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Woolper Creek Watershed Health Report

September 4th, 2014

In the 1960s government officials started to realize how polluted streams, rivers and lakes of the U.S. 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 **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 we all live 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. Many small creeks, such as Ashbys Fork and Allen Fork, flow into Woolper Creek. Eventually, Woolper Creek flows into the Ohio River, and is therefore part of the Ohio River Watershed (see map below).

There are two types of pollution that can affect a watershed: **point sources** and **nonpoint 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.

Woolper Creek Report Card

C+





	Dissolved Oxygen: A
	Nutrients: B
	E. coli: C-
	Sediment: B-
	Macroinvertebrates (Bugs): C
	Total Habitat: C
	Available Cover: B-
	Riparian Zone: C+

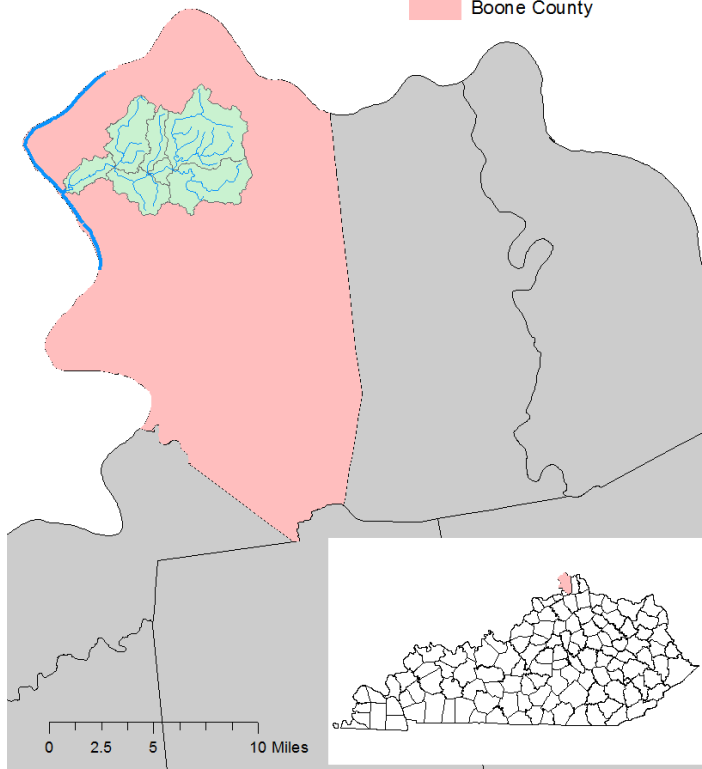
The pollutants are generally carried off the land by storm water.

The way we **use and live on our land** is the best way to understand how humans may potentially pollute the watershed in which they live. Two major forms of land use are urban and agriculture. 1) Urban areas 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 nonpoint sources due to impervious surfaces such as roads, parking lots and sidewalks. When areas of land are covered with buildings, pavement, and other structures, rain and snowmelt is prevented from soaking into the ground, disrupting the natural water cycle. 2) 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 **Boone County Conservation District** received a grant from the U.S. Environmental Protection Agency under §319(h) of the Clean Water Act through the Kentucky Division of Water. This grant money funded, in part, water quality and biological monitoring in the Woolper Creek Watershed in 2012 and 2013. Based on the data they collected, KDOW has given a "report card grade" of **C+** to the Woolper Creek Watershed. This watershed health report explains where the segments of creeks with poor grades are located, describes the indicators of health that went into calculating the grades for each watershed, and provides information on how the grades can be improved.

