

Flat Rock Creek: Hwy 75

By: Levi Tom

SW NE SE Section 8-20-13E

Tulsa County, Oklahoma

N 36° 13' 30.5"

W 95° 56' 40.8"

WBID#: OK 121300-01-0120D

Flat Rock Creek is located within Osage and Tulsa Counties and is within the Central Irregular Plains eco-region. Its watershed includes an oil field and an air park in Osage County. It runs into Bird Creek, located NW of Tulsa. Flat Rock Creek (upstream of this site) drains an area of approximately 20 square miles in the Central Irregular Plains ecoregion.

Flat Rock Creek's habitat was measured by wading in the stream for 400 meters and measuring physical parameters like water depth and width, erosion, shade, etc. The creek is in a deep channel with eroding banks and little vegetation on those banks. In the area assessed the creek is fairly straight. There was low flow and the pool bottoms were filled with loose sediment and dirt. A loose shifting pool bottom will not provide substrate for burrowing organisms and will not allow bottom-spawning fish to successfully reproduce. There is a good variety of deep and shallow pools which will support a diverse community of aquatic creatures. While the banks are eroding, there is still a reasonable riparian area of natural vegetation at the tops of the banks that allows the canopy to shade the stream. This is important because light is associated with heat and most aquatic creatures are more stressed by warmer waters and the lower oxygen solubility and higher metabolic rates that accompany the warming of the water. Flat Rock Creek also contains a decent number of rocky runs and riffles which offer a unique combination of highly oxygenated, turbulent water flowing over high quality cover and substrate. These rocky runs and riffles offer habitat for many highly adapted animals, especially the invertebrates that feed many of the fish in the stream. Finally, submerged logs, cobbles and boulders, root wads, beds of aquatic plants, and other natural types of hiding places are abundant. This helps Flat Rock Creek to contain almost as many fish and such as you would find in a pristine creek.

On July 7, 2007, a collection took place to see how many and what types of fish were living within this area of Flat Rock Creek. Two nets, 4'x15' and 6'x30', were used to seine 400m to collect different species of fish for this study. Overall there were twenty-two different species of fish found and recorded, which is the average amount one would expect to find in a high quality creek in this ecoregion. The number of sunfish found matched the average. However there is a decrease in the amount of sensitive and intolerant fish by approximately half. With these results this creek was given a B grading when compared to a high quality stream with a similar environment.

Of the twenty-two species of fish recorded, eleven (which is half) of the fish were tolerant, nine were of "intermediate" tolerance, and only two species of fish were intolerant. Four species were omnivores, meaning they will eat both meat and plants, fourteen were insectivores, eating only insects, three were piscivores or carnivores that eat primarily fish, and three were generalists, who will try to eat anything to survive.

There have been collections of benthic macroinvertebrates (critters without backbones that live on the bottom of the stream) during the winter and summer seasons over the years. These are made using a kicknet to collect from three one-meter square sections of the stream bottom in rocky riffles.

During the winter seasons of the years 2004, 2005, and 2007 the taxa richness, or different number of species found, increased from nine to sixteen, and then to twenty-two. A high quality stream has an average of seventeen. The sensitive species like the mayfly, stonefly, and caddisfly, increased between the years of 2005 and 2007 from one to three. (The average high quality stream has three.)

During the summer seasons of the years 2004, 2005, 2006, and 2007 the taxa richness followed a rollercoaster pattern with no consistency. Some years Flat Rock Creek has better summer collections than the average high quality streams and some years they are not as good. During the summer the number of sensitive species is less than half of what is found in a known high quality stream

Water samples from Flat Rock Creek were chemically tested using field screening techniques to check the oxygen saturation, soluble nitrogen, orthophosphate phosphorus, chloride, and pH levels from the beginning of the year in 2003 to the end of the year in 2008. All chemical levels were within average levels. However there were a couple times when the orthophosphate phosphorus levels were not within desirable amounts. For instance, on March 26, 2005 the orthophosphate levels were 0.300 and on April 2, 2006 they measured 0.113. Chloride levels higher than usual on a few occasions, like April 22, 2004 (280 mg/L Cl), January 21, 2006 (300 mg/L Cl), and June 25, 2008 (300 mg/L Cl).

Flat Rock Creek seems to be close to the expected average of an ideal creek in the Central Irregular Plains ecoregion. The habitat scores just slightly less than the high quality streams, but there is good shelter for animals and enough food. Erosion is causing loose sediment and dirt to deposit on the bottoms of the pools and it would be nice to have more vegetation on the banks. There are occasional spikes of orthophosphate phosphorus and chloride, but the water chemistry is usually in the expected range. The fish collection shows that some of the most sensitive species are missing. The benthic macroinvertebrate collections are very good in the winters and slightly stressed in the summers. Flat Rock Creek is not pristine, but is holding its own.