Volunteer Monitoring Quarterly Data Report

Beaver Lake Watershed - Benton, Washington and Madison counties in Arkansas

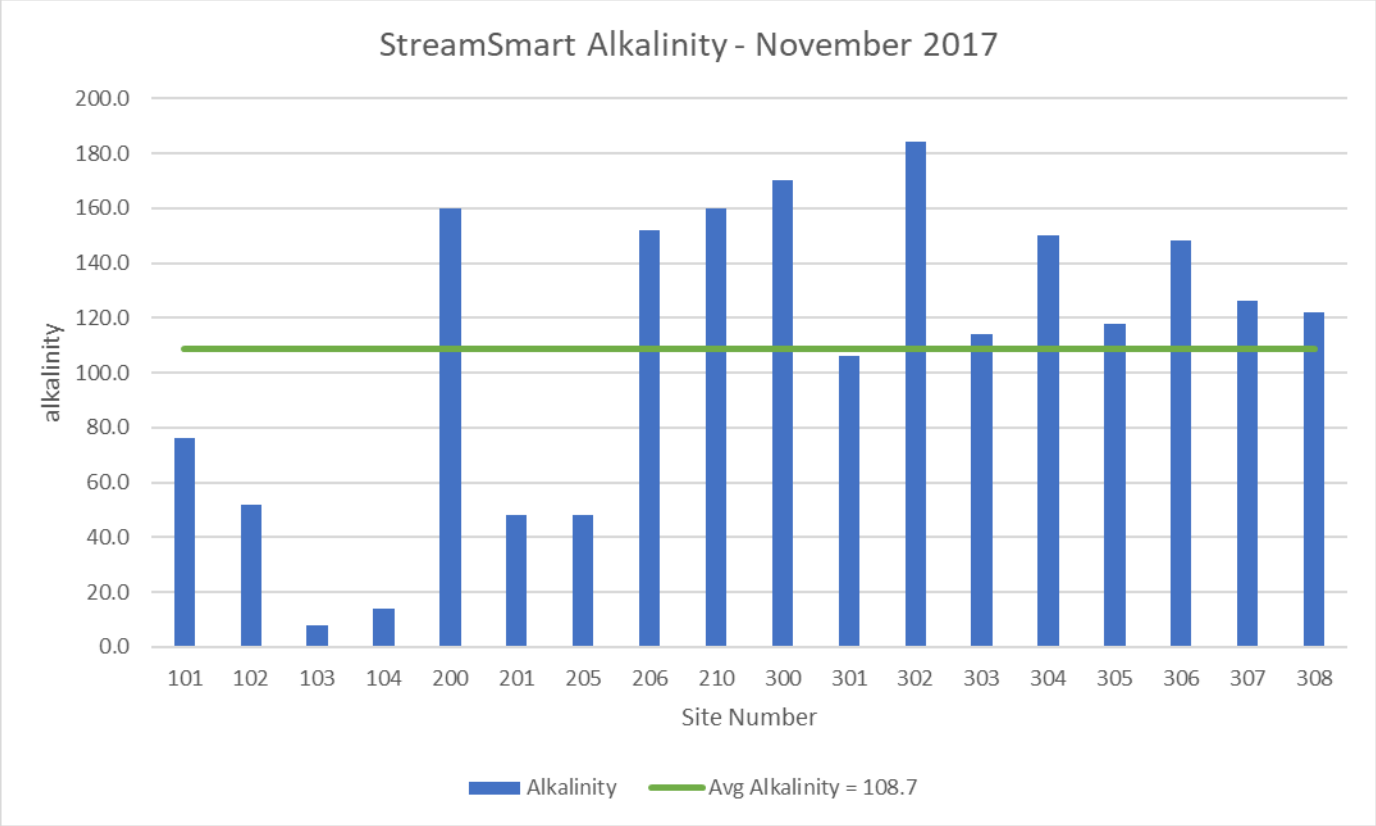
November 2017

Monitoring Period: Nov 4 - 15, 2017

A project of Ozarks Water Watch in Arkansas

Prepared by: Angela Danovi
StreamSmart Coordinator
Ozarks Water Watch
1200 W. Walnut Street, Suite 3405
Rogers, AR 72745

