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 Published on 6/4/18

Lost Creek Watershed

Department for Environmental Protection - Division of Water

In the 1960s, government officials started to realize how polluted streams, rivers, and lakes of the United States had become. In 1972, Congress passed laws, known as **The Clean Water Act (CWA)**, to protect surface water. The goal of the CWA is for all waters in the U.S. to be safe for swimming, fishing, and drinking (called **designated uses**).

We rely on local water sources for water to drink. We pay water treatment plants to withdraw and treat water with chemicals or other processes to make it safe for drinking. The dirtier the water, the more expensive it is to clean the water, which makes drinking water more expensive. The cleanliness of water is also referred to as **water quality**.

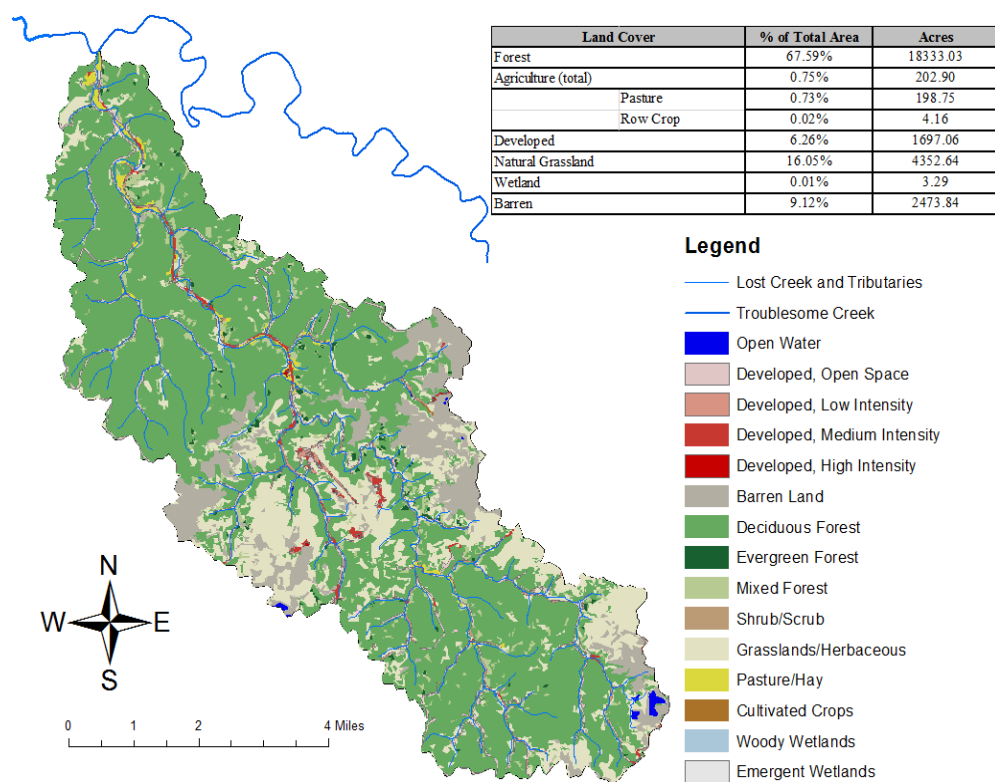
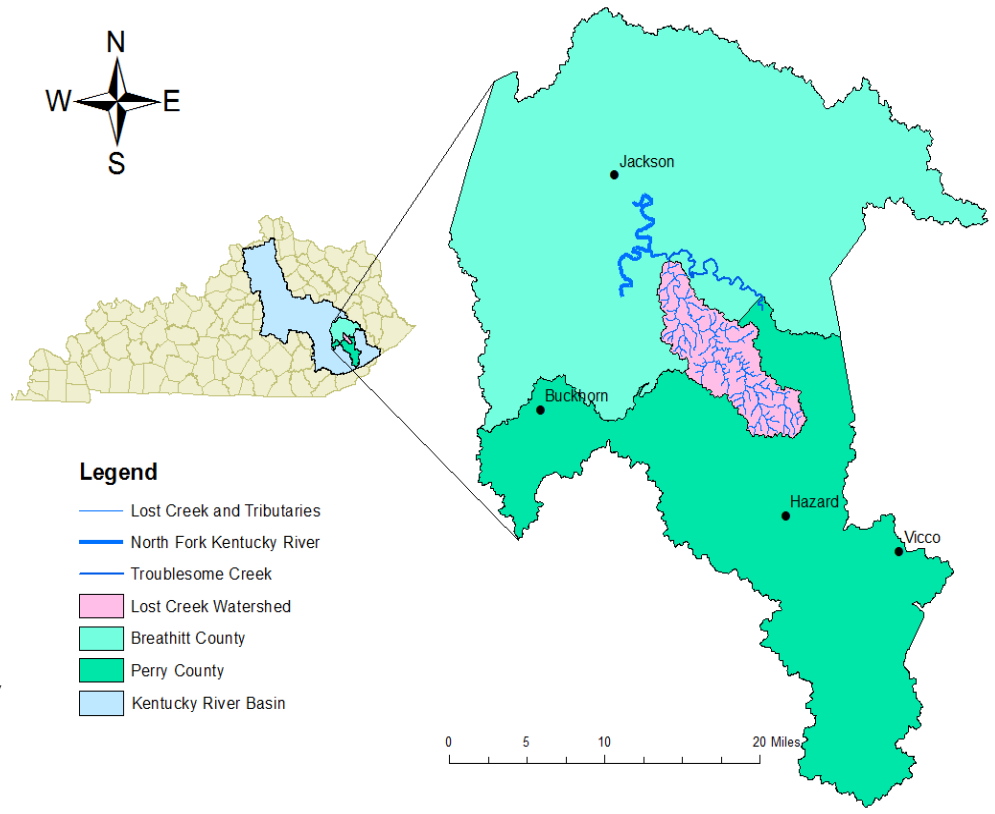
We all affect water quality because everyone lives in a watershed. A **watershed** is an area of land where runoff flows to a common stream. When streams come together, the two streams' watersheds combine to make a larger watershed. The Lost Creek Watershed (see upper map on this page) is a small watershed within a much larger watershed called the Kentucky River Basin.

