OZARKS WATER WATCH

STATUS OF THE WATERSHED 2018

Summarizing 2017 Water Quality in the Upper White River Basin

Ozarks Water watch is excited to bring you our 10th annual Status of the Watershed Report designed to answer the question, "How is the water?" in the Upper White River basin located in Southwest Missouri and Northwest Arkansas. Monitoring our Ozarks waters is a critical component in protecting our Ozarks economic prosperity and quality of life. Our watershed's natural resources, especially our beautiful rivers, lakes and streams, are the engine that drives our vibrant economy and brings us the visitors who enjoy our region's natural assets.

This report is a summary of data from 12 monitoring projects in the watershed including 7 volunteer groups. In fact, over 1/3 of the data points were collected by volunteers! Over 2,600 water quality measurements were taken on 1,336 different occasions at over 185 locations in the Upper White River basin.

I find it hard to believe I have worked in the water quality arena for 18 years, 10 years with Table Rock Lake Water Quality (that merged with Ozarks Water Watch in 2014) and 8 years with Ozarks Water Watch. And 2018 finds me as President and Executive Director of three nonprofit, charitable organizations; Ozarks Water Watch, Ozarks Clean Water Company and Ozarks Environmental Services. These three companies have a combined mission "To protect water resources and the public health by keeping our Ozarks waters clean and clear."

The focus pollutant of this year's Status report is erosion. Eroding streambanks are among the biggest threats to our rivers and streams. A 1,600-foot stretch of Elk River streambank near Noel, MO has lost over 170,000 tons over a 20-year period, an area 7.5 acres across and 10 feet deep, of soil lost to erosion during flood events. A just completed streambank remediation project spearheaded by The Nature Conservancy in partnership with the Missouri Department of Natural Resources and Tyson Foods, has stopped that erosion.

Not only do these flood events wash sediment into our waterways, the soil contains nutrients such as phosphorous that can lead to algae blooms and unwanted aquatic vegetation. A recent study concluded that streambank remediation is the most cost effective method of reducing nutrient in our waterways after wastewater treatment. I would encourage you to visit our website and sign up for our weekly newsletter to learn about environmental and water issues.

David L. Casaletto

President / Executive Director

Ozarks Water Watch
Ozarks Clean Water Company
Ozarks Environmental Services

Shoreline erosion at Table Rock Lake.

EROSION

The effects of urban runoff are visible in this photo. Note the undercut bank to the left and the channelized inflowing stream to the right.

Erosion is an insidous process that robs us of land, destroys streambanks and shorelines, all while carrying nutrients and other chemicals into our water.

While soil erosion may occur naturally, humans are speeding up the process. Now, excess soil in streams and lakes is one of the largest water pollution problems in our country. Soil can erode not only on the land in the watershed, but can occur in and along the water.

Cut banks are common on streams, the result of high water flow. Just a 1 inch rainfall on 1 acre of land equals more than 100 tons of water. A natural and healthy landscape can absorb the majority of that water. In an urban setting, with streets, roof tops, and parking lots, almost all of the water drains directly to a stream. The unnaturally high flow in streams means more energy that can erode the banks.

In lakes, wave action can scrape away at the shoreline. Wind, boat wakes, and lack of structure to reduce wave energy will contribute to shoreline erosion.

As homeowners and citizens, we can take care to keep the soil on the ground where it belongs. By supporting low impact development and stormwater management, we can reduce the impact of urbanization. By leaving natural vegetation along streambanks and lake shores, we allow the roots to hold soil in place. Aquatic vegetation absorbs energy from moving water and reduces its potential to erode.

For more information, subscribe to the Ozarks Water Watch newsletter. We often discuss these issues and show examples of what we and others are doing in the Upper White River Basin to help.

What can you do to reduce erosion?

- Install rainbarrels on your downspouts
- Build a raingarden in your yard
- Establish and maintain a vegetation buffer along streams and lakes
- Minimize soil disturbance, especially before a rain
- Volunteer to help plant trees and install erosion control structures

Though it will eventually succumb to erosion, this old tree is holding the streambank in place for now.

As erosion claims shorelines and streambanks, it steals our land and pollutes our waters.

