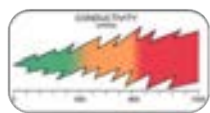
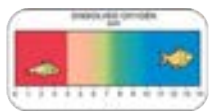


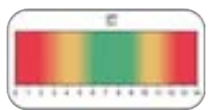
## What We Measure



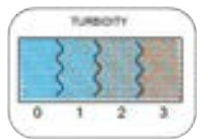
Conductivity is a measure of the dissolved solids in the water.



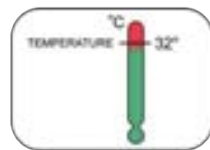
Aquatic animals need DO levels above 4ppm to survive.



Normal pH is between 6-9. Low pH means conditions are acidic, which can be harmful.



Turbidity is a measure of water clarity. High turbidity can be harmful to aquatic life.



Temperatures above 32 degrees C are stressful for aquatic life.



*E. coli* levels above 240 MPL/100 may cause health issues in humans.

## Basin Health Scores

This Report Card looks at Volunteer Data and breaks it into two scores.

***E. coli* Score:** Looks at bacteria (*E. coli*) in the stream and indicates how safe the levels are relative to swimming safety standards.

**Field Chemistry Score:** Looks at the water chemistry data and tells you how many times a problem was found during sampling for the year.

## Next Steps

Many samples collected in 2017 were within ranges for healthy streams. Most water quality issues that were observed were related to low dissolved oxygen and high *E. coli* concentrations.

Communities can do a lot to influence water quality by using Best Management Practices (BMPs) that help to minimize Runoff Pollution entering the streams.

**Rain Gardens:** Rain gardens add beauty to your yard and the native plants soak up rain water, filtering pollutants like bacteria, sediment, and chemicals

**Permeable Pavers/Concrete:** This type of green infrastructure allows water to soak into the ground, preventing it from running across a parking lot where it can pick up pollutants.

**Rain Barrels:** Capture rain water from your roof to prevent runoff pollution and get a cheap source of water for your yard.

**Riparian Buffers:** Riparian Buffers are an area of plants along a creek side that help filter pollutants out of storm water runoff.

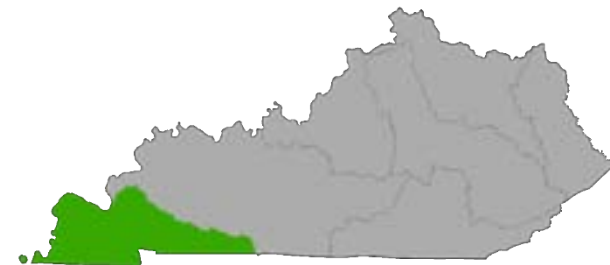


# FOUR RIVERS BASIN Report Card 2017



**WATERSHED  
WATCH  
IN KENTUCKY**  
*Explore. Connect. Protect.*

## What's Your Basin Score?



## Four Rivers Basin

Four Rivers Watershed Watch (FRWW) has volunteers in both Kentucky and Tennessee. FRWW began training volunteers in 1999, and has continued to sample for *E. coli* and field chemistry in streams and lakes in the Lower Cumberland,, Lower Ohio, Mississippi and Tennessee River basins.

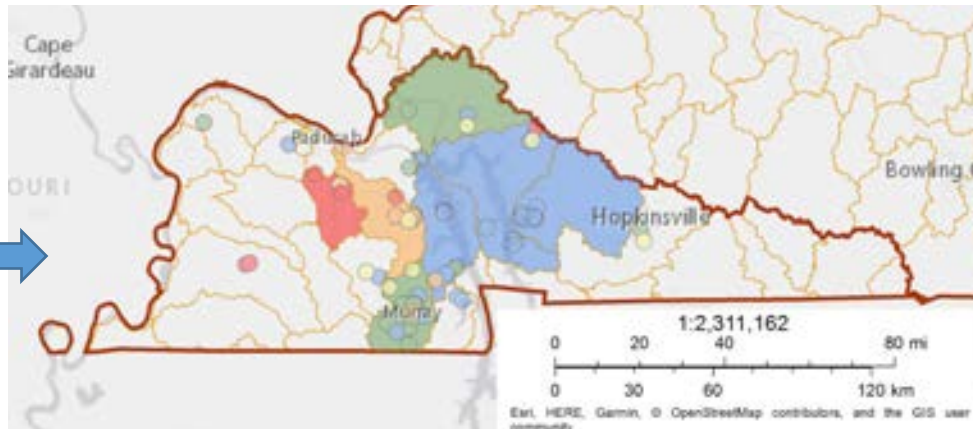
## Measuring Your Watershed

Watershed Watch in Kentucky (WWKY) is a state-wide citizen science program. It's mission is to teach volunteers to measure water health indicators that tell us how well a given stream meets state water quality standards for human health and safety, as well as for supporting healthy ecosystems. In this report we present the basic sampling results from your WWKY basin team, and talk about where the program has detected issues.

