante and Marty Illick.

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