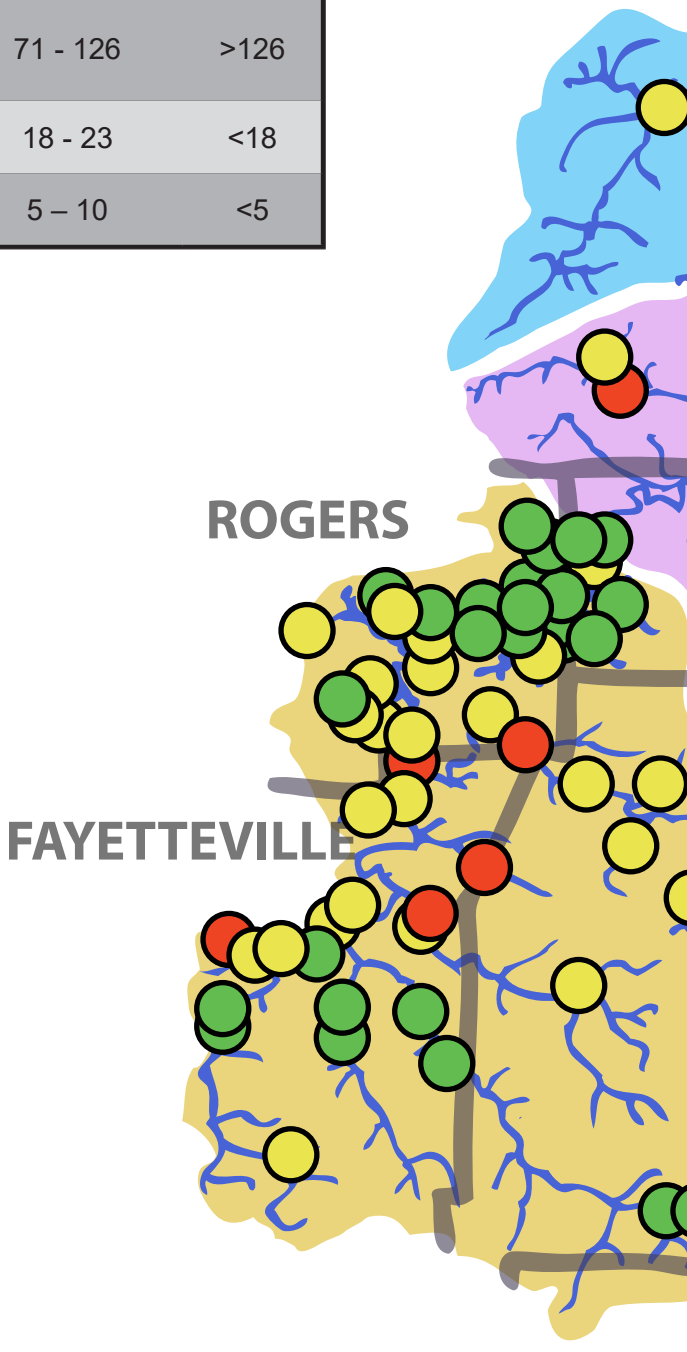
How We Assessed Water Quality

Parameter	Evaluation Method	Water Quality Assessment		
		HIGH	MID	LOW
Dissolved Oxygen	% of samples with >5 mg/L but less than 110% saturation	>75	50 - 74	<50
Total Nitrogen	Geometric mean of all values in mg/L	<0.500	0.501 – 0.900	>0.900
Total Phosphorus	Geometric mean of all values in mg/L	<0.020	0.021 – 0.035	>0.035
E. coli	Geometric mean of colony forming units per 100mL	<70	71 - 126	>126
Invertebrates	Missouri Stream Team Score	>23	18 - 23	<18
Lake Water Clarity	Geometric mean of all values in feet of clarity	>10	5 – 10	<5

