Mooser Creek: Pepsi

NE SW NE
Section 35-19N-12E
Tulsa County
Lat N 36º 05' 8.1"
Long W 95º 59' 56.8"
WBID# OK 120420-010070B

Blue Thumb Volunteer Monitoring Data Review – October 2013
Updated by: Brian Lewis

Description of Watershed and Monitoring Site:

Mooser Creek is in the city of Tulsa, OK and flows east from the Turner Turnpike to the Arkansas River. The north side of the creek is highly populated with commercial properties, industrial businesses and a few residential homes. The south side of the creek is mostly undeveloped and is a natural habitat. The site on Mooser Creek is behind the Pepsi bottling plant at the end of Lawton Avenue under an abandoned bridge. There is always water, though at times it is pooled or very low flow. There is quite a bit of diversity of wildlife due to natural habitat to the south of the creek. Mooser Creek is in both the Central Irregular Plains and Cross Timbers ecoregions, but most of the 5 square mile watershed is in the Cross Timbers ecoregion.

Stream Condition & Habitat Overview:

Habitat assessments were conducted on 8/6/03, 6/15/06 and 6/28/10 as a tool to assess the biological health of the stream using the presence or absence of suitable habitat. All three habitat assessments started at the monitoring site and went 400 meters upstream. The scores for these assessments are as follows: 94 in 2003, 78.2 in 2006 and 113 in 2010. High quality streams in the Cross Timbers ecoregion (reference conditions) averaged a habitat score of 84, thus the habitat here on Mooser Creek is of good quality. There has been a steady increase of in-stream cover which will give the biologics more habitat and food source. Pool bottom substrate has stayed at a moderate level; there are lots of rocks in Mooser Creek but there is also sand/sediment that erodes in to the creek to cover up some of the rocky void spaces that the creek bugs need. Mooser Creek contains a variety of pools both deep and shallow, more so in 2003 and 2010. Over the years there has been an excellent canopy to provide shaded areas as well as good streamside cover. The presence of rocky riffles increased in 2010. The banks and in stream substrate showed high levels of stability with minimal channel alteration, as well as little sediment collection. Mooser Creek averages a low flow, and a low sinuosity due to large rock bluffs lining the south banks. However, the flow in 2010 scored quite well. Bank stability was best in 2006. Overall, the habitat of Mooser Creek is better than reference conditions.

Biological Conditions:

Fish

Fish were collected the same day as the habitat assessments and from the same 400 meter reach of Mooser Creek. The fish collections in 2003 and 2010 were 55% as good as reference conditions and 2006 was only 36% as good as reference conditions. In 2003 and 2010 there were a total of 10-11 species of fish found, including 5 different species of sunfish: green sunfish, bluegill sunfish, longear sunfish, spotted bass and largemouth bass. Only 6 species were found in 2006, including 3 different sunfish species: green sunfish, longear sunfish, and spotted bass. Reference conditions averaged 19 species including 7 sunfish species. Most of the species collected at Mooser Creek were tolerant to poor conditions, though the spotted bass and central stoneroller are more intermediate. The collections are missing darters and other sensitive benthic species and insectivorous cyprinids (the dominant minnows in North American streams that disappear as the quality of the food base deteriorate). So the fish population has been suffering a long time at Mooser Creek.

Benthic Macroinvertebrates (bugs)

Benthic macroinvertebrates have been collected from rocky riffles in winter and summer index periods since the summer of 2000. There was no flow during the summers of 2001, 2002, and 2008 through 2011, resulting in absent data. When compared with the ecoregion reference conditions, both summer and winter collections show reduced numbers of taxa, especially the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) which are more sensitive to pollution than any other groups. The summer collections show excellent population diversity while this is lacking a bit in the winter collections. Mooser Creek averages a B rating in the benthic category for both winter and summer. The one exception is the summer 2007 collection which scored better than reference conditions because it had more species and the diversity was better.

Chemical Testing:

Water chemistry has been tested monthly since January 2001.

DO Mooser Creek has chronic problems with low levels of dissolved oxygen. The majority of measurements average between the caution (80-50%) and normal (80-130%) levels for Oklahoma streams. Data from 2000-2003 averaged 60%, increased to 80% in 2004-2008, then decreased a bit to 72% in 2009-2013. This is likely part of the reason for the struggles within the biological (fish and bugs) results.

pH pH ranges remain normal around 7.8 with few spikes.

Nitrogen There are very low levels of available nitrogen (nitrate, nitrite, ammonia) in the water, averaging about 0.7mg/L N which is at a normal level. There

was one spike in the early data on 1/5/01 at 2.9mg/L N (mostly ammonia). In more recent data there were 3 points in the caution level (0.8-1.5mg/L N) and 1 point in the poor level (>1.5mg/L N) on 4/26/11 at 2.5mg/L N (mostly nitrate).

Phosphorous The orthophosphate phosphorus has also been very low and the majority of the data has been in the normal level (<0.05mg/L P). Orthophosphate has been above 0.1 mg/L P (poor level) on only 5 occasions during the last 13 years, and all those were prior to 7/28/05.

Chloride The chloride spikes during the winter when there is ice and snow on the roads and highways, but the analytical results do not reflect any chronic effects to the stream's ecology.

Synopsis:

Mooser Creek is an urban stream with commercial and industrial land uses on the north bank of the creek and a natural habitat on the south bank of the creek. The habitat in the creek is exceeding the reference conditions for the ecoregion. The biological results, in combination with the analytical, are found to be less than desirable. The fish collections are only 55% or less of what would be expected for the habitat, and the macroinvertebrate collections show a lack of sensitive species. Coupled with the low average dissolved oxygen content of the water, we are seeing a steady degradation in the stream's ecology. It is possible; however, that lack of average flow in this stream may reduce the ability for oxygen to diffuse properly to support sensitive species of both fish and invertebrates, due to poor sinuosity and possible pollutants.