Monitoring Combined Nitrate-Nitrite in North Santiam River Tributaries
Oct 27, 2014
Eric Andersen, Regional Monitoring Coordinator; North Santiam, South Santiam and Calapooia Watershed Councils

Introduction

Water quality in the North Santiam (NS) basin is important to local residents, as well as aquatic resources. Historically the area has had little ongoing water quality sampling in tributaries of the lower NS basin. This lack of information prompted Watershed Council staff to secure grants from OWEB and OR DEQ to sample ambient water quality monthly at 7 sites on NS tributaries: Bear Branch, Marion Creek, Stout Creek and Valentine Creek. The project's data yields an overview of conditions on select NS tributaries. Additional sites were located in Linn County and are not discussed here. This document only discusses combined Nitrate-Nitrite (NO3+NO2) for Stout and Marion Creeks for the period November 2013 through June 2013.

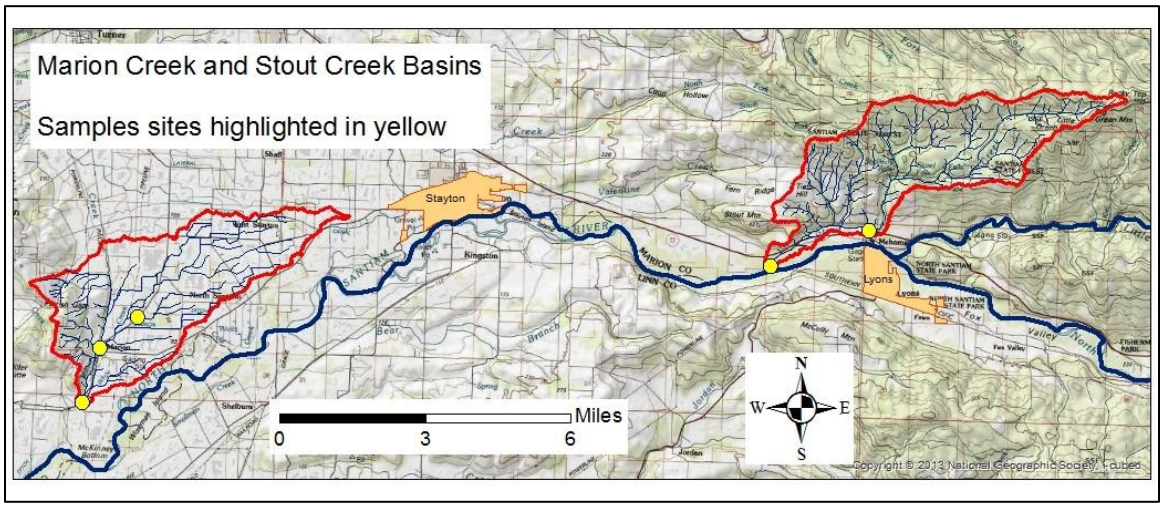
Nitrogen is a key nutrient needed for plant growth and is regularly added to crop fields in the Willamette Valley. Nitrate (NO3) is highly soluble in water and is easily leached from soils. There are several ground water areas in the Western Oregon with high nitrate levels. High nitrate levels are hazardous to human health. The US EPA states a 10 mg/L limit of nitrate in drinking water.

The main intent of the project was to characterize ambient water quality conditions in select creeks. Additional questions included:

- Do the sampling sites meet state water quality standards?
- Are there seasonal trends?
- How do sites compare to reference conditions?

Basin Location

Stout Creek enters NS River above Geren Island water treatment plant, while Marion Creek enters west of Stayon and below Geren Island water treatment plant.



