

Polecat Creek: 49th West Avenue

SE NE SE
Section 20-18N-12E
Creek County
N 36.02204°, W -96.04861°
WBID#: OK120420-02-0050J

Blue Thumb Volunteer Monitoring Data Review- October 23, 2013
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Description of Watershed and Monitoring Site:

The headwaters of Polecat Creek begin in Drumright, Oklahoma approximately 19 miles west of Heyburn Lake which is located about 13 miles southwest of Sapulpa, Oklahoma in Creek County. Multiple tributaries converge with Polecat Creek to the west of Heyburn Lake, including: Scholar Creek, Deep Creek, Figure Eight Creek, Dog Creek, Winkey Branch and Mosquito Creek. The watershed draining to this segment encompasses approximately 56,306 acres. Polecat Creek exits the south side of Heyburn Lake and flows east through rural and agricultural Creek County. Multiple tributaries converge with this segment of Polecat Creek, including: Kettle Creek, Little Polecat Creek, Clear Creek, Mountain Creek, etc. The watershed draining to this segment encompasses approximately 52,431 acres. Polecat Creek then starts to flow northeast to Sapulpa at the convergence of Rock Creek. The watershed draining to this segment of Polecat Creek is approximately 30,560 acres and mostly consists of agricultural and residential zoned properties. Multiple tributaries converge with this segment of Polecat Creek, including Skull Creek and Childres Creek. The next segment of Polecat Creek flows generally to the east and includes agricultural, residential and industrial properties. Some industries of note are: the Sapulpa Wastewater Treatment Plant, Creek County Landfill, Duncan and Sons dirt mining, Gem Dirt and Clary Sage Golf Course. The watershed draining to this segment encompasses approximately 7,896 acres. The monitoring site is located at a recently constructed bridge on 49th West Avenue at the Polecat Creek crossing. The monitoring location start point is directly adjacent to Duncan and Sons, a dirt mining facility. Polecat Creek flows for approximately 7.2 miles east until it enters the Arkansas River in Jenks, Oklahoma. Nickel Creek, Coal Creek and Hager Creek converge with Polecat Creek to the east of the monitoring location.

Stream Condition and Habitat Overview:

The habitat assessment performed on 07/26/2010 at Polecat Creek 49th West Avenue scored 84% (score=70.6) of the Cross Timbers highest quality reference average habitat score (score=84.0). Polecat Creek scored high as compared to the reference streams in instream cover and streamside cover. High quality instream cover consists of things like submerged logs, cobbles and boulders, roots and beds of

aquatic plants. Although there was high streamside cover, the bank vegetation stability scored low suggesting that the bank stability is in part due to rock or concrete.

The stream channel at the monitoring segment has been somewhat altered due to mining activities within the 400m reach. This has led to deposition of sediment and sand to the stream pool bottoms.

Pool bottom substrate scored low due to lack of substrate such as rocks, gravel and woody debris. This type of substrate provides habitat for smaller spawning fish, smaller vertebrates and invertebrates that are necessary to support many of the pool dwelling fish. Firmer sediment types like gravel, sand and rooted aquatic plants provide support for a more diverse group of organisms than a pool that is dominated by mud, bedrock, and no plants.

Polecat Creek is a relatively large creek (draining over 147,000 acres of land) and, therefore, shows a lack in canopy cover. Lack of canopy cover can lead to heat and stress due to lower oxygen solubility. The lower amount of rocky runs and riffles in the monitoring segment also suggests lower dissolved oxygen and lower algae, or food source.

Biological Conditions:

Fish

Using the average of high quality streams in the Cross Timbers Ecoregion as the benchmark, Polecat Creek ranks very well in total number of species caught. The total population was twice as much as reference conditions. At Polecat Creek there was 1 fewer species of intolerant fish and was well below average in sensitive benthic species. The overall score was 73% as good as reference conditions.

Although there were 17 different species of fish caught (reference stream had 19 species), the majority of species (96%) were intermediate to tolerant species as opposed to the reference average of tolerant species (70%). Four species with intermediate tolerance were found (Threadfin shad, Ghost shiner, Spotted bass and Slenderhead darter). Only one sensitive benthic species, the Slenderhead darter, was found suggesting increased siltation and oxygen demand. Reference conditions averaged 4 sensitive benthic species. Only one intolerant species was found, the Suckermouth minnow as opposed to two intolerant species in the reference condition. The presence of an intolerant species suggests a moderately high quality stream. Intolerant species are not present in a moderate quality stream.

