Little Deep Fork: Hwy 48

NW SW SW
Section 5-15N-9E
Creek County
N 35° 48’ 11.2”
W 96° 23’ 11.8”
WBID# OK520700-06-0130F

Blue Thumb Volunteer Monitoring Data Review – October 15, 2013
Written by: Gary Infield

Description of Watershed and Monitoring Site:

Little Deep Fork Creek, in the Cross Timbers ecoregion, was monitored at the highway 48 bridge 1 mile south of the town of Bristow which is about 30 miles southwest of Tulsa, OK. The headwaters start in Lincoln County about 15 miles, as the crow flies, due WNW from the monitoring site and flows ESE where it eventually empties into the Deep Fork River in Okmulgee County. Little Deep Creek has a lot of smaller creeks, tributaries and small lakes feeding into it thus the drainage area is big at about 112 square miles. The land use in this big drainage area is mainly ranch land with some farming and natural areas, and a few small towns and the creek does cross under interstate 44 and highway 66.

Daily traffic rarely notices the creek. Numerous other bridges in the Cross Timbers ecoregion look the same. Rainfall from the watershed follows the slopes across poor, sandy, acid soils. Heavy rains contribute to flooding and add sand to creek bottoms. The state built the bridge twice as high as the banks to stay above flooding. The banks of the creek are steep, high and difficult to climb without holding on to overhead roots and limbs. The surrounding watershed is steeply sloped with occasional open flat areas. The Cross Timbers is a Post Oak-Black Jack forest also with Hickory species. Birch, Cottonwood, Sycamore, Hackberry, Honey Locust and numerous Elm species cover a diverse understory. Near the creek, these trees grow large. Roots anchor the sandy soil and provide fish & wildlife shelter.

The highway 48 bridge is high enough so during low traffic times of day a serene, private show takes place. Raccoon, deer, squirrel, rabbit, turkey, coyote are curious to watch Blue Thumb activities from across the creek. These creatures come from the trees and across the creek by the utility right of way. An elusive Blue Heron works silently up and downstream at feeding

time. Underneath the bridge is a popular party/fishing spot. We never see that wildlife – just the debris.

Stream Condition & Habitat Overview:

A habitat assessment in summers 2002 and 2010 was conducted on Little Deep Fork starting at the highway 48 bridge and going downstream 400 meters. The 2002 assessment scored 87 and the 2010 assessment scored 88.2; both higher than the Cross Timbers ecoregion reference conditions which scored 84. Several of the categories significantly changed in their scores between the 2 assessments even though the overall scores remained about the same. In-stream cover was good to see a big increase. This is all the woody debris and aquatic vegetation in the creek water providing habitat and food for the fish and bugs. The bottom of the creek was less stable in 2010; perhaps there was more sand/sediment which is prone to wash out. This means that the path of the creek water has a higher chance to change its course in the main channel which will upset the habitat for the fish and bugs. There were more deep pools in 2010 which will provide more habitats for the bigger fish. Bank stability also decreased in 2010 due to a little less bank vegetation and more active erosion. Stream side vegetation was the only category that remained high in 2002 and 2010. Presence of rocky runs and riffles remained very low in both 2002 and 2010.

Biological Conditions:

Fish

Fish were collected on the same day and same stretch of water as the habitat assessments. The fish results saw a big difference between the 2 collections; 2002 scored 55% (“D” grade) as good as reference conditions while 2010 hugely increased to equal the reference conditions. The number of species increased from 11 to 16, reference averaged 19. Sensitive benthic species increased from 1 (freckled madtom) in 2002 to 3 (freckled madtom, redfin darter, slenderhead darter) in 2010, excellent to see as reference averaged 4 species. Sunfish species doubled to 6 species in 2010. Only 1 intolerant species (suckermouth minnow) was caught in 2006 and in 2010 there was 2 species (Suckermouth minnow, redfin darter). Interestingly enough, though, the population diversity decreased in 2010. Upgrades to the sewage plant were completed between 2002 and 2010. Remarkably the site recovered quickly from these upgrades.

Benthic Macroinvertebrates (bugs):
Macroinvertebrates were collected sporadically from 2002 to 2011. All collections were compared seasonally to the average of high quality creeks in the Cross Timbers ecoregion (reference conditions).

Winter collections were conducted in 2002, 2004-2005, and 2009-2011. From 2002-2005 the scores showed an increasing trend: 38% (C grade) in 2002, 54% (B grade) in 2004, and 69% (B grade) in 2005. The number of sensitive to pollution species increased as did the diversity and distribution. In 2009 the score dropped down to 46% (C grade) but then drastically increased in 2010 to 77% (B grade) and then in 2011 a small drop to 62% (B grade). The 2010 collection was the highest winter score from Little Deep Fork at Hwy 48 with excellent number of species, sensitive species were still really lacking, but the community was very well balanced, even better then reference conditions.

Summer collections were conducted in 2002-2004 and 2008-2011. All the summer scores were well below the winter scores, except for the 2004 collection. Summer is generally more stressful on the bugs due to less or lack of water and hotter conditions causing oxygen levels to decrease. The summer scores are pretty scattered but show a general downward trend. The 2004 collection was the best score, 80% (B grade), only lacking in sensitive species population. The worst scores were in 2008 and 2011 at 13% (D grade) when there were no sensitive species and higher amounts of organic pollution. The downward trend could be due to the extreme drought in 2010 and 2011 in combination with the water treatment plant upstream, but without more recent collections it is hard to say this for certain.

Chemical Testing:

Chemical data were collected almost monthly between 3/1/2002 – 3/18/2004 and 4/2/2008 – 2/26/2010.

Dissolved Oxygen Saturation generally followed the seasonal trends, higher in winter and lower in summer. Since 2004 the majority of the data was in the normal range between 80%-130% which is very good to see.

pH remained at a good stable level 7.5 to 7.8.

Available Nitrogen is the combination of Nitrate, Nitrite and Ammonia. From 2002-2004 the median was 0.6mg/L N which is very near the caution range 0.8-1.5mg/L N. There was only one point in the poor range (>1.5mg/L N) at 5mg/L N on 8/28/2003 which was all ammonia. Unfortunately nitrogen has been on an increasing trend with a median of 1.2mg/L N since 2004 and half of the data being in the poor range.

Orthophosphate Phosphorous has decreased since 2004 but the majority is still in the poor range, above 0.1mg/L P. There is a general trend of highest in summer decreasing to lows in winter. This is most likely due to the waste water treatment plant effluent.

Chloride levels have fluctuated but have decreased since 2004 from a median of 160mg/L Cl to 75mg/L Cl.

Synopsis:

At first I thought the site would measure off the charts as polluted since the Bristow waste water treatment plant sits ¼ to ½ miles upstream. But the fish do not seem to be too effected as the 2010 fish collection was equal to reference conditions. However, the creek bugs are suffering. The water chemistry does weave a path in and out of high to lower pollution levels so perhaps that has helped the fish to sustain themselves but the creek bugs have a shorter life span in the creek and are targeted with the higher pollution levels.

The local newspaper reported DEQ involvement in sewage plant upgrades during July 2008-January 2009. It is unknown what DEQ did to the plant in Bristow and the chemistry results do not show a significant decrease.

Little Deep Fork commonly had chunks of green filamentous algae, foam, trash and urine smells were strong. People continue to party and fish, leave beer cans & bottles, dump their vehicle oil under the bridge and trash the spot. This creek is suffering and is in desperate need of some tender loving care, education to the local public might help, along with upgrades to the treatment plant.