Site Number	Site Name	Monitoring Status	Lat/Long	Watershed
101	West Fork (Baptist Ford Bridge)	currently monitored	35.982714, -94.173129	West Fork
102	West Fork (Brentwood Park)	currently monitored	35.865723, -94.117257	West Fork
103	Baldwin Creek Near St. Paul	currently monitored	35.822256, -93.758937	Headwaters
104	White River Near St. Paul	currently monitored	35.818676, -93.779774	Headwaters
107	War Eagle Creek	not currently monitored - ended spring 2016	35.888319, -93.679017	War Eagle
108	Ogden Creek	not currently monitored - ended spring 2016	35.887777, -93.679069	War Eagle
200	Ward Slough	New Monitoring Site - August 2016	35.997178, -94.173949	West Fork
201	Middle Fork of W.R. at Harris Rd	currently monitored	35.995825, -94.072894	Middle Fork
202	College Branch - U of A	New Monitoring Site - November 2016		West Fork
205	Hock Creek	New Monitoring Site - November 2016	36.022453, -93.859784	Richland Creek
206	Spout Spring Branch	currently monitored	36.055019, -94.161107	West Fork
210	Town Branch (White River Ball fields)	currently monitored	36.043179, -94.135852	West Fork
300	Brush Creek	currently monitored	36.131947, -93.947956	Beaver Reservoir
301	War Eagle Creek (Huntsville)	currently monitored	36.149997, -93.740137	War Eagle
302	Glade Creek	currently monitored	36.159851, -93.811690	War Eagle
303	Clear Creek	currently monitored	36.195153, -93.789276	War Eagle
304	Clifty Creek	currently monitored	36.239342, -93.907653	War Eagle
305	War Eagle (Mill)	currently monitored	36.267597, -93.943130	War Eagle
306	Prairie Creek	currently monitored	36.341208, -94.096513	Beaver Reservoir
307	Holman Creek Upstream of Huntsville	currently monitored	36.104418, -93.756750	War Eagle
308	Holman Creek Downstream of Huntsville	currently monitored	36.124453, -93.734211	War Eagle



Maximum = 184.0 – Site 302 (Glade Creek)
Minimum = 8.0 - Sites 103 (Baldwin Creek)
Average = 108.7

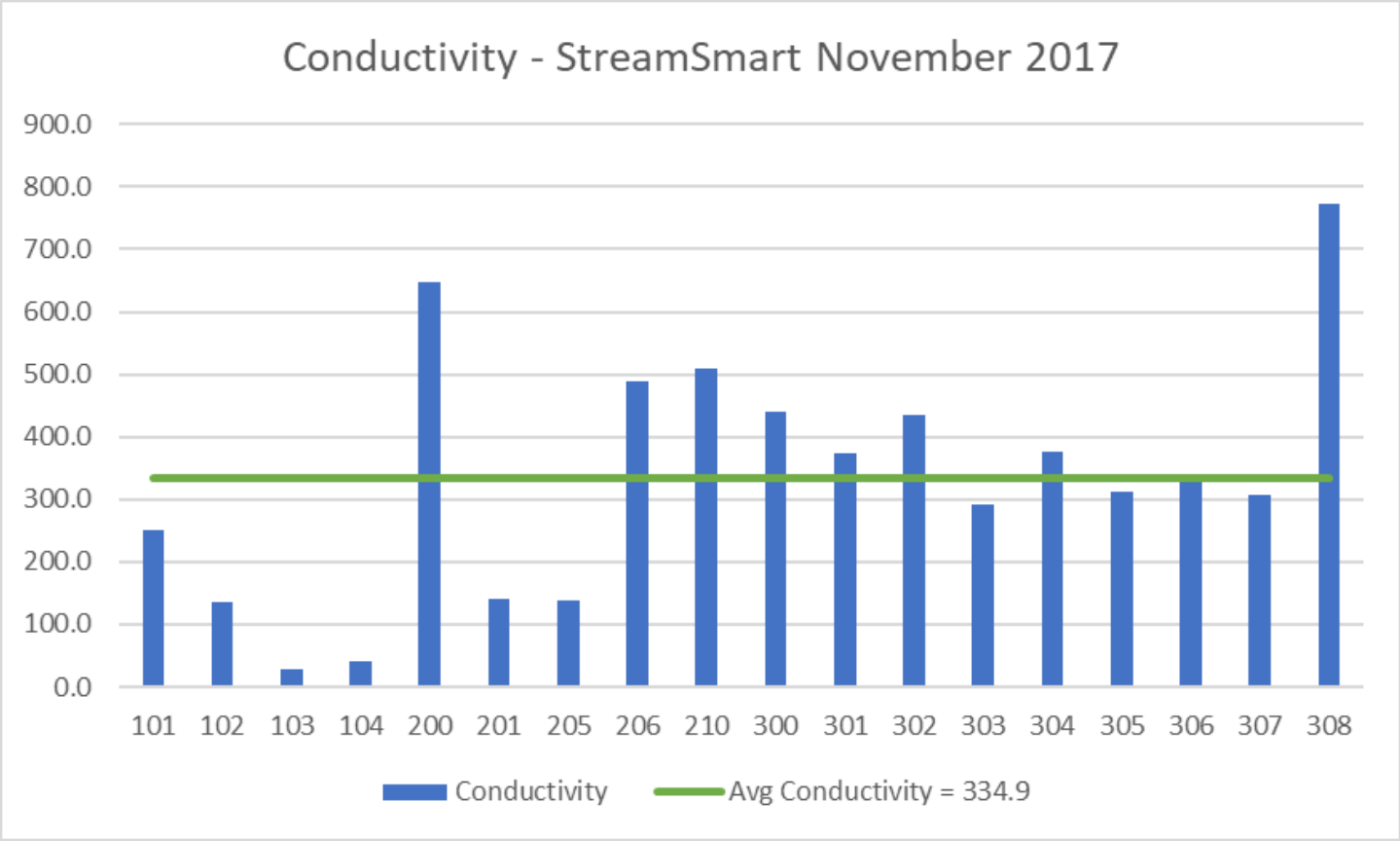
Site	Alkalinity
101	76.0
102	52.0
103	8.0
104	14.0
200	160.0
201	48.0
205	48.0
206	152.0
210	160.0
300	170.0
301	106.0
302	184.0
303	114.0
304	150.0
305	118.0
306	148.0
307	126.0
308	122.0

