

## **Stage Stand Creek: Hwy 81**

NE SE NE

Section: 7-1N-7W

County: Stephens

Latitude: N 34.57554

Longitude: W -97.96705

WBID Number: OK311210-00-0060Y

Blue Thumb Volunteer Monitoring Data Review: September 30, 2013

Written By: Kurtis Koll

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

Stage Stand Creek is a stream located north of Duncan, Oklahoma, about 8.5 miles. The stream has its headwaters from a natural spring about 800 meters northeast of the sampling site. The stream flows southwest for a few miles before merging with Little Beaver Creek. Stage Stand Creek is surrounded by a recreational golf course, pasture land, some housing development and an industrial park grounds. The stream is directed under Highway 81 through two concrete culverts before reaching the sampling site which is just west of Highway 81. On the east side of the highway, a concrete dam maintains the stream. Water flows over the dam through the culverts into a golf course. The drainage basin is mostly grass land or a maintained golf course. The monitoring site has a low base flow over rock delivered for stream bank erosion around the bridge. Stage Stand Creek is in the Cross Timbers Ecoregion.

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

East of the monitoring site the stream is bordered by heavy vegetation and significant trees. Water is pumped from the stream for a site east of the dam. The water behind the dam has depth and is used to maintain water level in a pond used for recreational fishing. At the monitoring site, the habitat consists of a good riparian zone (natural vegetated area along the creeks banks) on both sides of the stream. The golf course maintains its grounds but also protects the riparian zone. In times of drought, the stream maintains a reasonably constant amount of water thus the vegetation around the monitoring site consists of sedges, rushes, willow shrubbery, grasses and cattails. The distance across the stream varies but usually is about 5 meters with a depth of 0.5 meters. The stream is free of debris and trash and is also free of runoff from livestock. There is no oily film other than from decaying detritus from the stream bottom which is mostly sandy. There is no evidence of stream alteration except farther downstream. Farther downstream there is evidence of beaver activity. At least three beaver dams have been observed.

The habitat assessment score is 71.3 (compared to 84.0 for the Cross Timbers Ecoregion reference) with a high evaluation for canopy cover shading and streamside cover. The good canopy keeps the water cooler for the biologists. Roots from the vegetation at the water's edge

creates really nice habitat. There was a medium ranking for instream cover, flow, bank stability and bank vegetation stability. In the water were some aquatic vegetation and a few rocks for habitat structures. There were signs of active bank erosion. Low evaluation related to pool bottom substrate, pool variability, presence of rocky runs or riffles, channel alteration and channel sinuosity. With rainfall and stream volume changes, sand bars disappeared and appeared indicating limited stream bottom stability. Stage Stand Creek has a sandy bottom with very little amounts of rocky areas and the water depth stays pretty constant at calf to knee deep with no deep areas for bigger fish.

## **Biological Conditions:**

### **Fish**

Stage Stand Creek fish collection of 2010 was compared to the Cross Timbers Ecoregion reference average. The total number of fish collected was 717 compared to the reference tabulation of 594 but there was only 5 species represented compared to 19 for the reference. There were no sensitive benthic species recorded, these are bottom dwelling fish that are sensitive to pollution such as nutrients, sediment, low oxygen levels. As the number of sensitive benthic species decreases there is usually increased siltation and benthic oxygen demand. The absence of sensitive species supports the sandy to silty stream bottom conditions and is indicative of a less desirable stream quality. The number of sunfish species (5) is lower but comparable to the reference average (7). Since the number of sunfish species is reasonable, there seems adequate stream cover and food sources for these different species. There were no intolerant species present indicating a stream of moderate quality. No insectivorous cyprinids (minnows that eat insects) were present in the fish collection indicating a low invertebrate food base or suggesting that the density of aquatic invertebrates is decreasing or low in numbers. The Index of Biotic Integrity (IBI) scores Stage Stand Creek's fish collection as a "C" suggesting that intolerant and sensitive species are rare or absent and that there is decreased species richness.

