

Polecat Creek: 33rd West Avenue

SW NW NW

Section 27-18N-12E

Tulsa County

Latitude N 36° 00' 54.5"

Longitude W 96° 01' 45"

WBID#: OK120420-02-0050G

Blue Thumb Volunteer Monitoring Data Review – 10/31/2007

Updated by: Susan Rose and Kevin O'Connor

Site description:

Polecat Creek is located in the Cross Timbers ecoregion in northeast Oklahoma. As a 5th order stream, it is among the largest streams monitored by Oklahoma's Blue Thumb Program. Its watershed covers over 200 square miles. Its headwater starts between the towns of Drumright and Oilton in Creek County. From there it trends east and goes through Heyburn Reservoir, Sapulpa and eventually drains into the Arkansas River. Land use in the watershed is agricultural, urban, and industrial with some of Oklahoma's oldest oil fields along its banks. The effluent from several communities drains into Polecat Creek. Blue Thumb volunteers monitor the stream monthly at 33rd West Avenue south of 101st Street in Tulsa County.

Polecat Creek is deeply incised at the monitoring site under the bridge at 33rd West Avenue. To get down into the site, one must walk down a steep, rock-covered hill through thick brush and small trees. The stream itself is rocky and often has scattered trash items in it. There is a topsoil mining company on the north bank of the stream. There is also a commercial dump just to the southwest of the site.

Habitat assessment:

The habitat of 400 meters of Polecat Creek was assessed twice in July 2006. (The second assessment was a quality assurance replicate.) Two habitat assessments have been conducted previously, one in 1996 and the other in 2001. Overall, the habitat assessment shows that the stream habitat is better than the average of high quality reference streams in the ecoregion. Because of its size, Polecat Creek always has water, even during the recent drought. There is good high quality cover for organisms to hide behind, though some of it is trash that has been dumped from the bridge. Much of the stream is pooled and there is a good mix of both deep and shallow pools. There is not much canopy cover to shade the water because the stream is wide and soil mining on the north bank has removed many of the larger trees on the bank. The banks are stable. Polecat Creek is fairly straight in this reach. It appears that the habitat in this reach of Polecat Creek has improved since 2001.

Aquatic life collections:

Fish were collected twice in July 2006. The replicate collection was not quite as good as the original 2006 collection, but it had to be stopped after 300 meters because of lightning. The remaining 100 m had the best sunfish habitat and the number of sunfish species collected was the primary difference between the two collections. When

compared with the average of high quality streams in the Cross Timbers ecoregion, Polecat Creek is comparable to pristine conditions with an exceptional species assemblage.

The fish collection made 7/5/2006 had 23 species of fish which included seven species of sunfish (green sunfish, orangespotted sunfish, bluegill sunfish, longear sunfish, spotted bass, largemouth bass and white crappie.) There were two intolerant species, the suckermouth minnow and the redbfin darter. There were two additional darter species; logperch and slenderhead darter. The 2006 fish collection receives a total metric score of 22 which is 100% of reference conditions. This scores an "A" on the Index of Biotic Integrity (IBI).

There have been two previous fish collections in the past ten years. The first was made in 1996 and the second in 2001.

The fish collection made 10/15/1996 had 21 species of fish which included seven species of sunfish (green sunfish, orangespotted sunfish, longear sunfish, redear sunfish, spotted bass, largemouth bass and white crappie.) There were two intolerant species, the suckermouth minnow and the slim minnow. The biggest difference between this collection and reference conditions is the absence of sensitive benthic species like darters. The 1996 fish collection receives a total metric score of 18 which is 82% as good as reference conditions. This scores a "B" on the Index of Biotic Integrity (IBI), indicating decreased species richness, mostly the intolerant species.

The fish collection made 6/27/2001 had 20 species of fish which also included seven species of sunfish (bluegill sunfish, longear sunfish, redear sunfish, spotted bass, largemouth bass and white crappie.) There was only one intolerant species, the suckermouth minnow, though there was one species of darter (slenderhead darter.) The total metric score in 2001 is 16; 73% as good as reference conditions. This collection scores a "C" on the Index of Biotic Integrity (IBI), indicating that intolerant and sensitive species are rare or absent.

Macroinvertebrates have been collected every winter in January/February and every summer in July/August. Summer collections in the last five years have an average number of 12 taxa compared with 20 taxa in reference conditions. This indicates reduced water and/or habitat quality. There were three Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa in Polecat Creek compared with 7 taxa in reference conditions. The EPT taxa are the mayflies, stoneflies, and caddisflies that are more sensitive to pollution than any other groups. A single taxon, Trichoptera Cheumatopsyche, made up 52% of the individuals collected in the samples. Species diversity is limited. As more and more species are excluded by increasing pollution, the remaining species can increase in numbers due to the unused resources left by the excluded animals. The average summer riffle metric score for the last 5 years at Polecat Creek is 33% of reference conditions for the Cross Timbers ecoregion, earning an IBI score of "C".

