Clear and Foster Creeks Snapshot Monitoring Event

On Saturday June 28, 2003, The Clackamas River Basin Council (CRBC), watershed residents and Saturday Academy students collected thirty water samples from Clear Creek and its tributaries and from Foster Creek. The students analyzed the samples for pH, turbidity, conductivity, phosphorus, nitrate, ammonia, and chlorine to gain an understanding about the quality of the water. This information was related to the streamside vegetation findings in the 2002 *Clear and Foster Creek Watershed Assessment*.

A special thanks to creek side residents who provided most of the samples.

Results

The following table is a summary of the results from the Clear/ Foster Creek monitoring event on June 28, 2003. A description of each parameter is provided in the next section.

Parameter	Clear Creek	Clear Creek Tributaries	Foster Creek	"Safe" Levels
pH				
Average	7.07	7.07	7.07	6.5 – 8.5
Range	6.70 -7.30	6.88 - 7.28	6.88 - 7.16	
Conductivity (mS/cm)				
Average	0.06	0.06	0.09	NA
Range	0.06 - 0.06	0.04 - 0.14	0.07 - 0.10	
Turbidity (NTU)				
Average	1.24	3.07	3.9	NA
Range	0.92 - 1.48	1.05 - 8.33	1.58 - 8.74	
Soluble Reactive Phosphorus (mg/L P)				
Average	0.07	0.08	0.13	0.1
Range	0.04 - 0.12	0.02 - 0.26	0.02 - 0.18	
Chlorine (mg/L Cl_2)				
Average	0.03	0.08	0.07	0.02
Range		0.02 - 0.19	0.03 - 0.13	
Nitrate (mg/L N)				
Average	0.13	0.75	0.33	10.0
Range	0.08 - 0.17	0.03 - 2.33	0.01 - 0.52	(drinking water)
Ammonia (mg/L N)				
Average	0.03	0.03	0.03	Varies with pH
Range	0.01 - 0.07	0.01 - 0.08	0.00 - 0.06	

What We Looked At - Parameter Background

pH is the measure of whether a liquid is basic or acidic on a scale of 0 (acid like a lemon) to 14 (basic like ammonia) where 7 is neutral. The optimal range for a healthy creek, stream or river is 6.5 to 8.5.

Turbidity is a measure of water clarity. Organic and inorganic materials suspended in the water column will reduce light penetration and interfere with plant growth. This may lead to an inadequate food source for fish and the potential for oxygen depletion.

Conductivity is a measure of how well water conducts electricity. Solids dissolved in water such as salts and nutrients contribute to conductivity, so increased levels can be a general indicator of pollution.

Phosphorus is a naturally occurring nutrient essential for plant growth, but can become a water pollutant at high concentrations. It can enter surface water in organic matter, attached to soil sediments, or in man-made products such as detergents, fertilizers, industry wastes and pesticides. Samples were tested for soluble reactive phosphorus (SRP), which refers to any form of phosphorus that is dissolved in water and can be readily used by organisms. The recommended maximum for rivers and streams is 0.1 mg/L P.

Nitrate is an essential nutrient for plant growth and one of the main ingredients in fertilizers. Nitrates are naturally formed when bacteria break down ammonia and organic matter that contains nitrogen. Other sources of nitrate include manure, and municipal/industrial wastewater. Nitrate is very soluble so it can easily wash into groundwater and streams, where high levels of nitrate can cause problems such as excessive algal and plant growth.

Ammonia, a form of nitrogen, is naturally produced in the decay of organic material, and is increased by the input of sewage, manure, or fertilizer run off. At high concentrations, ammonia can become toxic to fish.

Chlorine is a man made chemical used for disinfection and water purification. Chlorine is an indicator of human-derived waste entering streams. Healthy streams should have chlorine concentrations below 0.02 mg/L Cl_2.

In addition to testing for pH, turbidity, conductivity, and nutrients, each participant was asked to provide their perceptions on the water quality, and health of their stream. In general, perceptions of water quality were good. Most participants noted no change in water quality over the last 5 years while a few felt that water quality had improved.

What We Found From Your Water Samples

The results are presented by stream mile, with 0 being the mouth of the stream and increasing in number as we travel upstream toward the headwaters. The Clear Creek tributaries are plotted where they enter Clear Creek.