### **Benthic Macroinvertebrates (Bugs)**

Three macroinvertebrate collections were taken; winter 2011 and summer 2009 and 2010. The Cross Timbers reference averaged 20 different bug species for the summer condition and Stage Stand Creek had 11 bug species in 2009 and 18 bug species in 2010. The 2011 winter collection had 7 bug species compared to the reference average of 16 bug species. As the number of species decreases the water quality and/or habitat quality is decreasing. The HBI (Modified Hilsenhoff Biotic Index) measures community of organism's tolerance to organic pollution. The HBI scores for Stage Stand Creek are 5.80 (winter collection) and 6.63 and 5.68 (summer collections). The winter collection is very comparable to the reference score of 5.80. In the summer collections, the 2009 score dropped in 2010 to be even closer to the summer reference average of 5.59. So there is an indication that the collections of macroinvertebrates from Stage Stand Creek tend to be a bit more tolerant to organic pollution. The number of macroinvertebrate species in the EPT

(mayflies, stoneflies and caddis flies – sensitive to pollution) is low for Stage Stand Creek. The winter collection had 1 EPT species (5% of the population) vs. 5 EPT species (27% of the population) for the reference. Interesting in the summer collections was in 2009 there were 2 EPT species that made up 22% of the population but in 2010 there were 3 species but they only made up 3% of the population; Cross Timbers ecoregion reference summer averages 7 EPT species at 34% population. As stream quality deteriorates, these EPT macroinvertebrates die or drift downstream indicating a stream of moderate quality. The Shannon - Weaver Species Diversity Index increases with increasing biotic quality. All three collections from Stage Stand Creek compared to reference conditions as far as species diversity. Overall, the bioassessment score for macroinvertebrates suggests that the community structure is less than expected with the loss of some intolerant macroinvertebrate forms and there is generally fewer species present due to the loss of the most intolerant forms.

### **Bacteria Screening:**

No bacteria screening was conducted.

### **Chemical Testing:**

Chemical data was collected monthly beginning 08/26/2010 and ending 01/24/2013.

**Dissolved Oxygen.** The dissolved oxygen saturation represents the amount of oxygen available for aquatic life support. Dissolved oxygen saturation data for the monitoring period consistently was above 85% (normal range being 80%-130%) except for two monitoring periods wherein the saturation data was low, 71% on 8/23/2012 and 57% on 9/24/2012. This was a big drought year.

**pH.** The pH which measures the hydrogen ion concentration or the “acidity” of the water varied from 7.4 – 8.0 which is reasonable for surface waters. The pH level is slightly alkaline (basic).

**Nitrogen.** An estimate is made of soluble nitrogen by adding the amounts of ammonia-nitrogen and nitrate/nitrite – nitrogen found in the waters. The levels of soluble nitrogen at Stage Stand Creek were all in the normal range; below 0.8mg/L N. Soluble nitrogen may indicate pollution scenarios or available nitrogen as nutrient supply for aquatic plants. There have been no recorded ammonia toxic level events at this site.

**Phosphorous.** The amount of phosphorus allowed in Oklahoma’s scenic rivers is 0.037mg/L P. Stage Stand Creek is not a scenic river but over the majority of the phosphorous readings were below detection with only three readings at 0.020mg/L P or 0.027 mg/L P. Stage Stand Creek has acceptable levels of phosphorus.

**Chloride.** Chloride levels ranged from 5mg/L Cl to 55mg/L Cl with a median reading of 35mg/L Cl. The chloride levels are low, i.e. 40 mg/L Cl, and may be from the concrete slowing

leaching or the limestone rock placed for erosion control or residues from salting the highway from winter ice events. Chloride levels fall within the reference condition for southwest Oklahoma.

### **Synopsis**

Stage Stand Creek is a moderately healthy stream located near Duncan in southwest Oklahoma. Chemical monitoring was conducted and the results indicate that oxygen levels remain high and pH levels seem normal. Both suggest a good water quality. Nitrogen and Phosphorus levels are low or below detection limit suggesting the lack of nutrients for aquatic plant growth (i.e. algae). There is also an indication that there is not a pollution problem with this site, as far as for the parameters that were tested. There is a bit of lack in habitat such as few rocky riffles, the water level is all the same depth, very unstable sandy creek bottom and sometimes lack of flowing water. Riffles are present but are “human-kind” made and limited in size and quantity. The lack of riffles may suggest low macroinvertebrate species richness. The physical attributes for successful fish and macroinvertebrate communities was low to medium. There was a good chemical water quality and generally medium physical habitat characteristic. Overall, the stream seems to be of decent health but did not indicate an adequate presence of intolerant fish and macroinvertebrate species nor diversity. The monitoring site is quite close to the headwaters so perhaps that is a limiting factor to the biologics and of course there could be other things going on that have not been tested for, such as bacteria, that could be limiting the biological population.