

Otter Creek - 2014 Water Quality Summary
Addison County Riverwatch Collaborative

Site	Location	Town
OTR7.3	Vergennes Falls/below outfall	Vergennes
OTR13	Route 17 Bridge	Weybridge
OTR18	Twin Bridges Picnic Area	Weybridge
OTR23	Frog Hollow	Middlebury
OTR30	Swamp Road Bridge	Salisbury

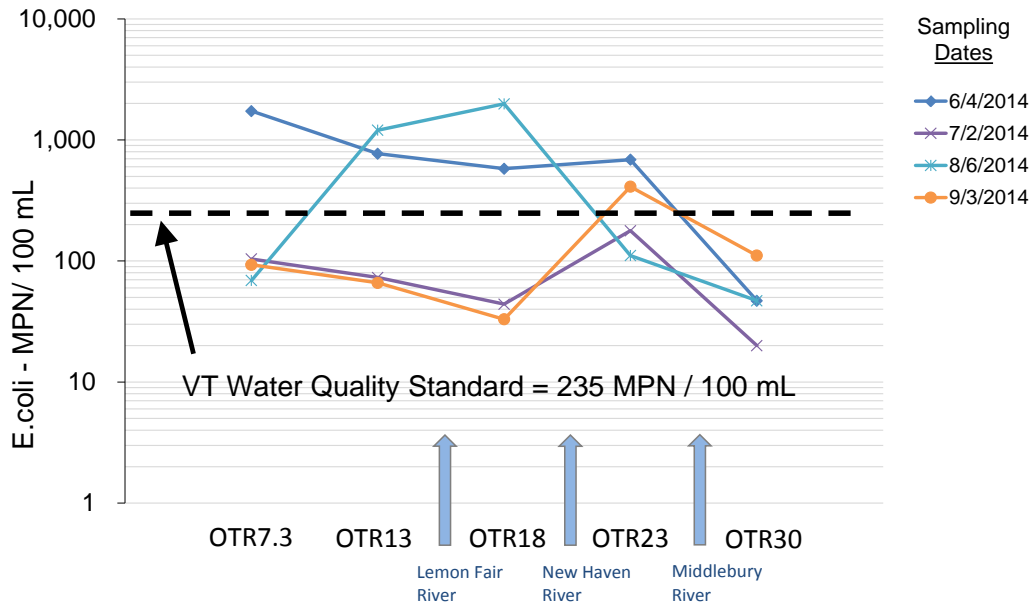
The Addison County Riverwatch Collaborative has been monitoring water quality in the lower Otter Creek since 1992. For the 2014 and 2015 seasons, Otter Creek is the subject of a more intensive monitoring focus, where rotational as well as sentinel stations are monitored and additional parameters are tested. Sampled sites include two sentinel sites (OTR18 and OTR7.3) and three rotational sites located on the main stem (see above table).

During 2014, sampling occurred on two spring dates (April 9 and May 7) and four summer dates (June 4, July 2, August 6, and September 3). The April event occurred during a time of snow melt in the mountains and represented high flow conditions on the river, based on records from the USGS gage on the Otter Creek at Middlebury and other area gages. May and June events occurred during moderate flow conditions on the river, while the July, August, and September events captured low to baseflow conditions. On an average annual basis, flows in 2014 were near normal in the Addison County watersheds monitored by the Collaborative.