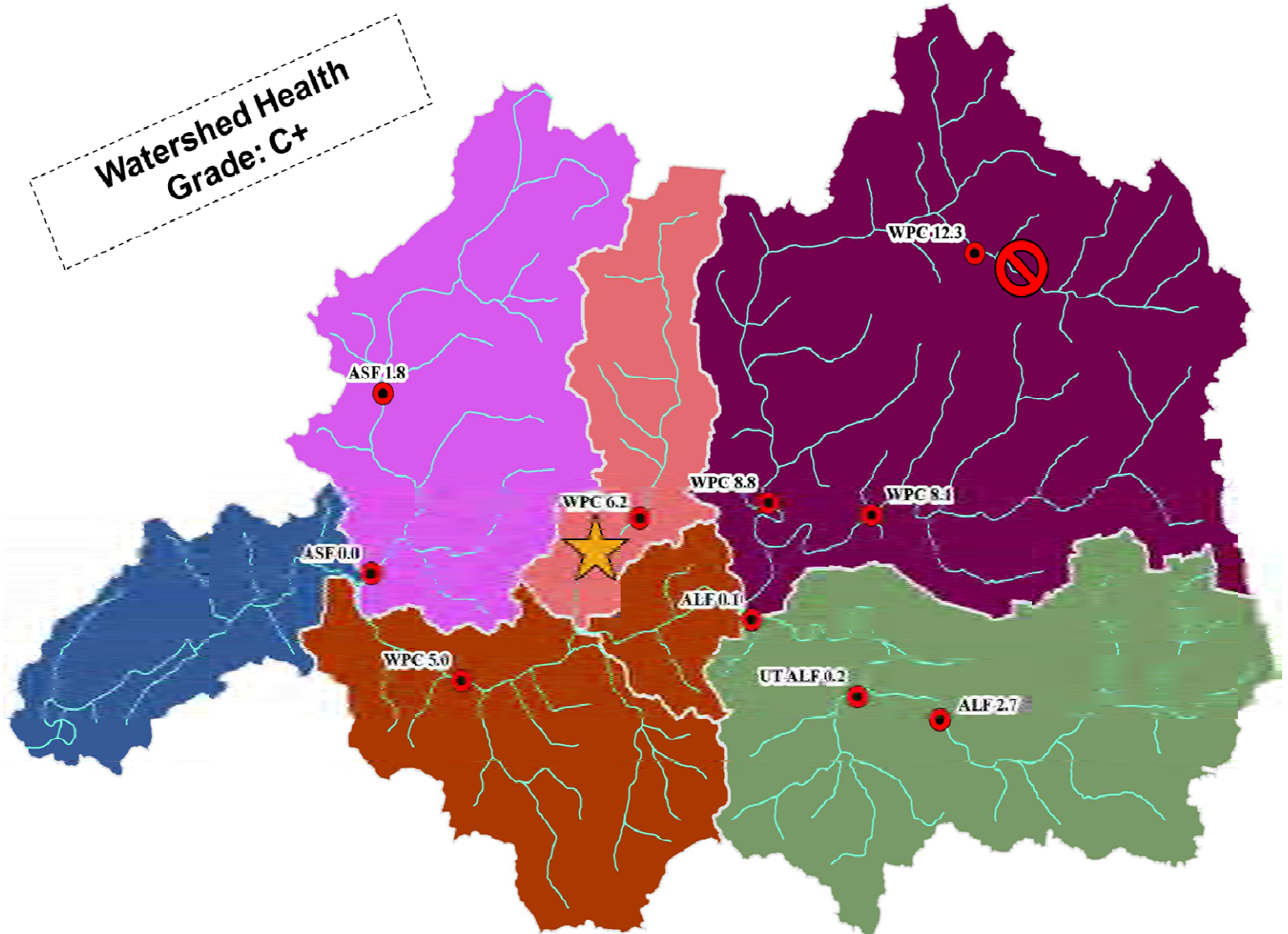
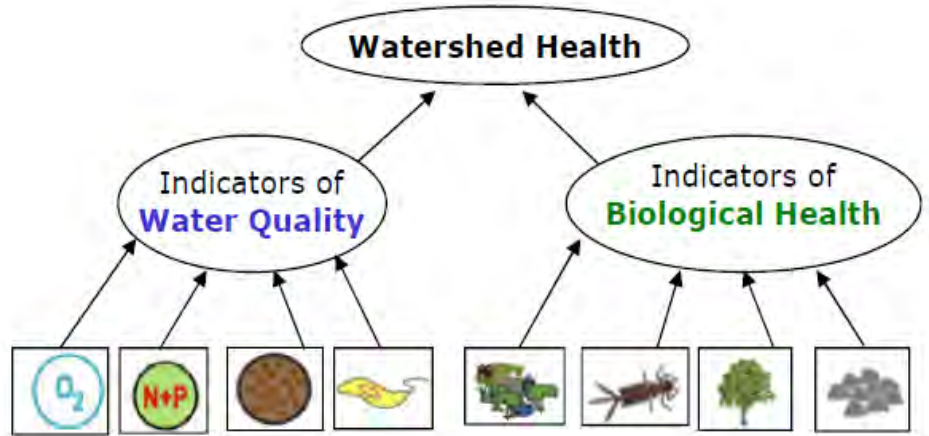



-  Woolper Creek Streams
-  Ohio River
-  Woolper Creek Watershed
-  Boone County




How was Woolper Creek Graded?