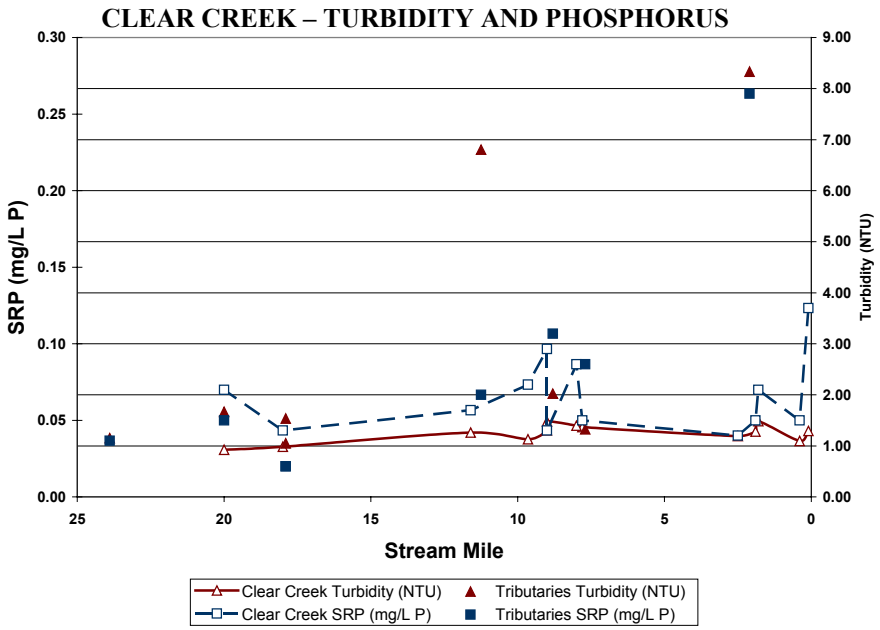
Clear Creek Tributaries

The tributaries feeding Clear Creek have higher levels for each of the tested parameters. The Clear Creek results as a whole are well within healthy levels. At this time the tributary inputs do not appear to be adversely affecting the Clear Creek system.

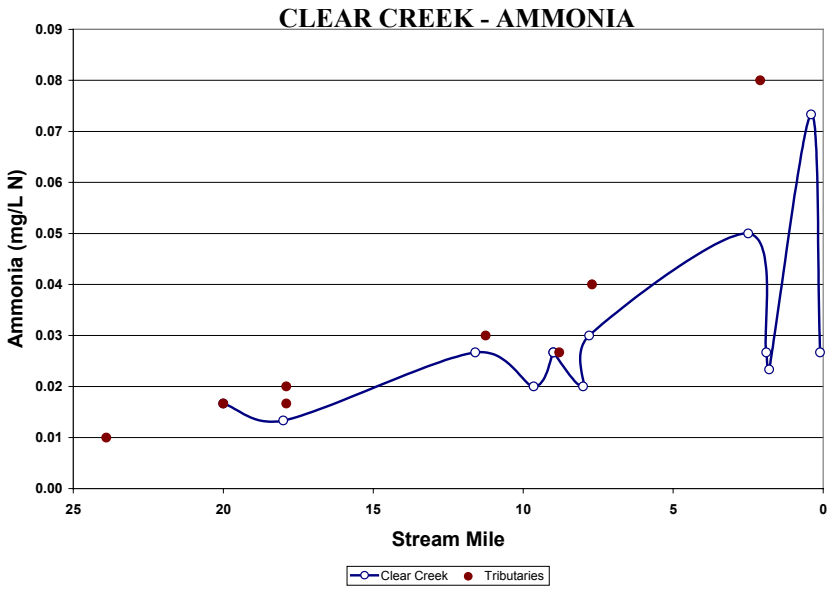
Chlorine

It is noteworthy that chlorine concentrations do not appear to be within “safe” levels for the Clear and Foster Creek Watersheds. More investigation is needed to validate this finding.