The number of sunfish species is 1 higher than the reference stream average suggesting a higher pool quality and pool bottom substrate on which fish can spawn.

Benthic Macroinvertebrates (bugs)

Benthic macroinvertebrates were collected from the monitoring segment of Polecat Creek during the summers of 2010 and 2011, and winters of 2011 and 2012. Overall, the creek has shown a gradual decrease in quality with a summer average of 70% and a winter average of 50% when compared to reference conditions.

The summer 2010 riffle sample (107%) was better than the reference conditions and contained a higher EPT taxa richness and abundance. EPT species are those most sensitive to pollution. Polecat Creek also had a lower HBI score than the reference average. This means that there was less organic pollution in Polecat Creek. In the summer of 2010, the segment of Polecat Creek was a high quality stream and comparable to the best situation expected within the ecoregion. As drought conditions and heat in the state increased from summer 2010 to mid-2012, Polecat Creek showed fewer species due to the loss of most intolerant forms. This is shown through the reduction in EPT index.

Chemical Testing:

Polecat Creek at 49th West Avenue was sampled monthly by Blue Thumb volunteers from 8/6/2010 to 2/18/2011.

DO. Dissolved oxygen saturation shows when there are problems with the amount of oxygen available for aquatic life. Too little or too much is an indication of problems. The chemical data show that all of the chemical analyses were within the acceptable percent oxygen saturation range, between 80-130%.

pH. All of the samples collected were within the acceptable 6.0 to 9.0 range.

Nitrogen. An estimate of soluble nitrogen is made by adding the amounts of ammonia-nitrogen and nitrate/nitrite-nitrogen found in the water. Levels of soluble nitrogen had a median value of 0.7 mg/L. Nitrate had a median value of 0.5 mg/L and ranged from BDL (below detection limit) to 2.0 mg/L in December and January. All samples were BDL for Nitrite. Ammonia had a median value of 0.1 mg/L and ranged from BDL to 0.4 mg/L in February.

During the spring and summer, the increased nitrogen-fixing activity of organisms and the addition of fertilizer cause the concentration of nitrates in the soil to steadily increase. Most of this nitrate is absorbed by plants. Thus, the removal of crops in the fall increases the chances for large flushes of nitrate from the soil to water bodies. This agricultural process, along with fertilizer application at the golf course

adjacent to the sample site, may have attributed to the high nitrate during winter months.

Phosphorus. Orthophosphate phosphorous readings had a median value of 0.073 mg/L, which is in the caution zone (0.05-0.1 mg/L). No pattern can be easily detected in the phosphorus data. The source of phosphorus could be from erosion, sediment stirred up from the bottom of the creek during mining activities, or application at the adjacent golf course. On 1/14/2011 there was a very high reading of 0.213 mg/L which is well within the poor zone (> 0.1 mg/L).

Chloride. The Chloride median is 60 mg/L. The highest levels of chloride were reported in the winter months of December and January. This would suggest the chloride levels being from salting the bridge during inclement weather.

Synopsis:

The decrease in stream quality may coincide with the heat and drought conditions during the timeframe. The sampling location at Polecat Creek drains a huge area at approximately 147,193 acres. There are a wide variety of agricultural, industrial, commercial and residential areas that drain to Polecat Creek or its tributaries.

Although Polecat Creek does not score as high as Cross Timber's rural reference streams, it scores comparatively well to other streams within the urban Tulsa metroplex. There was a total of 17 different species of fish collected during the summer 2010 collection. Both a sensitive benthic species of fish (the Slenderhead darter) and one intolerant species (the Suckermouth minnow) were collected. The presence of an intolerant species suggests a moderately high quality stream.

Intolerant species are not present in a moderate quality stream. There was not enough chemical analysis data collected to identify patterns although the winter months had lower quality water than the other seasons. The winter months were under low flow conditions. While Polecat Creek is not pristine, it appears to be a healthy stream, especially considering that there were draught conditions and that there are urban areas in the watershed.