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# Cox Creek Watershed Health Report

Department for Environmental Protection - Division of Water

The Kentucky Division of Water (DOW) is the state agency responsible for carrying out the requirements of the Clean Water Act to reach the goal of making all waters in Kentucky safe for swimming and fishing (called **uses**).

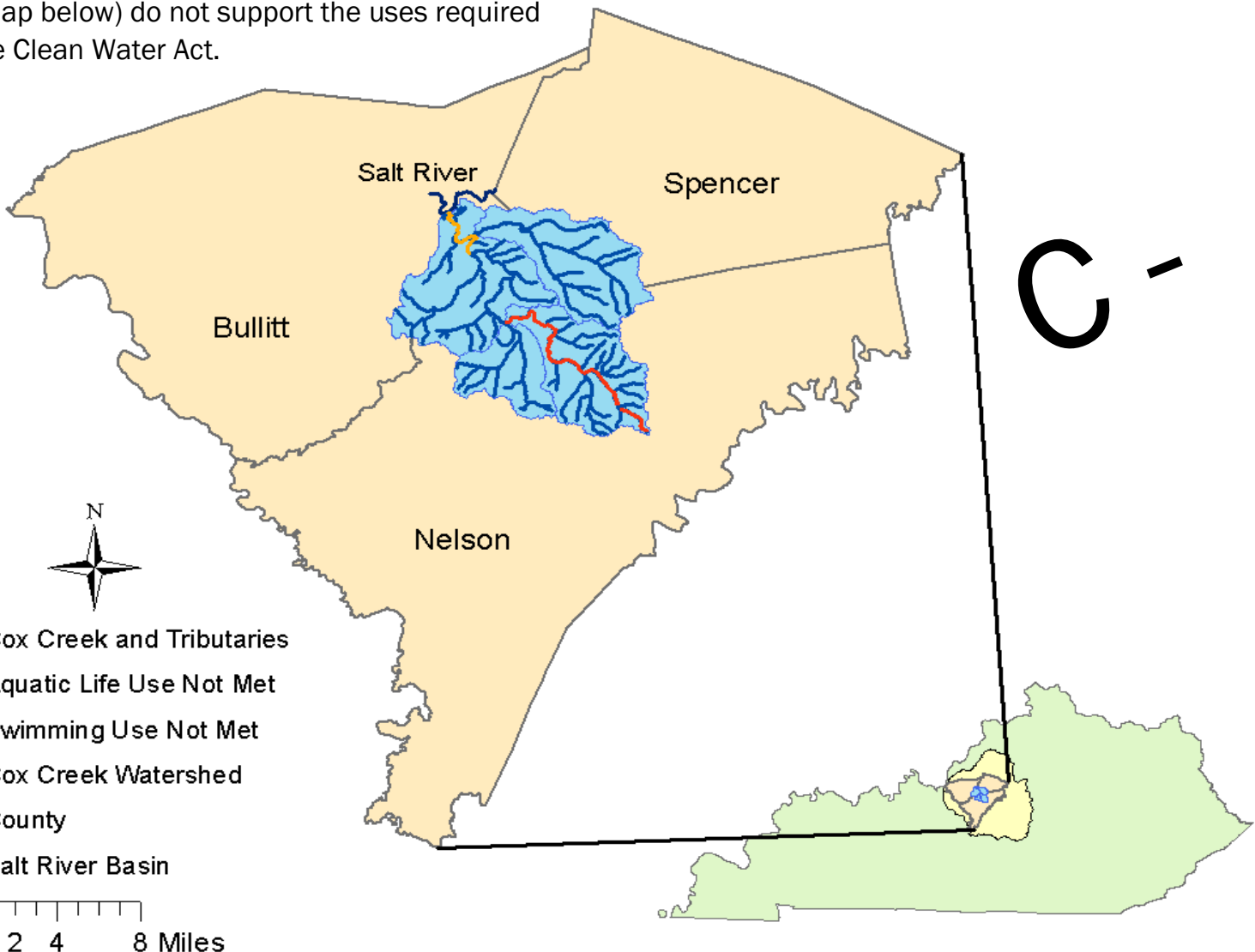
DOW has developed this health report to inform the residents of Bullitt, Spencer and Nelson counties of efforts to examine the health of Cox Creek and the area of land that drains into Cox Creek, which is called a **watershed**.

