

Harlow Creek: Edison

NE NW NW

Section 4-19N-12E

Tulsa County

Latitude N 36° 9' 39.7"

Longitude W 96° 2' 36.4"

WBID#: OK 120420-01-0170

Blue Thumb Volunteer Monitoring Data Review – 31 October 2007

Written by: Amy Tucker and David Shannon

Description of Watershed and Monitoring Site:

Harlow Creek in west Tulsa is located in the Cross Timbers ecoregion along the border between Osage and Tulsa Counties. Harlow creek runs two and a half miles before meeting with Blackboy Creek (aka Big Heart Creek) and then flowing into the Arkansas River. The drainage basin of Harlow Creek is approximately five to six square miles of primarily residential population. The monitoring site is located east of a church (approximately one half mile west of North 33rd West Avenue) on West Edison.

Stream Condition & Habitat Overview

The physical habitat of Harlow Creek was assessed for 400 meters on 08 June 2006. Excellent shading by trees along the streamside maintains optimal temperature and subsequently dissolved oxygen content. There is a diversity of grasses, herbaceous plants, shrubs, vines, saplings and large trees along the banks. This mixture of vegetation transfers energy and food to the stream more effectively than any single type of vegetation. The banks along Harlow Creek are stable and do not contribute sediment to the stream. Harlow Creek provides moderate structure for shelter such as submerged logs, root wads, boulders, small woody debris, and a mixture of aquatic plants. The creek also displays moderate pool bottom substrate. Pool bottoms are depositional areas of the stream and are easily damaged by settling materials. The flow is very low and the pools are shallow. This may be due to recent drought. In addition, there are not many rocky runs and riffles. In addition, Harlow creek primarily flows as a straight line. The physical habitat of Harlow Creek is better than the average high quality stream in the Cross Timbers ecoregion.

Biological Conditions

Fish

Fish were collected at Harlow Creek on 8 June 2006. The total number of fish was forty-three percent of the average Cross Timbers ecoregion high quality reference conditions; fish species include Central stonerollers (19), Black bullhead catfish (3), Blackstripe topminnow (1), Mosquitofish (99), Green sunfish (2), Bluegill sunfish (60), Longear sunfish (31) and Largemouth bass (1). There were no benthic species (darters, madtoms,

and sculpins) which are indicators of siltation and oxygen demand. The number of sunfish, four in Harlow Creek, may indicate the amount of sediment that enters and leaves the stream. An absence of intolerant species indicates Harlow Creek is at best a moderate quality stream. Ninety-one percent of the sample was made up of tolerant individuals. There are opportunistic fish that dominate communities that have lost their competitors through loss of habitat or water quality. The absence of insectivorous cyprinids, the dominant minnows in North American streams, indicates the quality and quantity of the macroinvertebrate food base is low. The overall quality of the fish collection was forty-five percent of the Cross Timbers ecoregion reference conditions indicating that top carnivores and many expected species are absent or rare; omnivores and tolerant species dominant. This score indicates the quality of the fish community; the habitat is better than reference conditions; any deficiencies are due to degraded water quality.

Benthic Macroinvertebrates (bugs)

Benthic macroinvertebrates have been collected from Harlow Creek since the winter of 2004. The winter collections are equal to or better than collections from the average high quality reference conditions in the Cross Timbers ecoregion. The summer collections have very few taxa from the orders Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddis flies) and are dominated by Diptera (midges). As more and more species are excluded, the remaining species can increase in numbers due to the unused resources left by the excluded animals. While the winter collections are comparable to the best situation expected, the summer collections show a reduced community structure and species richness with the loss of most intolerant forms. This dichotomy between winter and summer collections could be due to the very low flow of water in Harlow Creek over the past few summers during the drought.

Bacteria Testing

From September 2003 through August 2007, thirteen samples were taken for *E. Coli*. Four samples had *E. Coli* results greater than 400 CFU/100mL. The highest result was 1733 CFU/100mL on 25 August 2005. Most of the time there is not an issue with coliform bacteria.

Chemical Testing

Chemical data were collected monthly between 25 September 2003 and 31 May 2007.

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| DO | The median percent of oxygen saturation was 83%, on the low edge of normal. Twice the amount of oxygen dropped below 50%: 34% on 25 September 2003 and 40% on 25 August 2005. |
| pH | The median pH for Harlow Creek was 7.5, well within the normal range. |

- Nitrogen An estimate of soluble nitrogen was made by adding nitrate nitrogen, nitrite nitrogen and ammonia nitrogen. Most of the time the nitrogen was below the detection levels of the tests. The median value is 0.355mg/L N and is within the normal range.
- Phosphorus The median value for orthophosphate phosphorus is 0.01 mg/L P and is very low.
- Chloride The median chloride value is 55mg/L.

Synopsis

To determine if a creek is healthy we look at the physical habitat, biological community and water chemistry. The habitat at Harlow Creek is excellent: a stable stream with a good riparian area and cover for fish and macroinvertebrates under the water surface. The habitat on 8 June 2006 was better than the average high quality reference conditions for the Cross Timbers ecoregion. The fish collection on the same day was 45% as good as the reference conditions. While there were four species of sunfish, there were no benthic species (sensitive to oxygen), intolerant species, or insectivorous cyprinids (sensitive to the macroinvertebrate food base.) Winter benthic macroinvertebrate collections are excellent. Summer macroinvertebrate collections show a reduced community structure and species richness with the loss of most intolerant forms. Water chemistry shows all parameters were within normal values except the amount of oxygen, which was often below 80% of saturation and occasionally below 50% of saturation. When taken together, the water chemistry and biological community data seem to indicate that the problem in Harlow Creek may be the very low flow conditions during the summer months in the recent years of drought. Low flow can mean low amounts of oxygen. Low amounts of oxygen can explain the reduced quality of the summer bug collections. The missing fish are dependent on either oxygen or the bug population or both.

It appears Harlow Creek is not polluted and has excellent habitat. The biological community is somewhat limited by the amount of oxygen in the water during the very low summer flow conditions of the drought. Perhaps when we get rain again the biological community will recover.