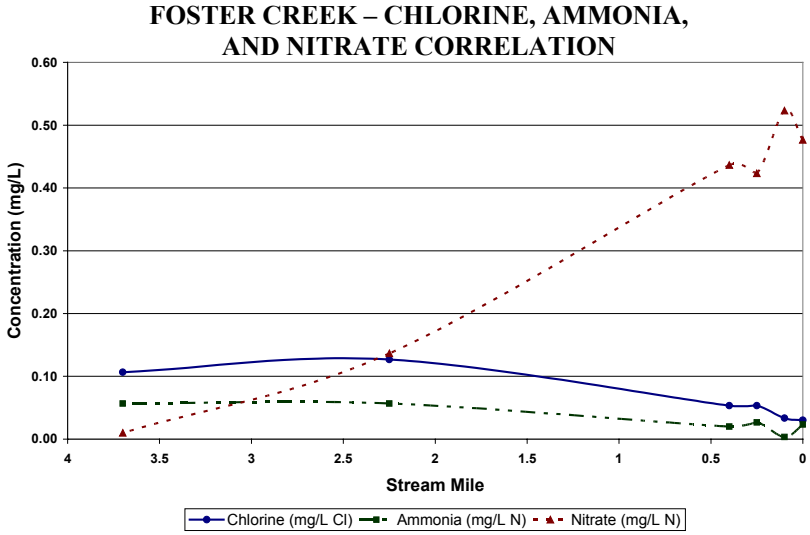
Phosphorus and turbidity can potentially come from soil erosion. Phosphorous is often found in sediments. These appear to have higher levels in the tributaries than in the main creek itself. Streamside vegetation can help prevent or reduce soil erosion.



Ammonia levels show a slight increasing trend in Clear Creek. Potential sources of ammonia could be septic systems and livestock. Keeping livestock and other animals away from the creek and off-stream watering can help protect water quality.



There appears to be some source of chlorine and ammonia in upper Foster Creek. Chlorine and ammonia both decrease as they flow downstream, while nitrate increases. The ammonia and nitrate could be related to fertilizer use. Careful use of, or reduction of fertilizer close to the water can help prevent this.



Streamside Vegetation: Why It Matters

Vegetation found on the stream banks and adjoining floodplains, known as riparian vegetation, plays a key role in the functions of stream habitat such as:

- Trees, roots, shrubs, and grasses slow the rate of flow and bind stream soil, preventing erosion and so decreasing turbidity;
- Pollutants, sediments, and nutrients can be filtered from surface runoff by healthy streamside vegetation;
- Shade from trees helps keep the water cool. Warm water is harmful to fish. Shade also decreases the light available for algae growth, and so helps to reduce algae;
- Fallen woody debris slows stream flow and provides habitat for fish;
- Streamside vegetation provides food and nutrients for aquatic life. Decomposing leaves provide food for the food chain;
- A well-vegetated stream stores water in its banks during the rainy season and slowly releases it during the drier seasons. This helps to prevent flooding and erosion and maintain flows for fish and humans;
- Wetland areas store and naturally filter water. They remove sediments and nutrients before releasing water to streams and/or ground water.

According to the Clear and Foster Creek Watershed Assessment, as little as 1% of the Clear Creek watershed and 4% of the Foster Creek watershed had satisfactory riparian vegetation. Planting native trees and shrubs will help to improve and maintain water quality, and property values. A healthy, diverse streamside vegetation environment helps keep water within established quality standards (especially for temperature) for those who use the water.

Resources and Information

The following table provides various resources in the area for those who'd like to help restore or take care of their own streams and streamside vegetation.

Clackamas River Basin Council • Funding and technical assistance for landowner projects • Free trees for qualifying waterside properties • Newsletter & links, Stakeholder groups and representatives	Phone: (503) 650-1256 www.clackamsriver.org/
Clackamas County Extension Service • Links& resources for aquatic health, small farms, forestry • Educational programs, 4-h etc.	Phone: (503) 655-8631 http://extension.oregonstate.edu/clackamas/
Saturday Academy Student Watershed Research Project • General watershed information and links • Monitoring data and resources	Phone: (503) 748-1363 www.swrp.org
Department of Water Quality • Water quality standards and information • Permits for discharge and fill • Loans and grants for water quality improvements	Phone: (503) 229-5696 www.deq.state.or.us
Oregon Department of Water Resources • Water rights, Surface & groundwater maps and programs	Phone: (503) 378-8455 www.wrd.state.or.us/
Clackamas County Soil & Water Conservation District • Tips for landowners, Lots of useful links • Grants and technical support, conservation planning	Phone: (503) 656-3499 http://www.cc-swcd.org