What is Alkalinity?

Alkalinity is the water's capacity to resist changes in pH that would make the water more acidic. Alkalinity refers to the capability of water to neutralize acid. The alkalinity of natural water is determined by the soil and bedrock through which it passes. The main sources for natural alkalinity are rocks which contain carbonate, bicarbonate, and hydroxide compounds. Limestone is rich in carbonates, so waters flowing through limestone regions or bedrock containing carbonates generally have high alkalinity - hence good buffering capacity. Conversely, areas rich in granites and some conglomerates and sandstones may have low alkalinity and, therefore, poor buffering capacity.

Alkalinity is important for fish and aquatic life because it protects or buffers against rapid pH changes. Living organisms, especially aquatic life, function best in a pH range of 6.0 to 9.0. Alkalinity is a measure of how much acid can be added to a liquid without causing a large change in pH. Higher alkalinity levels in surface waters will buffer acid rain and other acid wastes and prevent pH changes that are harmful to aquatic life.

http://www.water-research.net/index.php/the-role-of-alkalinity-citizen-monitoring



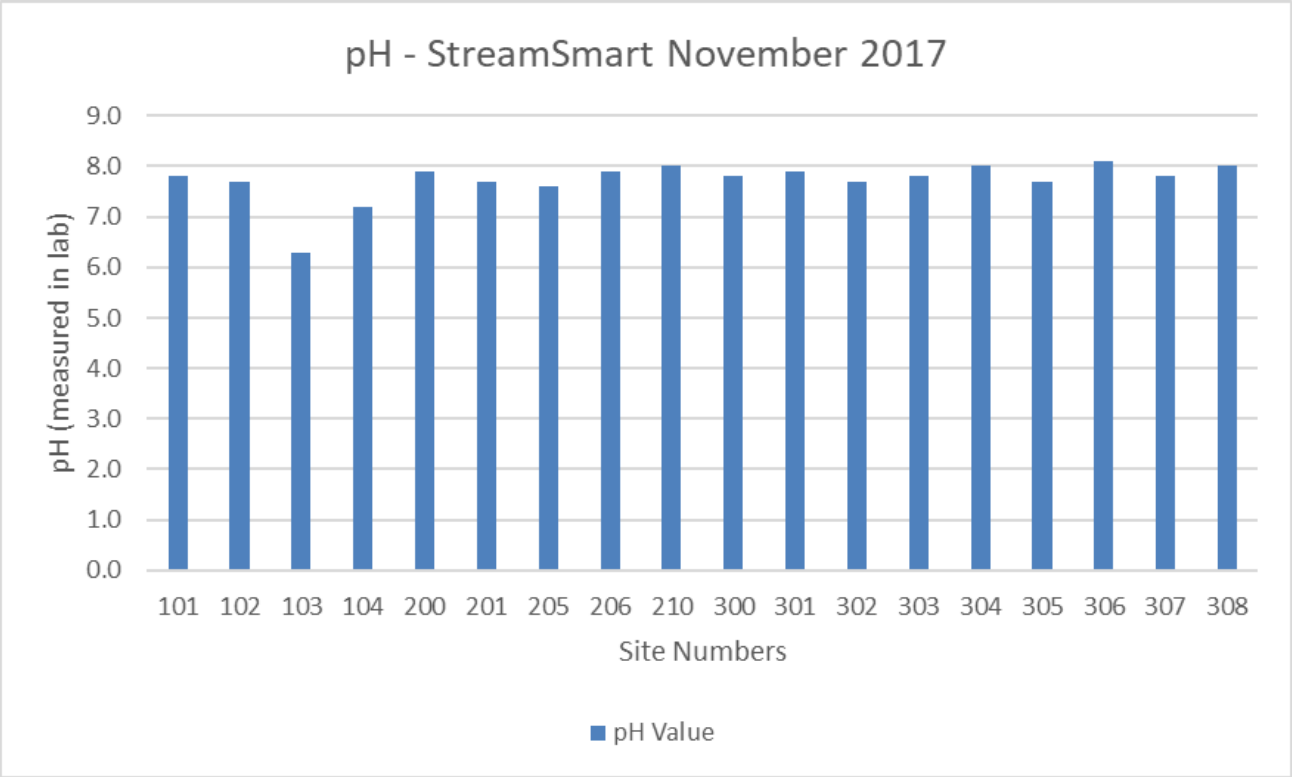
Maximum = 774 - Site 308 (Holman Creek Downstream of Huntsville)
Minimum =27.9 - Site 103 (Baldwin Creek)
Average = 334.9

Site	Conductivity
101	251.0
102	136.7
103	27.9
104	41.7
200	647.0
201	142.0
205	138.5
206	490.0
210	510.0
300	440.0
301	374.0
302	436.0
303	291.0
304	377.0
305	311.0
306	333.0
307	308.0
308	774.0

What is Conductivity:

Conductivity is a measurement of the ability of an aqueous solution to carry an electrical current. Typically, the units of measure are microhms/cm (uohms/cm) or microsiemens/cm (uS/cm). Conductivity or specific conductance is a measure of the ability of a fluid to carry a charge which is directly related to the concentration of dissolved substances. As the total dissolved substances in the water increases, the conductivity of the water also increases.

http://www.water-research.net/index.php/drinking-water-testing-and-conductivity-of-water



Site	pH
101	7.8
102	7.7
103	6.3
104	7.2
200	7.9
201	7.7
205	7.6
206	7.9
210	8.0
300	7.8
301	7.9
302	7.7
303	7.8
304	8.0
305	7.7
306	8.1
307	7.8
308	8.0

What is pH:

