

Cow Creek: Virginia Ave.  
NW NE SW  
Section 16-19N-2E  
Payne County  
Lat 36.12318  
Long. W 97.09975  
WBID OK 620900-04-0020D

Blue Thumb Volunteer Monitoring Data Interpretation – February 2012  
Data Report written by Sharla Lovern

### **Description of Watershed and Monitoring Site**

The headwaters of Cow Creek originate in north central Oklahoma, northwest of the Stillwater airport. The approximately 11 square mile watershed is long and linear, and the stream flows generally south. Cow Creek joins with Stillwater Creek south and east of the intersection of Sangre Road and Highway 51 on the west side of Stillwater. The monitoring site in this report is located a half mile north of Highway 51 at Virginia Avenue. Virginia Avenue is a low-water crossing with a very small culvert under the road, and generally dams water upstream and allows a small water course to pass. However, Cow Creek is an intermittent stream where it is not dammed, and thus many months water quality data cannot be collected because there is no flow through the channel. The watershed has a large portion of land devoted to Oklahoma State University's research farms.

### **Stream Condition and Habitat Overview**

A habitat assessment for Cow Creek was performed on July 1, 2009 – a date which is typical for mid-summer no-flow conditions unless immediately following a storm event. Cow Creek at Virginia Avenue scores higher for habitat than the reference average for the Central Great Plains eco-region (95.7 compared to 77.6). The stream scores high with in-stream cover and canopy cover shading, which lead to cooler water temperatures and less variation in temperatures, benefiting stream organisms. The stream also scores high in pool variability and streamside cover. Cow Creek scores in the medium category for pool bottom substrate as there is little rock in the watershed. Other habitat conditions in the medium range include channel alteration, channel sinuosity, bank stability, and bank vegetation stability. Cow Creek is a deepening and widening channel and is similar to the larger Stillwater Creek watershed of which Cow Creek is a tributary. Cow Creek has been straightened in various reaches over the years, including the downstream section near Highway 51.

### **Biological Conditions**

#### **Fish**

The fish collection for Cow Creek was performed on July 1, 2009. Cow Creek's fish population was actually quite surprising since the number of species was higher than the average condition for the Central Great Plains eco-region, and the overall fish collection for Cow Creek achieved a grade of 'B' compared to the 'A' condition of the reference

condition. Only one pollution sensitive benthic species (suckermouth minnow) was found, and a higher proportion (94%) of pollution tolerant species was found at Cow Creek compared to the reference condition (74%). More than half of the total fish collection was bluegill sunfish (34) and longear sunfish (82). Greater than 5 individuals of the following fish species were found: green sunfish (11), golden shiner (9), yellow bullhead catfish (7), mosquitofish (8), and logperch (7). Less than 5 individuals of the following fish species were found: gizzard shad, red shiner, common carp, suckermouth minnow, black bullhead catfish, orangespotted sunfish, largemouth bass, and white crappie. There were very few insectivorous cyprinids (minnows that eat insects) found, thus inferring that the food quality at Cow Creek is of low quality.

### **Benthic Macroinvertebrates (bugs)**

As a ponded and intermittent stream, there is more reason for Cow Creek to have a lower score compared to reference conditions and it did score a “C” on July 1, 2009. On this date, there were a total of 11 macroinvertebrate species found in the Cow Creek (Virginia Ave.) rocky riffle sample. Possibly the woody vegetative cover over the majority of the stream helps this situation for the reference condition has 16 species. The community’s tolerance to pollution is higher than the reference condition and there is less evenness in the spread of organisms across species, since 49% of the sample were of the gathering feeding group and 37% of the sample was Chironomidae (midge fly).

### **Chemical Condition**

#### **Dissolved Oxygen**

The dissolved oxygen content of Cow creek displays poor (low) saturation levels except in the spring samples. The average of all records was at 41% oxygen saturation which is below the normal low limit of 80%. Readings were in the normal range for dissolved oxygen (in terms of ability to support all aquatic life) for two months: 105% in March 2009 and 115% in April 2009. The spring rains make the stream come alive again for this intermittent system.

#### **pH**

The pH ranged from 7.4 to 7.8 with an average of 7.5, a normal range for pH.

#### **Soluble Nitrogen (Nitrate, Nitrite, and Ammonia combined)**

The estimate of soluble Nitrogen for Cow Creek is 0.68mg/L N which appears in the normal range. Nitrate and Nitrite were consistently below detection limits. Ammonia levels have been consistently below detection limits except for one sample at 0.1mg/L N in February 2009.

#### **Orthophosphate Phosphorous**

Orthophosphate levels had an average reading of 0.113mg/L P for the Fall 2008 and Spring 2009 samples, however in the spring when rain caused the stream to flow more consistently, the P values fell in the Normal range. The normal range for orthophosphate is up to 0.05mg/L P.

**Chloride**

Chloride levels had an average of 25mg/L Cl with higher readings of 50mg/L Cl in the spring season. All readings are in the normal range for this area.

**Synopsis**

Cow Creek was surprising with respect to the diversity and abundance of fish despite the intermittent nature of the stream. This intermittent nature perhaps has affected the bugs as their lifespan is just a few months to a year. Good riparian cover and a minimally urban watershed have allowed the stream to be relatively healthy when the water is flowing in the spring. During dry months the oxygen content decreases to an unhealthy condition and orthophosphate in particular seems to be a problem.