There are two types of pollution that affect a watershed: **point sources** and **non-point sources**. Point sources are any distinct points from which pollutants are or may be discharged. Examples include any pipe, ditch, channel, tunnel, well, or concentrated animal feeding operation. Nonpoint sources are pollutants originating from the land surface that have no well-defined source. The pollutants are generally carried off the land by storm water.

Land cover is the best way to understand how humans may potentially pollute the watershed in which they live. Cities and towns tend to have more point sources due to the number of facilities required to clean the water used in households and businesses, and may also have an increase in non-point sources due to impervious surfaces such as roads, parking lots, and sidewalks. Rural areas tend to have more nonpoint source pollution associated with agriculture. Animal waste, fertilizers, pesticides, and loose soil, which is exposed when trees are cut down, may enter the stream during rain events.

The lower map on this page shows the land cover for the Lost Creek Watershed. Much of the watershed is green, demon-

strating that the major land cover is deciduous forest. Barren land and grasslands are also major features of the landscape. This is due to reclaimed and active coal mining.



The Clean Water Act, Impaired Waters, and TMDLs

The Clean Water Act (CWA) requires states to submit a report to congress, called the **305(b) list**, which reports the water quality of streams, rivers, and lakes within the state that have been assessed. To prepare this report, the Kentucky Division of Water (DOW) identifies the **designated uses** of a waterbody and then assesses the waterbody to see if the water is clean enough to meet these uses. If the stream is not clean enough to meet its uses, the stream is found to be impaired.

An example of designated use is:

Warm Water Aquatic Habitat (WAH) - water quality promotes a healthy population of plants and animals that live in the water.