### **E.coli Score**

Each site receives a score based on the amount of bacteria (MPN/100mL) detected.

When there are at least 3 sites in a subwatershed, they receive a score based on the geomean of bacteria concentrations measured throughout the year.



**E.coli:** Graded Sites (Geomean per year)

- F (>2400) ● D (700.1-2400) ● C (240.01-700) ● B (130.01-240) ● A (0-130)

**E.coli:** Graded Local Basins/HUC10 (Geomean)

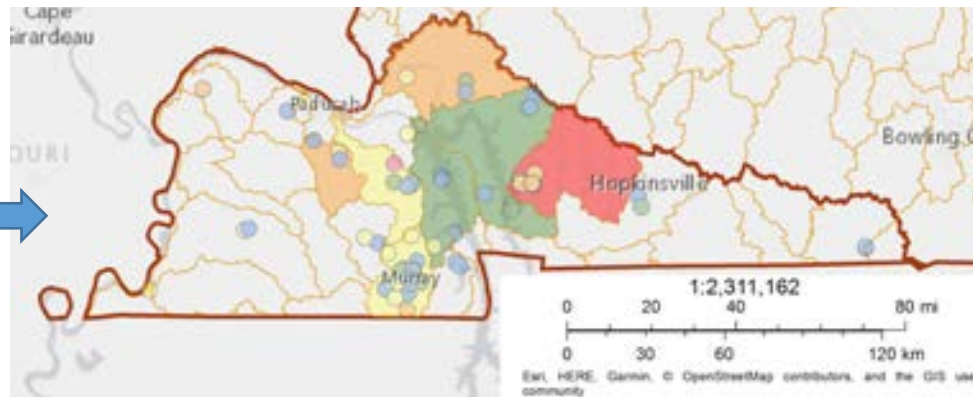
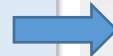
- F (>2400) ■ D (700.1-2400) ■ C (240.01-700) ■ B (130.01-240) ■ A (0-130)   Not Graded (less than 3 sites for analyses)

### **Field Chemistry Score**

The Field Chemistry Score tells us how healthy the water is for the fish and bugs in the stream. When we find that a parameter is out of the healthy range, the site receives a “flag”. The icons on the map show the number of flags that each site received for the year.

When a sub-watershed has 3 or more sampling sites, we are able to calculate a Field Chemistry Score for that area.

$$\frac{\text{Total \# Flags in the Watershed}}{\text{Total \# Sample Events in Watershed}} \times 100\% = \text{FC \%}$$



**Field Chem:** Sites (# of Water Quality Exceedances per year)

- 5+ Exceedances ● 4 Exceedances ● 3 Exceedances ● 2 Exceedances ● 1 Exceedance ● 0 Exceedances

**Field Chem:** Graded Local Basins/HUC10 (% Exceedances)

- F (>60% Exceedance) ■ D (41-60% Exceedance) ■ C (26-40% Exceedance)   Not Graded (less than 3 sites for analyses)
- B (11-25% Exceedance) ■ A (<10% Exceedance)

### But wait, there’s more...

These scores only take into account the basic WWKY water chemistry and bacteria samples that were collected. Check out the WWKY Data Portal to download all the data from this area at: <http://kgs.uky.edu/wwky/main.htm>

### How do we calculate the scores?

Volunteers collect water samples 3 times a year, in Spring, Summer and Fall. In order to generate a score for a subwatershed, there must be at least 3 sampling sites in that area. Where there is not enough data to generate a score, the map icons show individual site results.



### How Healthy is My Basin?

#### The Good

Five of the seven subwatersheds (with three sites or more) received A’s or B’s for human recreation in 2017.

Jonathan Creek-Kentucky Lake and Eddy Creek-Cumberland River both received A’s for aquatic habitat, indicating that field chemistry is not hindering aquatic life.

#### The Bad

Lower Clarks River and Lower West Fork Clarks River may not be safe for human recreation, as they received a D and F for *E. coli*, respectively.

Field Chemistry Scores indicate that streams in the Four Rivers Basin may have problems supporting fish and bugs in the stream. Livingston Creek-Cumberland River, Lower West Fork Clarks River, and Lower Little River received D’s or F’s for field chemistry. Dissolved oxygen and conductivity were indicated as potential problem areas in these regions.

Additional sampling is needed throughout the Four Rivers Basin to better characterize many of the subwatersheds.