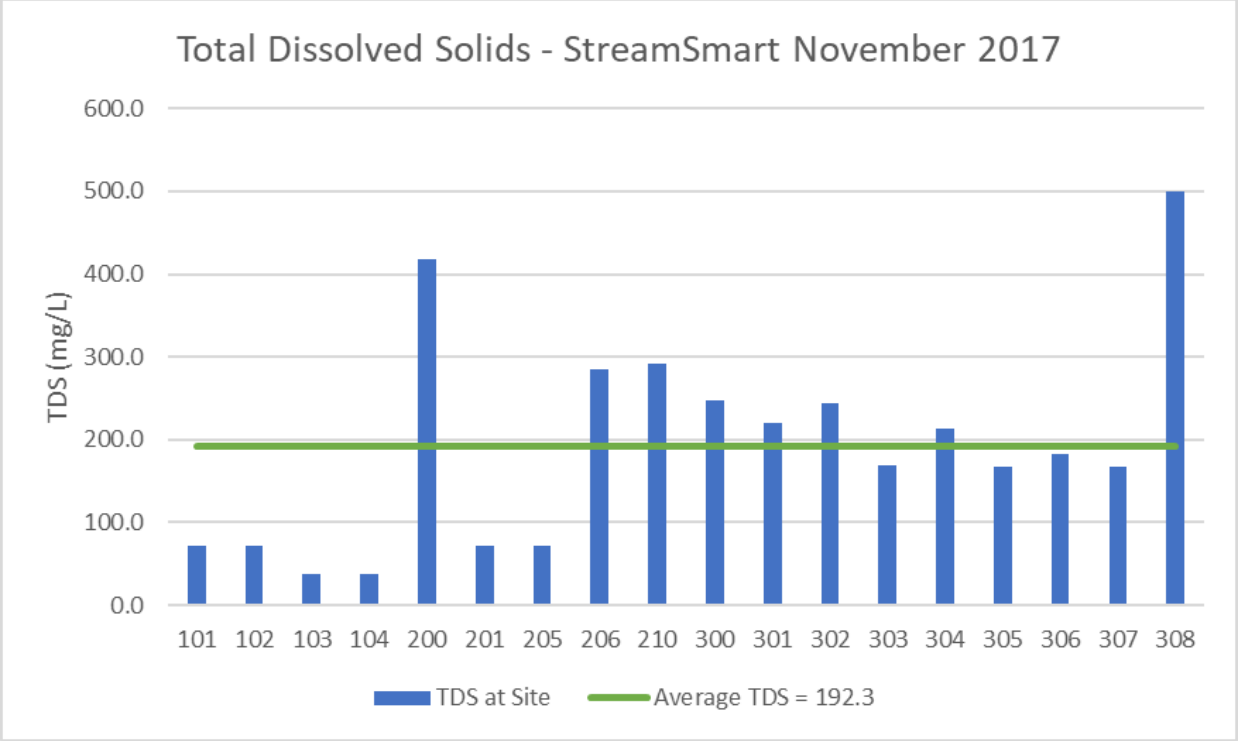
pH measurements run on a scale from 0 to 14, with 7.0 considered neutral. Solutions with a pH below 7.0 are considered acids. Solutions with a pH above 7.0, up to 14.0 are considered bases. Living organisms, especially aquatic life, function best in a pH range of 6.0 to 9.0.

The pH scale is logarithmic, so every one-unit change in pH represents a ten-fold change in acidity. In other words, pH 6.0 is ten times more acidic than pH 7.0; pH 5 is one hundred times mores acidic than pH 7.0.

The pH of a body of water is affected by several factors including the bedrock and soil composition through which the water moves. Some rock types such as limestone can, to an extent, neutralize acid. Another factor which affects the pH is the amount of plant growth and organic material within a body of water. When this material decomposes carbon dioxide is released. The carbon dioxide combines with water to form carbonic acid. Although this is a weak acid, large amounts of it will lower the pH. A third factor which determines the pH of a body of water is the dumping of chemicals into the water by individuals, industries, and communities.

Changes in the pH value of water are important to many organisms. Most organisms have adapted to life in water of a specific pH and may die if it changes even slightly. This is especially true of aquatic macroinvertebrates and fish eggs and fry.