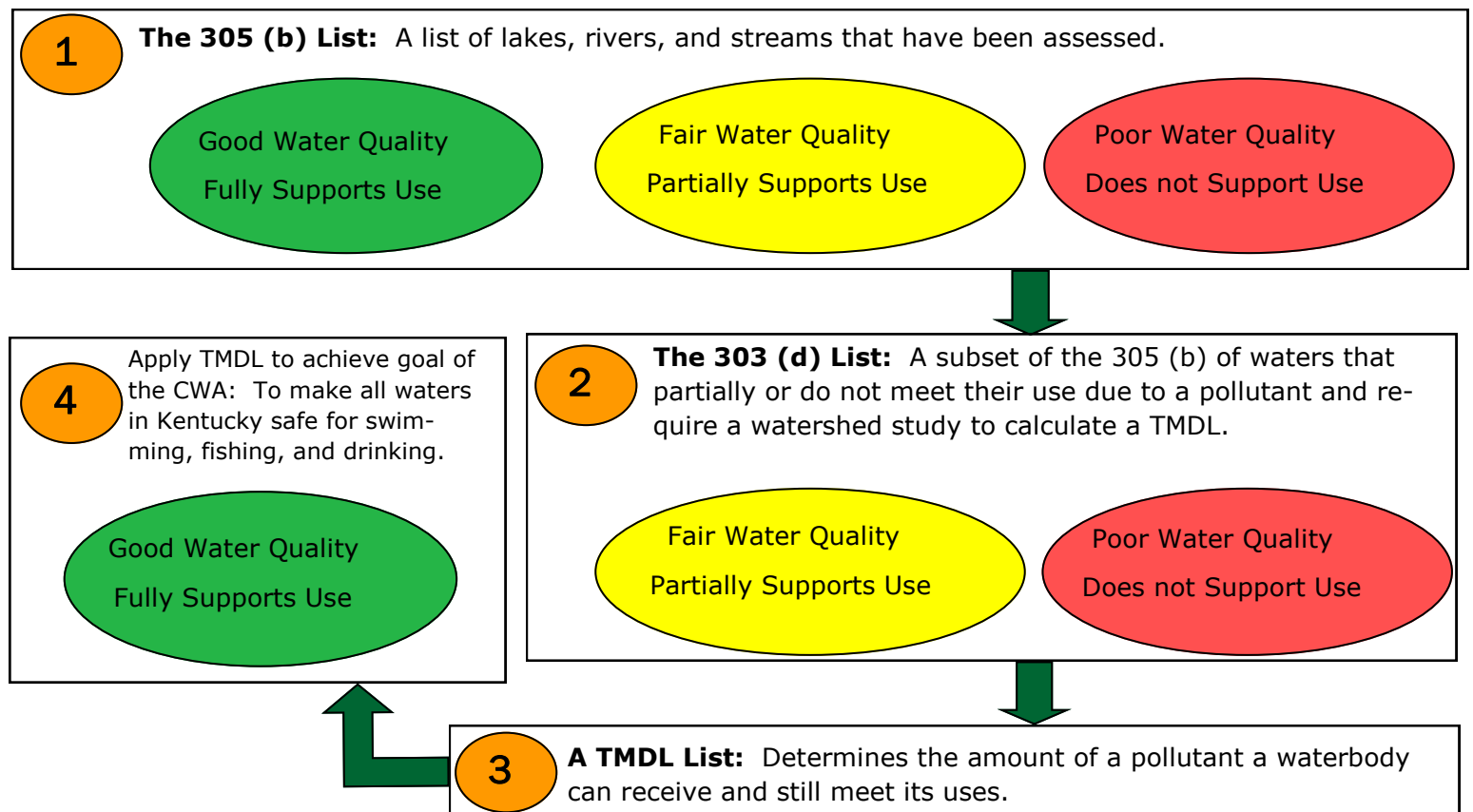
Another requirement of the CWA is the **303(d) list of impaired waters**. This report lists all of the assessed waters from the 305(b) list that do not support their uses and identifies the impairment as being caused by a **pollutant**, even though impairments can result from pollution or pollutants. **Pollution** is a general term that refers to something that causes instability, disorder, harm, or discomfort to an ecosystem and can include removing habitat from a streambank to littering. **Pollutants** are measureable substances that contribute to pollution that make the water harmful or unsuitable for a

specific purpose; examples include chemicals or waste products.

Only impairments caused by a pollutant are placed on the 303(d) list since waters on the 303(d) list require a pollutant load reduction plan, usually in the form of a **Total Maximum Daily Load (TMDL)**. A TMDL calculation is the total amount of pollutant(s) a waterbody can receive and still meet its designated use(s). A TMDL can be thought of as a watershed diet; the watershed's intake of a pollutant must be reduced by a certain percentage in order for the watershed to be healthy once again.

To be impaired for WAH, the fish and aquatic bug populations have reduced numbers or types due to a lack of habitat, which provides refuge, and/or pollutants present in the water, such as nutrients or sediment, that negatively impact their ability to breath, feed, or reproduce.