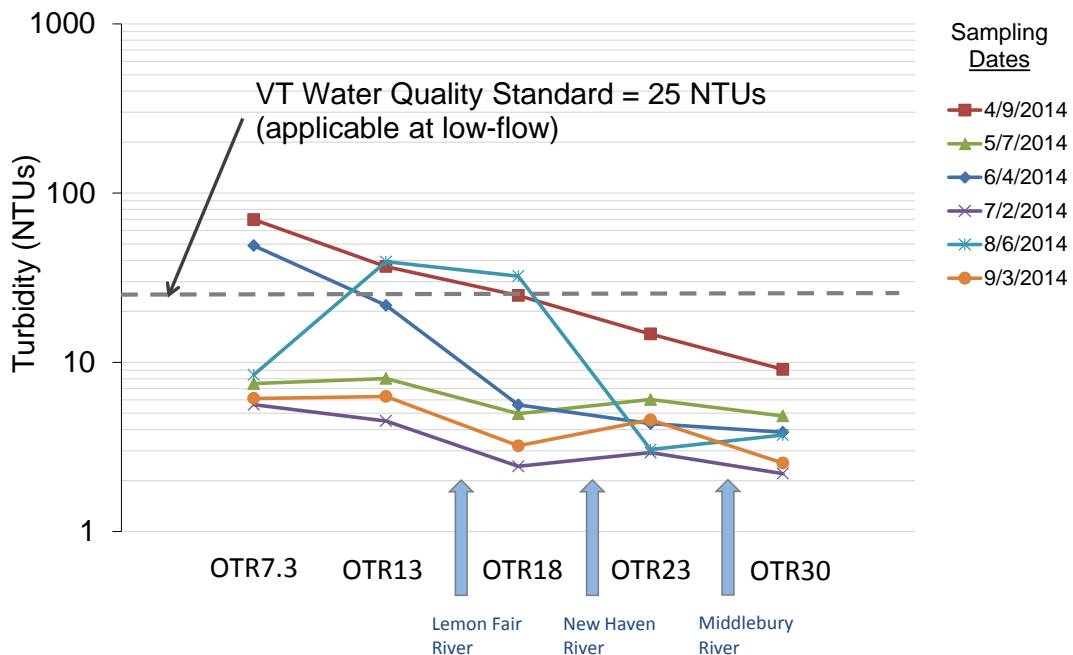
Samples were tested for E.coli, phosphorus (total and dissolved), nitrogen and turbidity; E.coli was tested only on the summer dates.

E.coli counts at sites on the lower Otter Creek ranged from 20 to 1,986 organisms/ 100 mL (see graph on following page). During low-flow conditions (July and September), E.coli values were below the recently-modified state standard of 235 organisms/100 mL at all stations except OTR23 on September 3. This station is downstream of inputs from Middlebury River, which yielded very high E. coli counts (>2,420 MPN/100 mL) during low-flow conditions on this date. During moderate to high flow conditions resulting from a summer thunderstorm (August 6) and persistent spring rains (June 4), E.coli counts were elevated at each Otter Creek station, exceeding the water quality standard at a majority of the stations. Between stations OTR30 and OTR13, Otter Creek receives runoff from the Middlebury River, New Haven River and Lemon Fair River. E.coli concentrations in one or more of these contributing watersheds were elevated on those dates, August 6 and June 4.

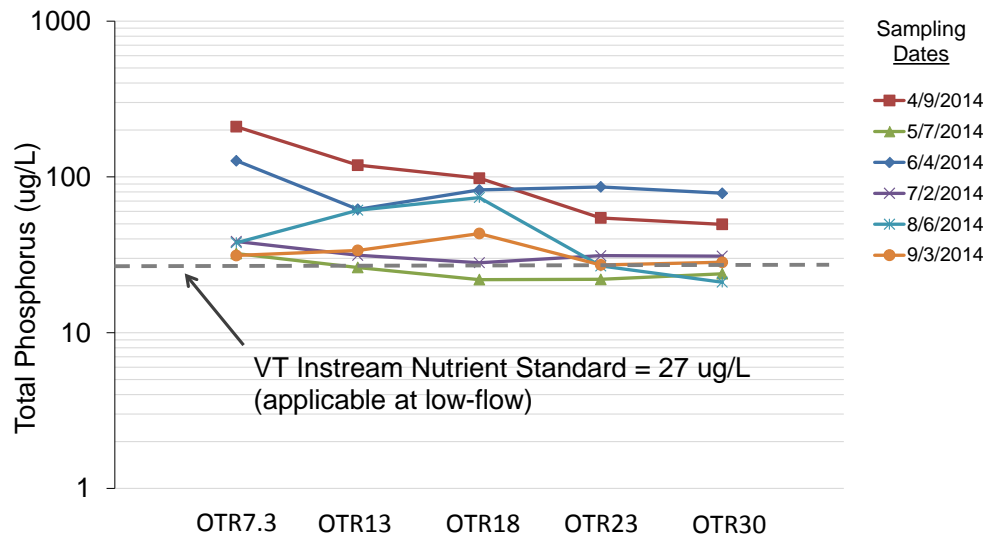
Nitrogen levels were detected at very low concentrations during the six spring and summer sampling dates. Concentrations ranged from 0.4 to 0.8 mg/L, with an average of 0.5 mg/L. These results are largely consistent with historic sampling results for nitrogen. A past standard for nitrogen as nitrate (5 mg/L) was eliminated during the 2014 update of the Vermont Water Quality Standards.