Upon initial evaluation, it was determined that parts of Cox Creek (shown in red and orange on the map below) do not support the uses required by the Clean Water Act.

The U.S. Environmental Protection Agency (EPA) requires that states conduct watershed studies on all such waters to calculate the maximum amount of pollution a creek can receive and still support a healthy watershed. This amount is known as a **Total Maximum Daily Load**, or TMDL.

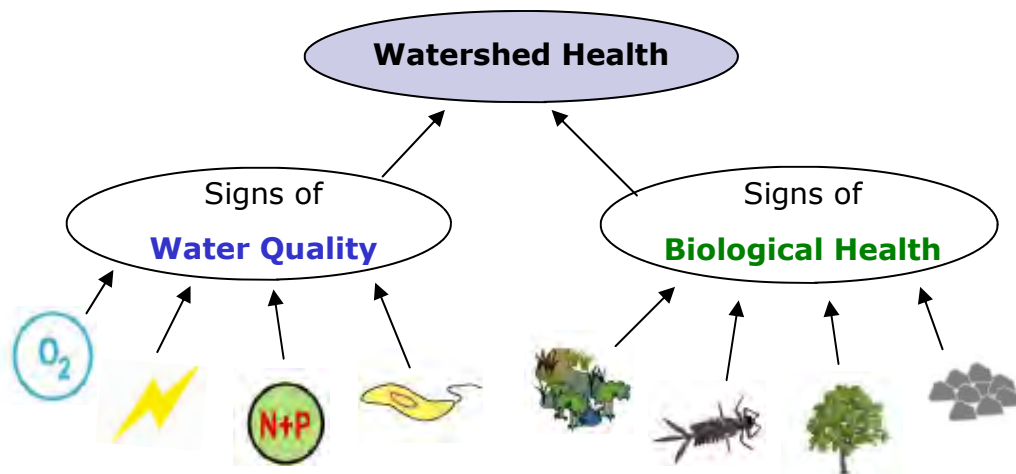
Following a year-long study in 2009 by DOW to gather scientific data, the division has given a "report card grade" of a **C-** to the watershed. This health report explains the signs of health that went into assigning that grade and provides information on how the grade can be improved.

# C-





## What goes into grade assignment?

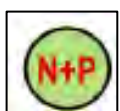
1. Data collected were divided into signs of **water quality** or signs of **biological health**.
2. Each sign received a grade, A through F, according to the results of our study, which were compared to health and science requirements and DOW scientific information.
3. The grades from each biological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




### Signs of Water Quality


 **Dissolved Oxygen (DO):** Concentration of oxygen dissolved in water and 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 total dissolved solids content of water. Low specific conductivity is desired, and increasing specific conductivity negatively impacts fish and aquatic bugs.