http://www.water-research.net/index.php/ph-in-the-environment



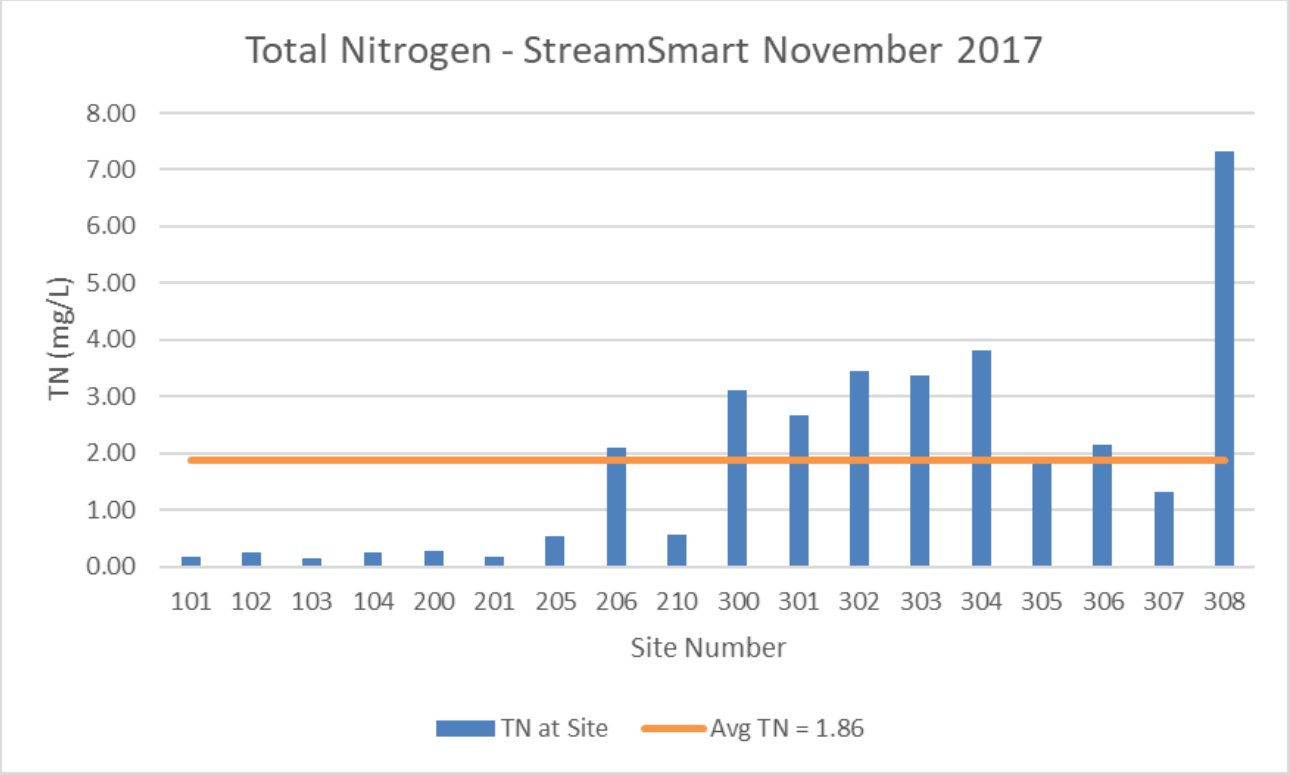
Maximum = 500.0 – Site 308 (Holman Creek Downstream of Huntsville)
Minimum = 37.8 – Sites 103/104 (Baldwin Creek/White River Near St. Paul)
Average = 192.3 mg/L

Site	TDS
101	71.1
102	71.1
103	37.8
104	37.8
200	417.8
201	71.1
205	71.1
206	284.4
210	291.1
300	246.7
301	220.0
302	244.4
303	168.9
304	213.3
305	166.7
306	182.2
307	166.7
308	500.0

What is Total Dissolved Solids?

A water quality parameter defining the concentration of dissolved organic and inorganic chemicals in water. After suspended solids are filtered from water and water is evaporated, dissolved solids are the remaining residue. An elevated total dissolved solids concentration does not mean that the water is a health hazard, but it does mean the water may have aesthetic problems, such as taste and odor, or cause nuisance problems.

http://www.water-research.net/index.php/water-treatment/tools/total-dissolved-solids