Since Lost Creek and its tributaries do not support some of their designated uses, and the cause of the impairment was identified as a pollutant, it is on the 303(d) list of impaired waters and requires a TMDL for those stream segments. Therefore, a watershed study has been initiated for Lost Creek.



Lost Creek Watershed Study

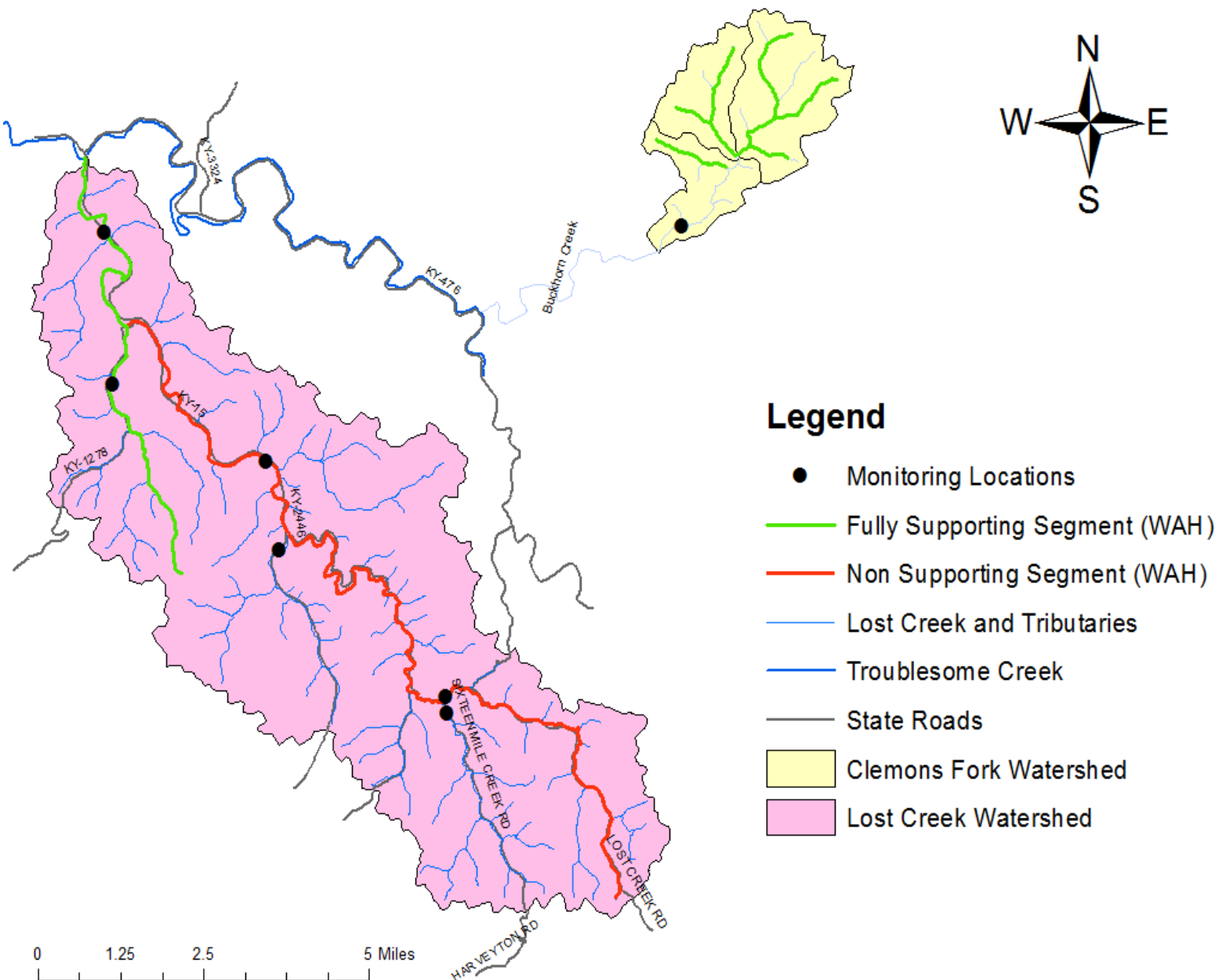
Lost Creek is a 43mi² tributary of Troublesome Creek, which flows into the North Fork Kentucky River in Breathitt County. Lost Creek was listed on the 2016 303(d) list as impaired for its WAH designated use and the causes of impairment were identified as sedimentation/siltation, turbidity, total dissolved solids, and lead. Lost Creek (river mile 3.7 to 20.4) does **not support** the WAH designated use and is therefore highlighted **red** (see map below).