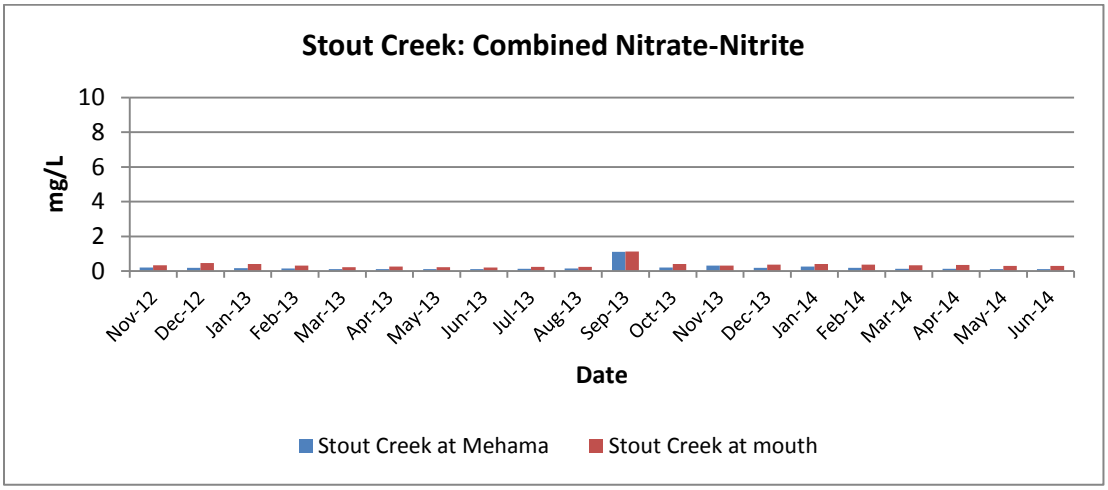
Methods

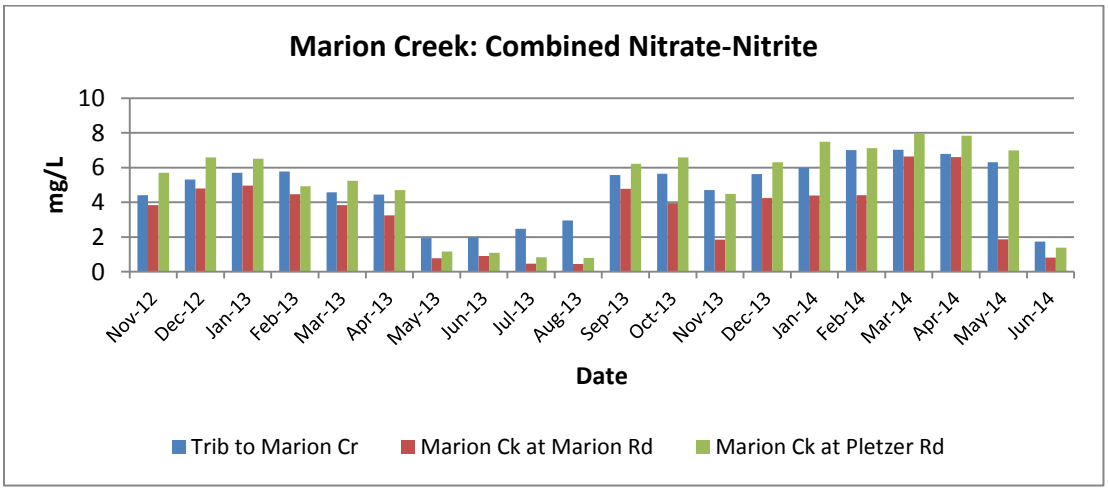
Site selection was based on input from project partners and the location of historic sampling sites. Sites were sampled one time per month starting Nov 2013 and will end Nov 2014. Sampling generally occurred during the mornings of the first week of the calendar month. Samples were sent to the OR DEQ laboratory for analysis using persulfate digest (Technicon Auto-Analyzer II) technique.

Results

Results here only include Nov 2013 through June 2014. No surface water sample exceeded 10 mg/L of combined nitrate-nitrite. Marion Creek basin had higher NO3+NO2 values overall than Stout Creek. Both Marion and Stout Creeks had higher values during fall and winter than spring and summer. Maximum values occurred during Sept 2013 and were most likely influenced by a large rain event prior to sampling.

All results for Stout Creek and Marion Creek.





The OR DEQ has established benchmark values for summer in-stream conditions in Willamette Valley streams. The OR DEQ lists a combined NO3+NO2 value of <0.199 mg/L as good and >0.301 mg/L as poor. Only Stout Creek at Mehema met the good benchmark during July and August. All Marion Creek sites exceeded 0.301mg/L and were considered poor for combined NO2+NO3.

Summer results. All values in mg/L.

	Marion Creek			Stout Creek	
	Marion Cr trib	at Pletzer Rd	at Marion Rd	Mehema	Mouth
July 2013	2.48	0.463	0.835	0.125	0.243
Aug 2013	2.95	0.45	0.802	0.146	0.241
Sept 2013	5.57	4.78	6.21	1.11	1.12

<0.199 mg/L as good and >0.301 mg/L as poor

Discussion

Although sampling only occurred once a month, none of the sampling sites had NO3-NO2 values greater than 10 mg/L. Additional sampling is needed to determine if there are times that do exceed 10 mg/L. Stout Creek had much lower NO3+NO2 values than Marion Creek, and was most likely related to less intensive agriculture in the basin.

Marion Creek had high NO3+NO2 readings. Project partners and local landowners should explore avenues for reducing the combined NO3+NO2 in Marion Creek and its tributaries. Management strategies focusing on fertilizer application technique and timing, grass lined ditches and enhanced riparian buffers should be considered. Riparian buffers are an excellent low cost strategy for reducing fertilizer runoff and sedimentation. The North Santiam Watershed Council has worked with local landowners to implement numerous riparian enhancement projects in the area.

For more information please contact:

Eric Andersen, Regional Monitoring Coordinator;
North Santiam, South Santiam and Calapooia Watershed Councils

Email: monitoring.coordinator [at] gmail.com