 **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. 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.









### Signs of Biological Health

 **Total 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.

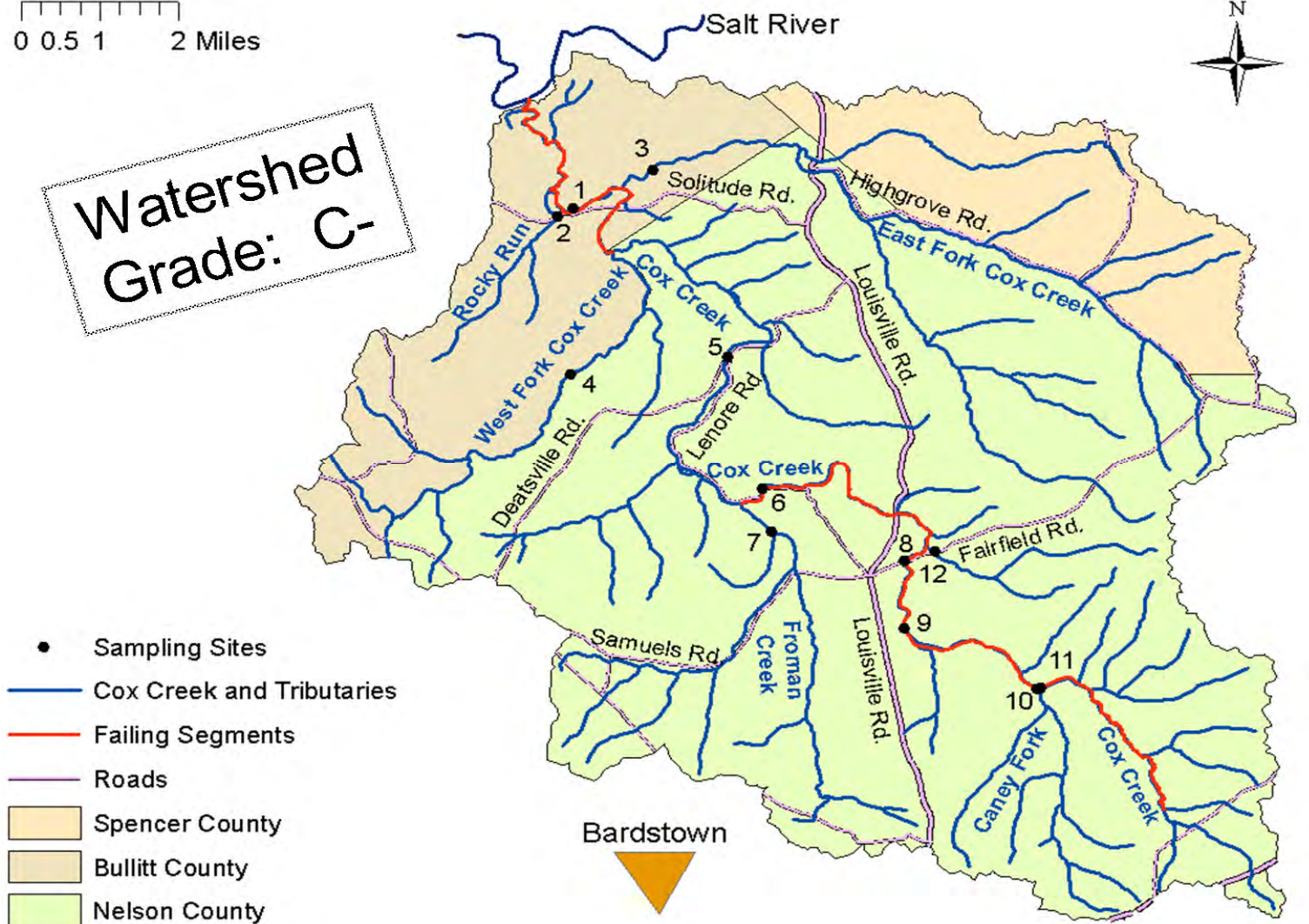
 **Riparian Zone:** A component of total habitat that is defined by the land adjacent to a stream that has distinct soil types and plant communities, which aid in absorbing water and shading the stream. To receive an A, the riparian zone must be at least 18 yards wide on each side of the stream.

 **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.

Site # and DOW Number	Creek Name	 O <sub>2</sub>		 N+P						Site Grade
1) DOW12005002	Cox Creek	B+	B+		F			D	F	<b>D</b>
2) DOW12005003	Rocky Run	A	C		F					<b>C</b>
3) CFD12005501	East Fork Cox Creek	B	B+		F			B	D	<b>C</b>
4) DOW12005004	West Fork Cox Creek	A	C		F			D	C	<b>C-</b>
5) DOW12005005	Cox Creek	D	B		F			D	D	<b>D</b>
6) CFD12005502	Cox Creek	C	B	C-	D	F	F	D	D	<b>D</b>
7) DOW12005006	Froman Creek	F+	B		D					<b>C-</b>
8) DOW12005007	Cox Creek	C	B	C-	F					<b>C-</b>
9) DOW12005008	Cox Creek	B	B	C-	D					<b>C</b>
10) DOW12005009	Caney Fork	C	B	C	F	D	F	C	F	<b>D+</b>
11) DOW12005010	Cox Creek	D+	B	C-	F	F	D	D	D	<b>D</b>
12) DOW12005001	Cox Creek UT					F	A	B	C	<b>C+</b>


0 0.5 1 2 Miles


**Watershed Grade: C-**



# Summary: Room for Improvement

## POSITIVES

 Specific conductivity was fairly good, indicating reasonably low dissolved solids.