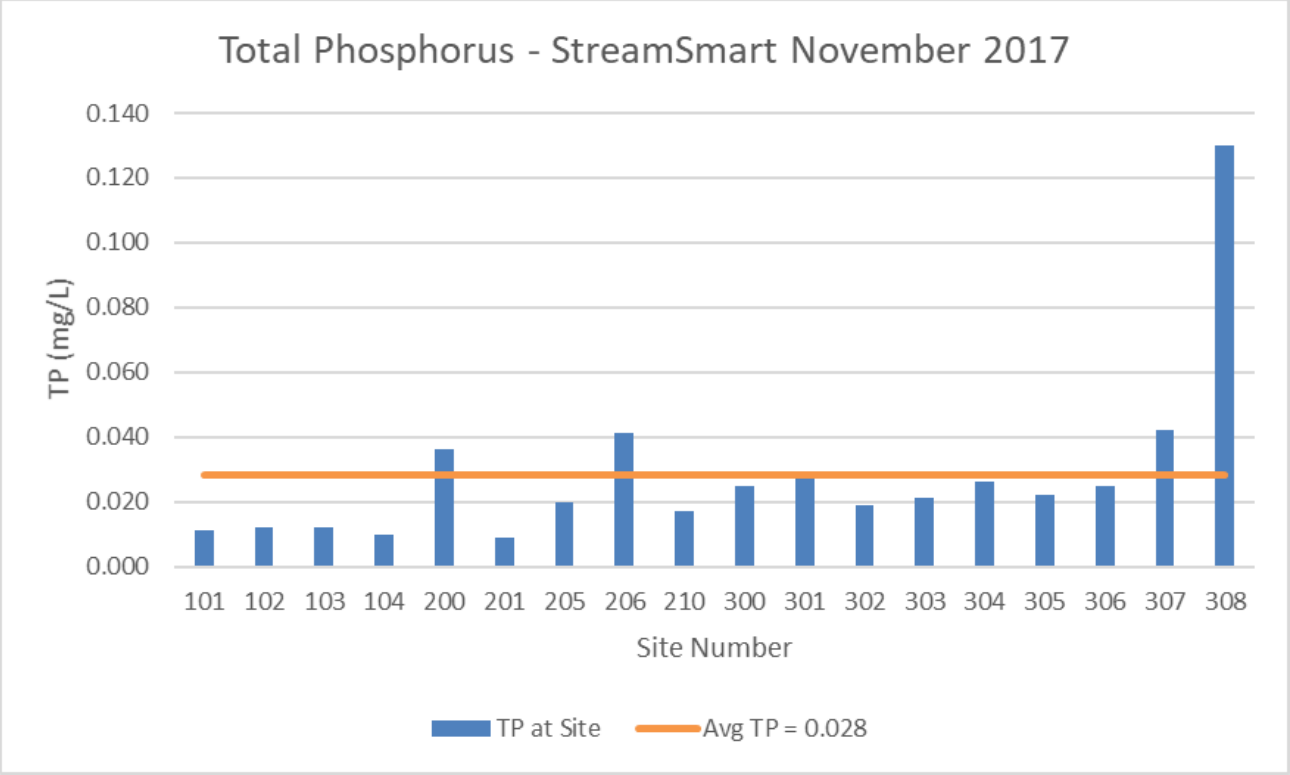


Maximum = 7.32 Site 308 (Holman Creek Downstream of Huntsville)
Minimum = 0.15 Site 103 (Baldwin Creek)
Average = 1.86 mg/L

Site	TN
101	0.18
102	0.25
103	0.15
104	0.24
200	0.28
201	0.18
205	0.53
206	2.10
210	0.56
300	3.10
301	2.67
302	3.46
303	3.38
304	3.81
305	1.82
306	2.15
307	1.32
308	7.32

What is Total Nitrogen?

There are three forms of nitrogen that are commonly measured in water bodies: ammonia, nitrates and nitrites. Total nitrogen is the sum of total kjeldahl nitrogen (ammonia, organic and reduced nitrogen) and nitrate-nitrite. It can be derived by monitoring for organic nitrogen compounds, free-ammonia, and nitrate-nitrite individually and adding the components together. An acceptable range of total nitrogen is 2 mg/L to 6 mg/L, though variations from this range can occur. We measure total Nitrogen as part of our on-going monitoring of nutrients concentrations in surface water.