1. Information collected was divided into indicators of **water quality** or indicators of **biological health**.
2. Each indicator received a grade, A through F, according to the results of our study, which were compared to health and science requirements and KDOW scientific information.
3. The grades from each biological health indicator were averaged to achieve a biological health score.
4. Similarly, each indicator of water quality was averaged to achieve a water quality score.
5. These two scores were averaged to achieve a **watershed health grade**.



 **Worst in Show:** WPC 12.3 had the lowest overall grade with a C. Degraded habitat, reduced bug populations, and high levels of *E. coli* were common themes. WPC 12.3 had the lowest riparian zone score in the watershed and tied with WPC 8.1 for the worst *E. coli* score.

 **Best in Show:** Double Lick Creek (WPC 6.2) had the highest overall grade with a B+. Improved habitat, available cover and riparian zone along with a lack of sedimentation kept this site at the top. However, improvements could still be made to the *E. coli* scores.

Indicators of Water Quality



Dissolved Oxygen (DO): Concentration of oxygen dissolved in water and readily available to fish and other aquatic organisms.



Nitrogen and Phosphorus (Nutrients): Although natural sources of nutrients exist, human activity is a major source of nutrient pollution, including municipal sewage treatment plants, industrial outflows, commercial fertilizers and animal waste.



***E. coli*:** A type of bacteria that lives in the intestinal tract of humans and other warm-blooded animals. *E. coli* is used to indicate the potential risk of contracting a gastrointestinal illness resulting from contact with surface water. *E. coli* is measured during the warmer, recreational months of May thru October. This period of time is called the Primary Contact Recreation season. To receive an A, and therefore not be impaired for Primary Contact Recreation (PCR), the *E. coli* concentrations were above the level considered safe for swimming 0–20% of the time. Grades B through F indicate an impairment for PCR and reflect *E. coli* levels that were above the standard 20–100% of the time.



Sediment: 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.

Indicators of Biological Health



Total Habitat: Stream habitat is assessed by scoring 10 habitat indicators, 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.



Riparian Zone: A component of total habitat that is defined by the land adjacent to a stream that has distinct soil types and plant communities, which aid in absorbing water and shading the stream. To receive an A, the riparian zone must be at least 18 yards wide on each side of the stream.



Available Cover: A component of total habitat, which looks at the quantity and variety of structures in the creek that provide fish and aquatic bugs a place to hide, feed, reproduce and raise young. Examples include cobble and boulders, fallen trees, logs, branches, root mats, undercut banks and aquatic vegetation.

Creek Name (Map Name)									Site Grade
Allen Fork (ALF 0.1)	A	B+	C	C-	C	D	D	B	C
Allen Fork (ALF 2.7)	B	B	D	B-	C	D	C	B	C
Ashbys Fork (ASF 0.0)	B	B	C	C-	B	D	C	D	C
Ashbys Fork (ASF 1.8)	A	B	B	B	B	D	B	B	B
Tributary of Allen Fork (UT ALF 0.2)	B	B-	D	C	C	D	B	B	C
Woolper Creek (WPC 12.3)	A	B	F	B	C	D	B	F	C
Woolper Creek (WPC 5.0)	B	B	C	B-	C	C	B	C	B-
Double Lick Creek (WPC 6.2)	A	B-	C	B+	C	A	A	A	B+
Tributary of Woolper Creek (WPC 8.1)	C	B	F	B	C	C	B	B	C
Woolper Creek (WPC 8.8)	A	B	C	B	C	A	B	B	B
Indicator Grade	A	B	C-	B-	C	C	B-	C+	

Summary

Dissolved oxygen (DO) levels were suitable for fish and bugs most of the time, making DO the highest scoring indicator. The exception was at site WPC 8.1, which scored a C and often had low DO levels during the spring and summer months.

Nutrient levels scored a B, on average, but some sites did experience elevated levels of nutrients occasionally. Therefore, nutrients should be managed accordingly so that this indicator of water quality remains in the positive column.

Available Cover levels scored a B- on average, but ranged between a B and D, demonstrating that this indicator is variable throughout the Woolper Creek Watershed. Available cover is important for a healthy population of aquatic bugs and fish and should be protected or enhanced to improve this indicator's overall score.