 Dissolved oxygen (DO) levels were, for the most part, suitable for fish and bugs. Lower DO grades at a few sites probably resulted from over growth of algae that occurs when loss of tree cover reduces stream shading and nutrients runoff into streams.

## NEGATIVES



From May to November 2009, 8 of the 11 sites had *E. coli* concentrations above the safe standard for swimming 80 to 100 percent of the time. These levels may cause gastrointestinal illness if the water is swallowed or infection if contact is made with an open sore or wound.

Decreasing numbers and types of fish and bugs were related to loss of habitat, riparian zone and cover. This cover provides habitat for beneficial bacteria, which are eaten by the bugs that are then eaten by the fish. This cover also provides habitat for fish and bugs to live, feed, mate and hide from predators.

Rising water temperatures due to loss of shading when trees are cut and banks cleared.

## GRAY AREA



For the most part, nitrogen and phosphorous levels were reasonable but rose following rain events due to pollution entering the stream with runoff or sewer overflow.

To reduce these periodic increases in nutrients, **land management** should include introduction of permeable surfaces, sewer line extension, use of rain barrels and rain gardens, increased stream bank vegetation and correct use of fertilizers.

## What can you do?

- **Trees are the best way to protect and restore water quality and biological health.**
  - ◇ Leave in place or establish vegetation alongside streams to provide natural filters that stabilize stream banks, minimize erosion, regulate water flow, provide shade, and absorb excess nutrients.
  - ◇ Plant trees and do not mow within 18 yards of the stream bank.
- **To keep water safe for swimming**, keep animals out of the streams, which will limit the amount of animal waste entering the waterways, reduce excess nutrients, and protect habitat.
- **To improve habitat**, allow fallen trees, logs, leaves, gravel, cobble and boulders to remain in the stream to create habitat for fish and bugs to feed, find refuge and reproduce.
- **To reduce nutrients**
  - ◇ Use chemicals and pesticides according to labels and fertilizers based on soil test results. Limit uses and store and dispose of properly.
  - ◇ Report sewer leaks and overflow problems.
  - ◇ Properly dispose of pet waste.
- Keep grass clippings, petroleum products, trash, and litter out of storm drains; this material enters the stream directly without treatment.
- Service your vehicle regularly to prevent oil and anti-freeze leaks and reduce noxious emissions.
- Become a certified citizen **volunteer** water quality monitor or establish a program in your local community or watershed.
- **Talk to your local legislators** about improving the health of your watershed. Stress the importance of **land management** as land is developed.

## Where to go for more information

### Volunteering

- Watershed Watch in Kentucky: [water.ky.gov/wsw/Pages/default.aspx](http://water.ky.gov/wsw/Pages/default.aspx) or contact Jo Ann Palmer at 800-928-0045 or [JoAnn.Palmer@ky.gov](mailto:JoAnn.Palmer@ky.gov)

### Purchasing or planting native trees and plants

- Division of Forestry: [forestry.ky.gov/Pages/default.aspx](http://forestry.ky.gov/Pages/default.aspx)
- Kentucky Native Plant Society: [www.knps.org/plant\\_resources.html](http://www.knps.org/plant_resources.html)

### Grants and programs

- KY's Nonpoint Source (Runoff) Pollution program: [water.ky.gov/nsp/Pages/default.aspx](http://water.ky.gov/nsp/Pages/default.aspx)
- KY's Natural Resource Conservation Service: [www.ky.nrcs.usda.gov/](http://www.ky.nrcs.usda.gov/)
- KY's 319 Grant program: [water.ky.gov/Funding/Pages/NonpointSource.aspx](http://water.ky.gov/Funding/Pages/NonpointSource.aspx) or contact James Roe at 502-564-3410 or [James.Roe@ky.gov](mailto:James.Roe@ky.gov)

### Making changes at home and work

- Bluegrass PRIDE: [www.bgpride.org/gallery1.htm](http://www.bgpride.org/gallery1.htm)