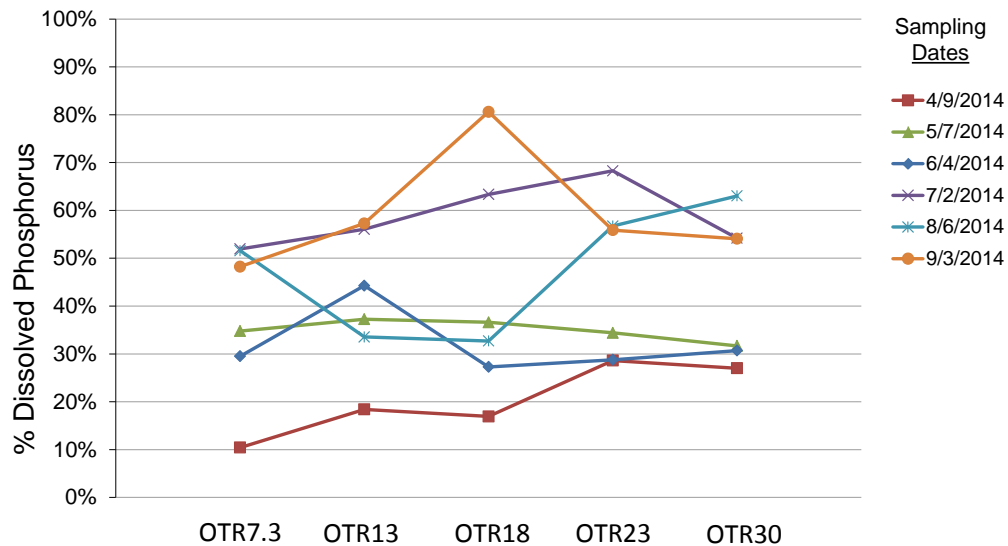
Turbidity levels at the Otter Creek stations ranged from 2.2 to 70 NTUs, with a mean value of 13 NTUs for the six sample dates. Results from 2014 are largely consistent with historic trends. Based on past years' sampling results, turbidity can become elevated at times of increased flow – during a summer thunderstorm, or during spring runoff conditions. A modest increasing trend in turbidity with distance downstream is typically observed during all flow conditions. The Vermont state standard of 25 NTUs (for Class B warm-water fisheries) is applicable during low-flow conditions. Turbidity results were below the standard at each station during low-flow conditions on July 2 and September 3. Turbidity was elevated at select downstream stations during moderate- to high-flow conditions on April 9 and August 6, and at downstream station OTR7.3 on June 4. As with E.coli, Turbidity values from contributing watersheds of the New Haven River and Lemon Fair River were somewhat elevated on those high-flow dates.



Phosphorus levels at Otter Creek stations were detected at low to moderate concentrations during the six spring and summer sampling dates in 2014. Concentrations ranged from 21 to 210 ug/L, with a mean of 55 ug/L. Results were consistent with historic trends, which generally indicate a modest increase in concentrations with distance downstream. At all stations, moderately high concentrations of Total Phosphorus have been detected in past years at times of high flow and runoff. In 2014, the mean concentration of Total Phosphorus for the two available low-flow summer sample dates (July 2, September 3) at each of the sites exceeded the approved instream nutrient standard of 27 ug/L for the warm-water medium gradient (WWMG) wadeable stream ecotype in Class B waters. These reaches of the Otter Creek might instead be classified as a Slow Winder stream ecotype, but criteria have not yet been developed for this stream classification.



The percent of total phosphorus present in the dissolved form varied with flow condition during the 2014 sample dates. Dissolved phosphorus represented a higher percentage of the Total Phosphorus concentration during low-flow conditions on July 2 and September 3. This pattern likely reflects the greater relative contribution of sediment-sorbed forms of phosphorus during moderate to high flows.



2015: The lower Otter Creek will continue to be a focus watershed in 2015, with the same five sentinel and rotational sites monitored for E.coli, total and dissolved phosphorus, total nitrogen, and turbidity. Beginning in year 2016 and continuing through 2019, the number of sampling locations in this watershed will be reduced to two sentinel stations, OTR18 and OTR7.3, as the focus of more intensive sampling rotates to another Collaborative watershed.