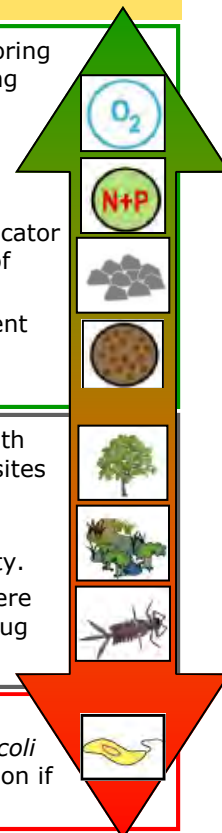
Sediment, on average, scored a B-. Some sites are experiencing sedimentation, which occurs when sediment coming into the watershed during rain events settles along the creek bottom during low flow, which buries habitat or makes the habitat unstable.

The Riparian Zone scored a C-, on average, but ranged between a B and F. This indicator of biological health varied greatly throughout the watershed, with some sites having a relatively wide riparian zone while other sites had a riparian zone that was greatly reduced or non-existent.

Habitat scored mostly Ds, but due to a few As and Cs, the average score was a C. Habitat degradation is a common theme throughout Woolper Creek watershed, and should be improved to enhance biological diversity.

Aquatic macroinvertebrates (bugs) scored a C, on average, and scored Cs at all sites but 2, where Bs were achieved. The lack of quality habitat in addition to localized water quality issues seem to be impacting the bug populations negatively.

E. coli levels were above the standard considered safe for swimming between 50% (C) and 100% (F) of the time, depending on the site. The overall score was a C-, making this the lowest scoring indicator. When *E. coli* levels are elevated, there is an increased risk of gastrointestinal illness if the water is swallowed or an infection if contact is made with an open sore or wound.



What can you do?

- **Protect the good** that remains. Work with local government and land owners to protect areas that are less degraded. Practice responsible land management and development to minimize further degradation.
- **Trees and other plants protect and restore water quality and biological health.**
 - ◇ Leave in place or establish trees and other vegetation along streams to provide natural filters that stabilize stream banks, minimize erosion, regulate water flow, provide shade, retain sediment, absorb excess nutrients and provide habitat.
 - ◇ Don't mow to the edge of a stream. Leave a buffer of trees and other vegetation at least 18 yards wide along the stream bank.
 - ◇ Allow fallen trees, logs, leaves, gravel, cobble and boulders to remain in the stream to create habitat for fish and macroinvertebrates to feed, find refuge and reproduce.
 - ◇ Minimize streamside grazing by animals.
- **To reduce sediment and/or nutrient inputs**
 - ◇ Maintain streamside vegetation.
 - ◇ Plant cover crops.
 - ◇ Install settling ponds.
 - ◇ Reduce animal access to streamside grazing.
 - ◇ Guard waterways during construction activities.
 - ◇ Have your soil tested and apply fertilizers according to the results of the soil test. Apply pesticides according to label directions. Check the weather before applying fertilizers and pesticides to be sure they will be absorbed before it rains.
- **To keep water safe for swimming**
 - ◇ Maintain functional septic systems and replace failing septic systems.
 - ◇ Pick up after your pets. Dispose of animal waste properly.
 - ◇ Reduce animal access to streamside grazing.
- **Other Tips**
 - ◇ Keep grass clippings and petroleum products out of storm drains. This material enters the stream directly without treatment.
 - ◇ Dispose of trash and recyclables properly.
- **Volunteer**
 - ◇ Become a citizen water quality monitor by joining Kentucky Watershed Watch. Visit water.ky.gov/wsw/Pages/default.aspx or contact Jo Ann Palmer at 800-928-0045 or JoAnn.Palmer@ky.gov
 - ◇ Organize a creek clean-up to remove litter along and within Woolper Creek.
- **Education and Resources**
 - ◇ Making decisions with water quality in mind: Bluegrass GreenSource at www.bggreensource.org
 - ◇ Kentucky Agricultural Water Quality Act: www.bae.uky.edu/awqpt/background.htm
 - ◇ KY's Nonpoint Source (Runoff) Pollution program: water.ky.gov/nsp/Pages/default.aspx
 - ◇ Like "Kentucky Watershed Health Reports" on Facebook.
 - ◇ Visit our webpage for all watershed health reports: <http://water.ky.gov/waterquality/Pages/HealthReports.aspx>.
 - ◇ Contact the Licking River Basin Coordinator, Chad Von Gruinigen, at 502-564-3410 ext 4941.