Lost Creek in its entirety (river mile 0.0-20.4) also does **not support** the Primary Contact Recreation (PCR) use. The cause of impairment for PCR is *E. coli*. Although this is not the focus of this study, it is still important in fully understanding the health of the watershed.

Several new WAH impairments within the North Fork Kentucky River basin listed on the 2016 303(d) list were attributed to the pollutant lead. Data collected throughout the basin from 2012 – 2014 showed an increase in lead levels that had not been seen in previous years of data collec-

tion. Recent data collected within the basin indicate that lead levels may be dropping, although elevated levels are still being observed periodically. In an effort to better characterize these WAH impairments, a smaller tributary (Lost Creek) within the North Fork Kentucky River drainage was chosen for an intensive monitoring study. The data collected for this study will be used to support updated 305(b) WAH use-attainment assessments throughout the watershed.

Lost Creek will be studied from March 2018 to February 2019 by the Kentucky DOW. DOW biologists will sample six sites in the Lost Creek watershed as well as one site in the Clemons Fork watershed (used as a reference site) monthly for 12 months at the locations shown in the map below. The parameters being measured or collected are defined on the next page.



Each measurement made or sample collected is considered an indicator of **Water Quality** or **Biological Health**. These indicators demonstrate how pollution entering the stream impacts the overall health of the **Lost Creek Watershed**. Below, indicators of watershed health that DOW biologists will measure or collect are defined.

Indicators of Water Quality



Dissolved Oxygen: The concentration of oxygen dissolved in water that is readily available to fish and other aquatic organisms.



Specific Conductivity: A measure of the ability of water to conduct an electrical current, which is used for approximating the amount of dissolved substances in water. When specific conductivity is elevated above natural levels, it may negatively impact fish and aquatic bugs.



Sedimentation: Soil, sand, and minerals washed from land or stream banks into water, usually after rain. Sediment can be suspended in the water column, making the water turbid, or it can deposit on the stream bottom when water flow slows and loses energy.



pH: An expression of the basic or acidic condition of a liquid; it may range from 0 to 14, where 0 is the most acidic, 14 is the most basic, and 7 is neutral. Natural, healthy waters have a pH between 6 and 9.



Metals: Metals are present in water as ions and can occur naturally or from pollution. Metals that occur naturally result from rock, soil, and minerals coming into contact with water. Metals that result from pollution enter the stream from waste water facilities, industrial activities, mining, or runoff that absorbs metals from the landscape as it travels to the stream. Excess metals are toxic to many aquatic animals, make the water unsafe for drinking, and increase treatment costs.



Nutrient Enrichment: Although natural levels of nutrients are part of a healthy watershed, excess nutrients can cause water quality problems. Human activities that can contribute nutrients include: municipal sewage treatment plants, industrial outflows, failing septic systems, commercial fertilizers, and animal waste.

Indicators of Biological Health



Habitat: Stream habitat is assessed by scoring 10 habitat signs, which are both living and nonliving parts of the surroundings that support an organism, population, or community.



Aquatic Macroinvertebrates (bugs): An animal without a backbone, large enough to be seen with the naked eye. They are often the immature forms of insects that live on land as adults and are an important food source for fish. Different species prefer different habitats, and some are more tolerant of pollution than others.

What can you expect?

- Over the **next year**, DOW biologists will collect water and biological samples in the watershed every month. If you see them, feel free to ask questions about their work.
- Within the **next three years**, DOW will distribute an informal "health report" of the Lost Creek Watershed to share results of the study and explain ways the community can help improve water quality.
- Within the next **five years**, a pollution reduction plan such as a TMDL may be written for the Lost Creek Watershed. The plan will outline which pollutants need to be reduced and by how much for the watershed to meet its designated uses.
- Within the **decade**, TMDL implementation and community efforts may help improve water quality and biological health of the Lost Creek Watershed.
- To stay informed, **LIKE** 'Kentucky Watershed Health Reports' on Facebook.
- Visit our website and view the story map at <http://water.ky.gov/waterquality/Pages/TMDLProgram.aspx>
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(scan to link to our Facebook page)