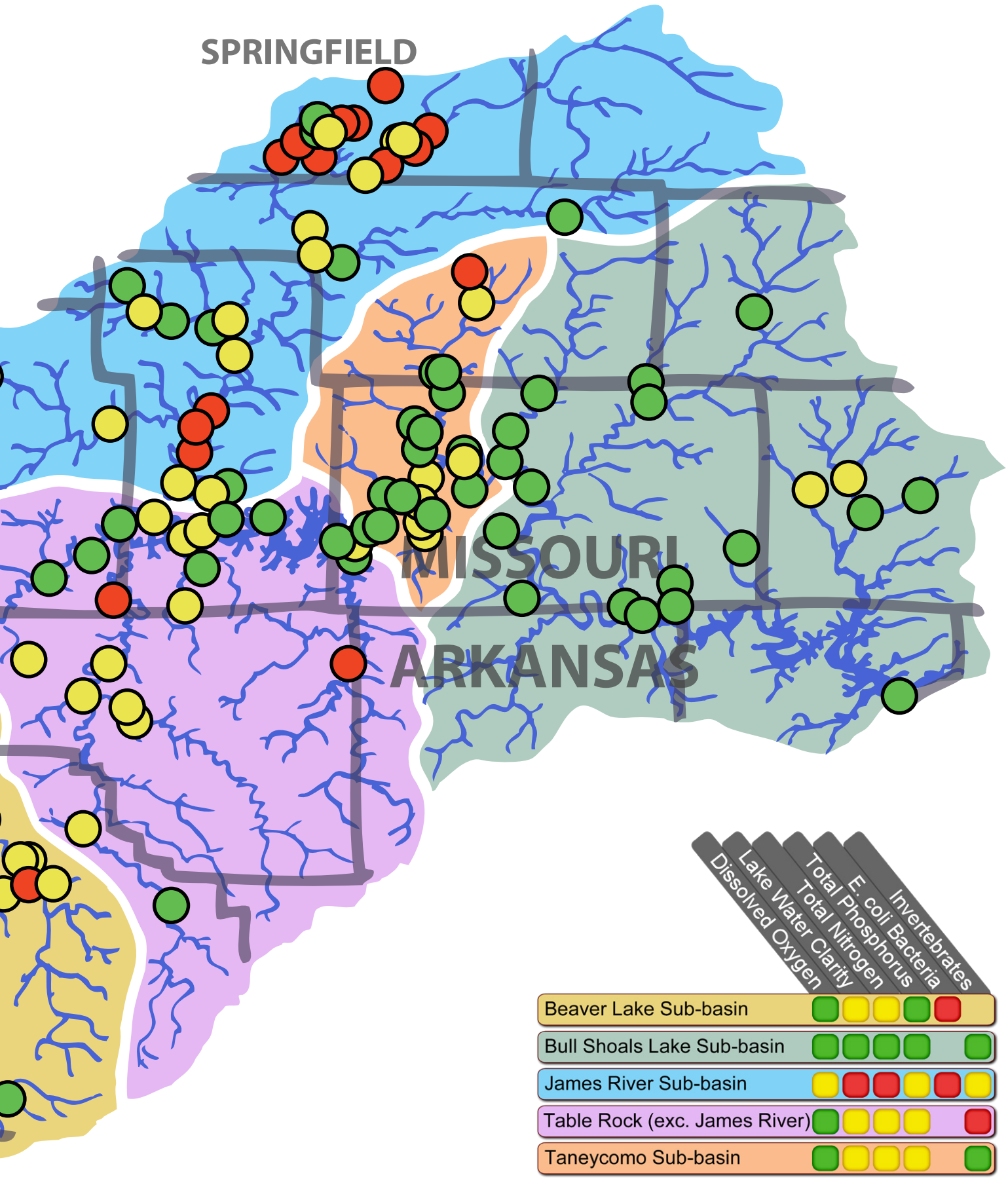
WHAT WAS MEASURED IN 2017?

- 567 Dissolved oxygen values
- 627 Total Nitrogen values
- 927 Total Phosphorus values
- 168 E. coli counts
- 52 Invertebrate scores
- 282 Water clarity readings

The scores in this report show how the numerous monitoring sites in the region compare to one another and are not intended to define “good” or “bad” water quality. What this report attempts to do is show where the highest and lowest *relative* water quality is. Identifying these sites will help us to focus our efforts where they are needed and let us allocate our limited resources accordingly.



For an interactive map, visit
OZARKSWATERWATCH.ORG


SPRINGFIELD
MISSOURI
ARKANSAS
Invertebrates
E. coli Bacteria
Total Phosphorus
Total Nitrogen
Lake Water Clarity
Dissolved Oxygen
Beaver Lake Sub-basin
Bull Shoals Lake Sub-basin
James River Sub-basin
Table Rock (exc. James River)
Taneycomo Sub-basin

There are many ways to measure water quality.

Depending on what is measured, one can determine if a lake or stream can support the many life forms within it. Measurements can also help us ascertain if a lake or stream is likely to have problems in the future, has experienced a problem in the past or is unsafe for humans to swim in. We looked at six such water quality parameters to help us rank water quality in the region.

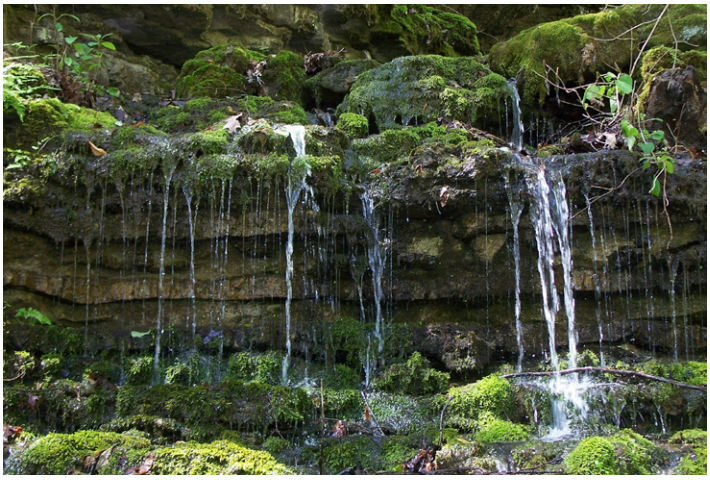
Oxygen and water clarity show current water quality. Phosphorus and nitrogen are nutrients that show the potential for future algae problems. Aquatic invertebrates estimate water quality of the recent past. E. coli is an indicator of pontential danger to human health.