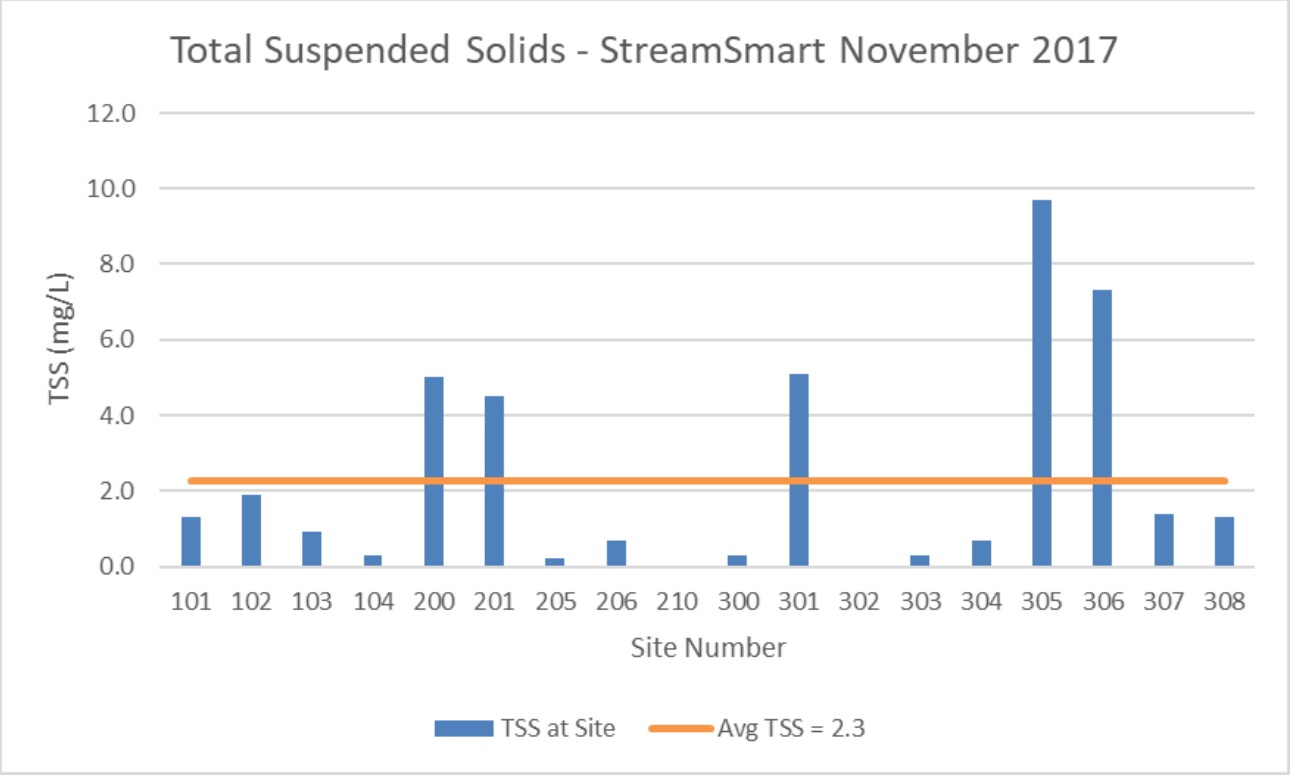
Maximum = 0.130 – Site 308 (Holman Creek downstream of Huntsville)
Minimum = 0.009 – Site 201 (Middle Fork of White River at Harris Rd)
Average = 0.028 mg/L

Site	TP
101	0.011
102	0.012
103	0.012
104	0.010
200	0.036
201	0.009
205	0.020
206	0.041
210	0.017
300	0.025
301	0.027
302	0.019
303	0.021
304	0.026
305	0.022
306	0.025
307	0.042
308	0.130

What is Total Phosphorus?

Phosphorus occurs naturally in rocks and other mineral deposits. During the natural process of weathering, the rocks gradually release the phosphorus as phosphate ions which are soluble in water and the mineralize phosphate compounds breakdown. Phosphorus is one of the key elements necessary for the growth of plants and animals and in lake ecosystems it tends to be the growth-limiting nutrient.

Total phosphorus is a measure of all the forms of phosphorus in the sample (orthophosphate, condensed phosphate, and organic phosphate). This is accomplished by first "digesting" (heating and acidifying) the sample to convert all the other forms to orthophosphate. Then the orthophosphate is measured by the ascorbic acid method. Because the sample is not filtered, the procedure measures both dissolved and suspended orthophosphate. Monitoring phosphorus is challenging because it involves measuring very low concentrations down to 0.01 milligram per liter (mg/L) or even lower. Even such very low concentrations of phosphorus can have a dramatic impact on streams.



Maximum = 9.7 mg/L – Site 305 (War Eagle Mill)
Minimum = 0.0 mg/L – Site 210 (Town Branch)
Average = 2.3 mg/L

Site	TSS
101	1.3
102	1.9
103	0.9
104	0.3
200	5.0
201	4.5
205	0.2
206	0.7
210	0.0
300	0.3
301	5.1
302	0.0
303	0.3
304	0.7
305	9.7
306	7.3
307	1.4
308	1.3

What is Total Suspended Solids?

The suspended or colloidal particles, commonly referred to as total suspended solids (TSS), are all the extremely small suspended solids in water which will not settle out by gravity. TSS is measured on a sample of water (which has been settled) and are those particles which will not pass through a very fine filter.

TSS in streams in northwest Arkansas usually range from 0.1 to 20 mg/L but can get as high as 500 mg/L during storm flows because the faster water moves the more sediment it can carry and the more force it has to cause erosion of the stream banks and channel.