Winter macroinvertebrate collections in the last five years have an average number of 13 taxa compared with 16 taxa in reference conditions. Once again the EPT taxa were limited and the dominant taxon was 46% of the sample. The winter metric score at Polecat Creek is 62% of reference conditions, earning an IBI score of "B".

Bacteria

Eschericia coli has been measured during the summer months of May through September. For streams where people wade and play the *E. coli* level should be below 400 CFU/100 ml. The highest values each year were measured in May and June. All of the results above 400 CFU/100 ml are listed below:

5/26/1999	690 CFU/100 ml
6/24/1999	>2400 CFU/100 ml
6/29/2000	>2400 CFU/100 ml
7/27/2000	460 CFU/100 ml
5/31/2001	2000 CFU/100 ml
6/28/2001	1700 CFU/100 ml
6/26/2003	>2400 CFU/100 ml
6/24/2004	950 CFU/100 ml
8/25/2005	825 CFU/100 ml

Chemical Quality:

The chemical data show that Polecat Creek usually has a healthy amount of dissolved oxygen in the water. The median value of oxygen saturation is 95%, well within the normal parameters. The percent oxygen saturation dropped to 29% on 12/29/2001, the only time it was below 50% saturation. There have been eight times since 7/28/2001 when the percent oxygen saturation was between 50% and 80%.

pH has stayed between 7.5 and 8.0, which is healthy.

An estimate of soluble nitrogen is made by adding the amounts of ammonia-nitrogen and nitrate-nitrogen found in the water. The median value of soluble nitrogen is 0.12 mg/L N, well within normal levels. A healthy stream should have less than 0.8 mg/L N. Polecat Creek exceeded this level:

on 7/27/2002 with 1.16 mg/L N,
on 12/31/2004 with 0.88 mg/L N,
on 11/4/2005 with 1.0 mg/L N,
on 11/26/2005 with 2.0 mg/L N,
on 12/24/2005 with 1.0 mg/L N,
on 9/26/2006 with 1.2 mg/L N,
on 11/28/2006 with 1.0 mg/L N,
on 1/5/2007 with 1.4 mg/L N,
on 2/4/2007 with 1.4 mg/L N,
on 3/11/2007 with 1.2 mg/L N.
on 4/8/2007 with 1.2 mg/L N, and
on 7/10/2007 with 1.2 mg/L N.

These are not dangerous amounts, but will support algae growth. The nitrate nitrogen field test changed from the cadmium reduction method to test strips in July 2005 because of accuracy and precision issues with the old method. This could account for the apparent increase in soluble nitrogen recently.

Orthophosphate phosphorus is another nutrient found occasionally in Polecat Creek. The median orthophosphate phosphorus value is 0.08 mg/L P. A healthy stream should have less than 0.1 mg/L P. Levels found have exceeded this level:

on 12/1/2001 with 0.1 mg/L P,
on 12/28/2002 with 0.107 mg/L P,

on 11/31/2002 with 0.120 mg/L P,
on 12/28/2002 with 0.5 mg/L P,
on 1/26/2003 with 0.167 mg/L P,
on 6/28/2003 with 1.433 mg/L P,
on 11/29/2003 with 0.137 mg/L P,
on 6/26/2004 with 0.163 mg/L P,
on 10/30/2004 with 0.2 mg/L P,
on 8/27/2005 with 0.190 mg/L P,
on 9/24/2005 with 0.240 mg/L P,
on 11/14/2005 with 0.173 mg/L P,
on 11/26/2005 with 0.170 mg/L P,
on 12/24/2005 with 0.1 mg/L P,
on 2/8/2006 with 0.133 mg/L P,
on 4/11/2006 with 0.107 mg/L P,
on 8/20/2006 with 0.107 mg/L P,
on 9/26/2006 with .290 mg/L P, and
on 4/8/2007 with 0.167 mg/L P.

Chloride presence is less than 200 mg/L, which is a safe level.

Monitoring Polecat Creek monthly provides information about the health of a large and important watershed. The habitat is quite good, especially considering the soil mining and dump on the banks at the site. Biological collections indicate a loss of some of the most sensitive species of macroinvertebrates and a healthy fish population. Overall, the creek remains fairly healthy. It faced challenges in the past from effluent released by Sapulpa's water treatment plant. Fortunately, the plant has been modernized in recent years and the effluent released has been kept to a minimum. Through continued monitoring, problems can be addressed before they become serious. Under the watchful eyes of volunteers, the life supported by Polecat Creek and its watershed will continue to be protected.