

Wewoka Creek: Lima (N3610)

NW NW NW
Section 16-8N-7E
Seminole County
N 35°10'19.9"
W 96°34'54"
WBID#: OK520500-02-0010Q

Blue Thumb Volunteer Monitoring Data Review: 8 February 2008
Written by: Chrysti Bruner

The headwaters of Wewoka Creek start near Earlsboro in Pottawatomie County, Oklahoma. The creek runs SE through the southern part of Seminole County to New Lima where we sample. From there, it continues east until it flows into the North Canadian River a few miles East of Wetumka, Oklahoma. The sample site is located in the Lower North Canadian Watershed and is in the Cross Timbers ecoregion. The land usage around Wewoka Creek is mainly agricultural, including farmland and crops, with several small communities within the watershed. Wewoka Creek receives two point sources of treated effluent from waste water treatment plants operated by the cities of Seminole and Wewoka.

Wewoka Creek has a fairly straight channel with good canopy cover for shade and moderate bank vegetation which contributes to the banks' stability. Canopy cover is provided by various types of trees. There is good variability between deep and shallow pools. The pool bottoms are not stable, but there are not many point bars forming. The creek is apparently used by livestock from surrounding properties. The most recent habitat assessment resulted in a metric score of 87, which is better than the average high quality stream in the Cross Timbers ecoregion.

Water chemistry at Wewoka Creek has been tested 16 times between 7/29/2003 and 4/17/2007. The water test results are as follows:

Dissolved oxygen saturation changes with the temperature of the water. By looking at the percent saturation, we can see when there are problems with the amount of oxygen available in the water for aquatic life. Too little oxygen can cause aquatic animals to die. Too much oxygen is an indicator that there are wide swings in the amount of oxygen available during a 24 hour period. While the median value for dissolved oxygen saturation in Wewoka Creek is 83.5 % (and in the normal range), there have been times when it is a bit too high or too low, possibly indicating a problem with algae. The following values are outside the normal range (80% - 130%):

10/31/2005	60%
11/21/2005	75%
12/27/2005	70%
6/8/2006	140%
7/3/2006	132%
2/8/2007	70%
4/17/2007	66%

pH in the State of Oklahoma is normal between 6.5 and 9. The median value for pH at Wewoka Creek is 8.15.

An estimate of **soluble nitrogen** is made by adding the amounts of ammonia nitrogen and nitrate/nitrite nitrogen found in the water. The normal range is less than 0.8 mg/L N. The median value for Wewoka Creek is 1.1 mg/L N. The following values are above the normal range (0.8 mg/L N):

7/29/2003	2.8 mg/L N
7/29/2004	2.9 mg/L N
11/21/2005	1.0 mg/L N

5/30/2006	1.2 mg/L N
7/3/2006	1.7 mg/L N
1/23/2007	2.3 mg/L N
2/8/2007	2.4 mg/L N
3/28/2007	2.4 mg/L N
4/17/2007	2.4 mg/L N

Orthophosphate phosphorus is another nutrient. Most of the Blue Thumb streams in the state have values below 0.05 mg/L P. The median value for Wewoka Creek is 0.3 mg/L P. Only 3 of the values were in the normal range, all of the others were higher.

7/29/2003	0.187 mg/L P
7/29/2004	1.4 mg/L P
11/21/2005	1.6 mg/L P
12/27/2005	1.6 mg/L P
4/27/2006	1.467 mg/L P
5/30/2006	1.333 mg/L P
6/8/2006	1.567 mg/L P
7/3/2006	0.3 mg/L P
12/27/2006	0.053 mg/L P
3/28/2007	0.107 mg/L P

Chloride is higher at Wewoka than any other site monitored by Blue Thumb in the Cross Timbers ecoregion. The median value is 380 mg/L Cl.

Water chemistry indicates a problem with oxygen saturation in Wewoka Creek. While the median value is within the normal range, much of the time, the oxygen saturation is a little too high or a little too low. This indicates a swing in the amount of oxygen available in the water during a 24 hour period. The nutrients are considerably higher than in other creeks monitored by Blue Thumb. These nutrients could be causing algae blooms which would affect the oxygen saturation. There is no indication whether the nutrients and chloride are coming from agricultural practices or from the water treatment plants or something else.

Fish have been collected twice at Wewoka Creek, in 2004 and in 2006. The 2006 collection resulted in 19 species, including 7 species of sunfish: green sunfish, orangespotted sunfish, bluegill sunfish, longear sunfish, largemouth bass and white crappie. 13% of the sample was the intermediate tolerance insectivore, the sand shiner. There were 11 individuals of one intolerant fish, the suckermouth minnow. The metric score for Wewoka Creek was 73% of the average high quality reference conditions in the ecoregion, a C. The difference in the scores is due to a lack of sensitive benthic species (darters, madtoms and sculpins) and only one intolerant fish collected. The types of fish in this location tell us there is a little problem but not sure whether it is chemical or habitat.

Benthic macroinvertebrates (bugs) have been collected in winter and summer index periods since the summer of 2003 from rocky riffles when available and otherwise from woody debris. In both sets of collections Wewoka Creek does not have as many taxa as the average high quality stream in the ecoregion and has only about half the number of the sensitive mayfly, stonefly and caddisfly taxa (EPT). The metric scores for the bug collections indicate Wewoka Creek receives a B in comparison with the reference streams.

Wewoka Creek has excellent habitat for the Cross Timbers ecoregion and this part of the state. The water chemistry indicates there is a problem with nutrients and chloride and the oxygen saturation sometimes swings from low to high. The bugs are doing reasonably well, though species richness is less than expected due to loss of some intolerant forms. The fish are suffering a bit more: intolerant species are rare or absent. This may be due to an unstable stream bottom in addition to the chemistry.

Wewoka Creek is an excellent target for landowner education about best management practices that can protect the creek. Additionally, the community at large might make the communities of Seminole and Wewoka aware that they care about the quality of the sewage treatment plants.