

Duck Creek at Myers Park: Stillwater Oklahoma

NE NW NW
Section 22-19N-2E
Payne County, OK
Latitude N 36.11162°
Longitude W 97.08418°
WBID#: OK620900-04-0195G

Blue Thumb Volunteer Monitoring Data Interpretation – 27 February 2012

Written by: Doug Sander

Description of Watershed and Monitoring Site

Duck Creek begins just northwest of Oklahoma State University in Stillwater, OK on land used by the University for horses and cattle. The creek then runs along the west edge of the campus proper and continues south through about a mile of residential streets (and 2 small city parks) before crossing 12th Street and returning to agricultural land. It is about 2 miles long, with the first mile being dry except during the spring and immediately after a rain during the rest of the year. The second mile of the creek runs a small trickle of water all year regardless of rainfall unless drought is severe. Duck Creek drains a watershed basin of approximately 5 square miles and is a small part of the Stillwater Creek watershed in the Central Great Plains ecoregion of central Oklahoma. The monitoring site is located in Myers Park, approximately ½ mile upstream from where Duck Creek empties into Stillwater Creek. The site was selected due to its ease of access and the fact that a ledge of sandstone causes a riffle above a six by ten foot pool that is almost always a foot or more deep—deep enough to easily take samples.

Stream Condition & Habitat Overview

In the monitoring area, the stream bottom is of sandstone and silt composition and the banks are lined with un-mowed weeds and trees below the mowed lawn of the park. A single large cottonwood tree provides morning shade to the sampling spot. A habitat assessment carried out during the summer of 2009 (6/17/2009) resulted in an overall score of 72.5. The average of high quality streams within the Central Great Plains ecoregion is a habitat score of 77.6. This assessment on Duck Creek showed good instream cover, canopy cover shading, and streamside cover, but only moderate pool bottom substrate, channel alteration, bank stability, and bank vegetation stability. Stream flow was rated poor, as was the pool variability and the channel sinuosity. More rocky riffles would be highly beneficial for the biological community but there is only the one 4 inch riffle. Except for the rare pool, the water is generally 2-4 inches deep, insufficient habitat for any but small fish. Downstream of the sampling site, after the stream leaves the park, the water is knee deep with near vertical banks and is lined with trees for about a block, just upstream of the 12th Street bridge.

Biological Conditions

Fish

A fish collection was conducted on Duck Creek 6/17/2009. Collection of fish species present in the monitoring site area was accomplished by seining 400 meters (a quarter mile) downstream of the sampling site. Out of 405 total fish captured, 7 species of fish were identified, none of which were insectivorous cyprinids (minnows that eat bugs). Species included red shiners, black bullhead catfish, yellow bullhead catfish, mosquito fish (predominant), green sunfish, bluegill sunfish, and longear sunfish. All of the fish collected were tolerant to pollution. No intolerant species nor sensitive benthic species (darters, madtoms, sculpins) were found. When compared to the average of high quality sites in the Central Great Plains ecoregion, Duck Creek scored a D (50%).

Benthic Macroinvertebrates (bugs)

There was inadequate flow to collect benthic macroinvertebrates.

Bacteria Testing

Bacterial counts of *Escherichia coli* and fecal coliforms were taken during the summer months of June, July, August and September in 2009. *E coli* counts were 200, 100, 166 and 16 CFU/100 ml respectively. Fecal coliforms were 27333, 21966, 30000, and 15000 CFU/100 ml, respectively. These counts are quite acceptable and except for September being lower for an unknown reason, the counts were quite steady.

Chemical Condition

The following chemical data were collected monthly between 09/20/2008 and 11/21/2009.

Dissolved Oxygen (DO):

Dissolved oxygen saturation shows when there are problems with the amount of oxygen available in the water for aquatic life. Too little or too much are indicators of problems. Chemical data show that the DO saturation levels at the sampling site ranged between 138% and 196% except for 3 anomalous readings, one in January (27%), one in June (210%), and one in July (70%). Photosynthetic activity and high water temperatures are the primary causes of the high DO saturation levels in the stream during the summer months. The normal range for DO saturation is 80%-130%.

pH (Hydrogen ion concentration):

Hydrogen ion concentration levels at the sampling site varied from 7.5 to 9.0, with a mean pH of 8.2. The stream water is slightly basic (7.0 being neutral), but is well within pH limits for normal biological activity.

Nitrogen:

An estimate of soluble nitrogen (combination of Ammonia, Nitrate and Nitrite) showed levels ranging from undetectable to 1.25 mg/L except for 1/17/2009 with 2.25 mg/L and 7/18/2009 with 1.50 mg/L. These were the same two dates with anomalously low dissolved oxygen readings. High levels of soluble nitrogen might be attributed to fertilizer runoff from neighborhood lawns or runoff after winter use of fertilizer to melt ice on sidewalks.

Orthophosphate Phosphorous:

Phosphorous amounts in the stream were determined by detecting the level of orthophosphate. Normal ranges are between 0.00 mg/L P and 0.05 mg/L P. The levels of orthophosphate at the sampling site ranged between 0.020 mg/L P and .246 mg/L P, with the mean level at 0.105 mg/L P. The higher readings occur during the summer and fall, leading one to speculate that fertilizer and pesticides from neighborhood lawns might be registering in the testing, though the phosphorous levels do not correlate with the nitrogen levels.

Chloride:

Chloride levels measured in the stream ranged between 50 mg/L Cl and 240 mg/L Cl, with a mean level of 161 mg/L Cl. The highest readings came during January and March. No pattern can be easily detected in the chloride levels.

Synopsis

Duck Creek runs along the west edge of Oklahoma State University campus and through some west Stillwater residential neighborhoods. It is channelized with a concrete bottom in two places and generally carries water flow only after heavy rains. The habitat assessment through Myers Park and further south scored relatively well when compared to the high quality streams in the Central Great Plains ecoregion. The fish collected are all tolerant species and only about half the number of species in the reference streams in this area. The oxygen saturation is alarmingly high and this means that the oxygen probably drops to low levels just before dawn. This puts a real stress on the biologics. The constant presence of nutrients (nitrogen and phosphorous) would suggest runoff from agriculture and residential landuse. Overall, there are some problems for Duck Creek.