The colored bars show the percentage of sites monitored with each of the relative water quality assessments described on the previous page (high, medium, low).

Dissolved Oxygen:
Essential for aquatic life

We humans can breathe oxygen directly from the air around us. Fish and other aquatic organisms must extract dissolved oxygen (DO) from the water they live in. Certain pollutants can reduce DO, making water unsuitable for aquatic life. Sometimes, due to excessive algae growth, DO levels are too high. This is also bad for aquatic life.

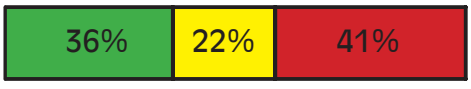
In most cases where DO concentrations are a concern, the actual values were higher than desired. This condition suggests the presence of too much algae. The solution is usually to reduce the amount of nutrients entering the water.



Phosphorus and Nitrogen:
Nutrients that drive algae growth

High nutrient levels lead to higher than normal algae growth. Changes in algae growth can alter the natural aquatic communities in our lakes and streams by changing habitat and the amount of dissolved oxygen. Some algae even produce toxins.

Nutrients enter our waters from various sources, including septic systems and sewage effluent, animal waste, excessive fertilization of lawns and fields, and runoff from agricultural and urban areas. To help reduce nutrient pollution at home, maintain your septic system (if you have one), fertilize your lawn sparingly, and pick up after your pets.



Secchi Transparency:
A measure of water clarity

The Secchi disk is a small plate-like device that is lowered into lakes to determine water clarity. Poor water clarity is usually caused by algae or sediment in the water.

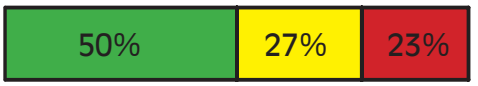
Of the 72 sites in the watershed where Secchi measurements were taken, 69% had at least 5 feet of clarity. The sites with the least clarity tended to be near inflowing streams. Because of their proximity to sediment and nutrient sources, it is expected that these sites would have lower water clarity than sites in the main lake channels.

Secchi
72 Sites

Aquatic Invertebrates:
Living indicators of stream health

Invertebrates are simply animals without spines. Many insects (one group of invertebrates) commonly seen around lakes and streams begin their life in the water. Dragonflies, mayflies and caddisflies spend most of their lives in the water, eventually emerging to mate and die. Other invertebrates, like mussels and crayfish, may live their entire lives under water.

Some stream invertebrates are very sensitive to pollution, while others are very tolerant of pollution. The presence of certain invertebrates in the stream provide insight to a stream's health, both short and long-term.



Invertebrates
30 Sites

E. coli:
Bacteria associated with fecal matter

While some strains of E. coli can be harmful to humans, these bacteria are used as an indicator of other harmful organisms associated with human fecal contamination. Low background levels are common, due to the presence of pets and wildlife.

Data from only 11 sites monitored in 2017 were contributed to this report. These sites are primarily in urban areas or areas of concern. The E. coli data presented here do not represent the watershed as a whole.

E. coli
11 Sites

White River Valley Electric Cooperative

A Touchstone Energy® Cooperative

Ozarks Water Watch would like to thank White River Valley Electric Cooperative for their generous support of this report.

This report features data provided by:

Ozarks Water Watch volunteers collected total nitrogen and total phosphorus samples at 22 Missouri stream sites.

Beaver LakeSmart volunteers sampled at 5 sites on Beaver Lake. This report features their Secchi, total phosphorus and total nitrogen data.

Stream Smart volunteers monitored 19 stream sites in the UWRB. Included in this report are their total nitrogen and total phosphorus data.

Missouri Stream Team volunteers monitored 29 sites in the Upper White River Basin (UWRB). This report features their dissolved oxygen and invertebrate data.

Secchi Day on Beaver Lake volunteers sampled at 35 Beaver Lake sites. This report features their total phosphorus and water clarity data.

The Lakes of Missouri Volunteer Program volunteers monitored 29 lake sites. Their total nitrogen, total phosphorus and water clarity data are featured in this report.

James River Basin Partnership volunteers monitored invertebrates at 5 sites on the James River for Missouri Stream Team.

United States Geologic Survey (USGS) monitored 26 sites for total nitrogen, total phosphorus, and dissolved oxygen.

Arkansas Department of Environmental Quality (ADEQ) measured total nitrogen, total phosphorus, and dissolved oxygen at 22 sites.

Taney County monitored 27 sites for concentrations of dissolved oxygen.

Beaver Water District measured total nitrogen, total phosphorus, dissolved oxygen, and E. coli bacteria at 8 locations.

The City of Springfield measured E. coli at 4 locations.