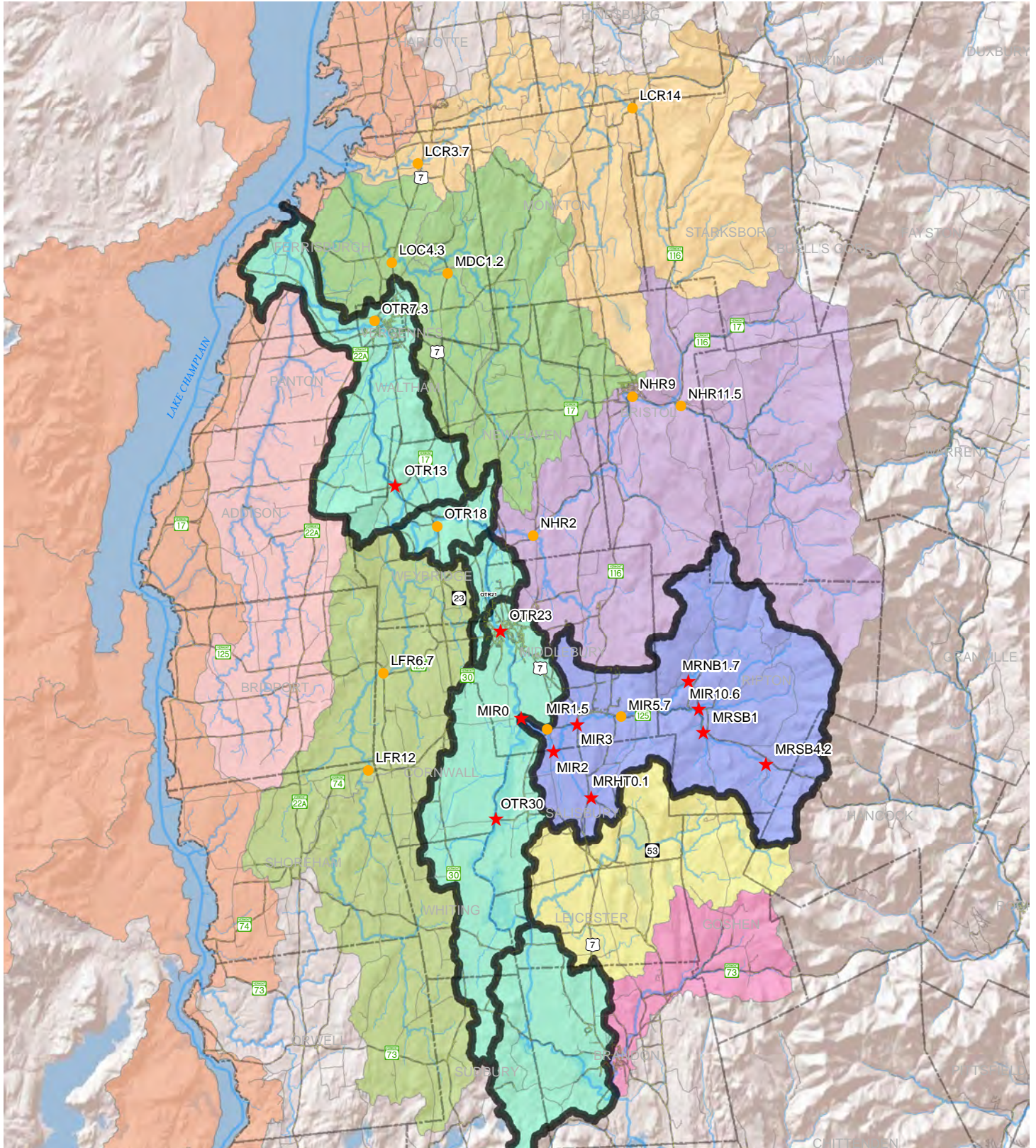
For more information, the Otter Creek sampling coordinator:

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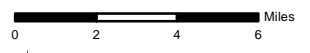
Addison County Riverwatch Collaborative coordinator: Matt Witten, 434-3236, mwitten@gmavt.net
or visit our web page at: www.acrpc.org/acrwc

Addison County River Watch Collaborative

Water Quality Monitoring Sites by Watershed, 2014



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|-------------------|--------------|-------------------------------|--------------------------------|------------------------------|
| ★ Rotational Site | Roads | Rotational Basins 2014 | Orange Lake Champlain Direct | Pink Dead Creek |
| ● Sentinel Site | — Pavement | Black Otter Creek | Yellow Lewis Creek | Light Blue Lemon Fair River |
| | — Gravel | Black Middlebury River | Light Green Little Otter Creek | Yellow-Green Leicester River |
| | | | Teal Otter Creek | Blue Middlebury River |
| | | | Purple New Haven River | Magenta Neshobe River |



The Addison County River Watch Collaborative is a citizen organization whose mission is to collect and assess the water quality of Vermont surface waters, and to facilitate water quality and stream corridor improvement measures on a watershed scale.