

Rock Creek: 40' Hole

By: Lauren Deaton

NE NW NE Section 9-1S-3E

Murray County

N 34° 29' 28.8"

W 96° 59' 31.9"

WBID#: OK 310800-02-0090T

The site on Rock Creek at 40' Hole is located in south central Oklahoma in the Cross Timbers ecoregion and drains approximately fifty square miles of watershed. Above this site, the creek runs south through the city of Sulphur and through the Chickasaw National Recreation Area. The land around it is mostly rural with farming and agriculture, until it runs through the urban area of Sulphur.

Rock Creek is monitored at the 40' Swimming Hole. The habitat assessment went upstream for 400 meters. There are not many rocky riffles here because it is one of the places in the world where travertine forms and the riffles have become travertine bedrock. There is a good variety of deep and shallow pools to serve as homes for different species. The creek is wide so that while there is good vegetation along the banks, there is a modest amount of shade over the creek to help keep the water cool. The banks are very stable and are covered with a mix of vegetation that offers a high quality source of food. Within the stream, there is excellent cover for aquatic animals to hide under, inside and behind. This consists of things like submerged logs, cobbles and boulders, root wads, and beds of aquatic plants. The habitat in Rock Creek is better than the average habitat in known high quality streams in the Cross Timbers ecoregion.

A good way to determine the health of the stream is to count the number of different kinds of fish. On August 8, 2008, fish were collected by seining (pulling a net through the water) the same 400 meters as the habitat assessment. Fish were counted and released. When compared with known high quality streams in the same ecoregion, Rock Creek is missing some of the sensitive fish that live in spaces between the cobbles and gravel of the stream bottom. This may be because of the active travertine formation in the stream. Rock Creek also has lower numbers of intolerant species. Rock Creek gets a grade of B for the fish collection.

Here is a list of the fish collected and the (number of individuals):

- Central stoneroller (23)
- Blacktail shiner (16)
- Black redhorse (2)
- Channel catfish (2)
- Mosquitofish (50)
- Green sunfish (6)
- Warmouth sunfish (1)
- Bluegill sunfish (26)
- Longear sunfish (13)
- Redear sunfish (16)
- Orangethroat darter (2)
- Logperch (1)
- Freshwater drum (1)

Another sign of the health of a stream is the community of aquatic invertebrates (bugs). They are collected in the winter and summer from rocky riffles, streamside vegetation or woody debris. The vegetation and woody debris samples are collected using a “D” net by rubbing the vegetation or debris under the water for three to five minutes. Most of the collections from 2002 through 2008 are comparable to pristine conditions within the ecoregion (a grade of A).

Water chemistry in Rock Creek is something very important to look at. One of the most important things is the amount of oxygen dissolved in the water. If there is not enough oxygen aquatic animals cannot live there. The median dissolved oxygen in the creek is 115 % saturation, which is in the normal range. Nutrients (nitrogen and phosphorus) in the water can cause excessive algae growth. The median amount of soluble nitrogen is 0.1 mg/L N and the average orthophosphate phosphorus is 0.02 mg/L P. Both of these values are very low and certainly within the normal range. The average pH in the creek is 8 and that is where it should be. The median chloride is 120 mg/L. The largest amount of chloride found in the creek was January 31, 2009, and it was 400 mg/L. This was probably because of salting icy roads.

Bacteria in creeks are always something to watch for. *E. coli* is supposed to be less than 400 colony forming units (CFU) per 100 mL of water for safe swimming. Samples exceeded the 400 CFU limit twice in 2008. April 30, 2008 had 1000 CFU and on August 31, 2008, the value was 1700 CFU/100 mL.

Rock Creek at 40' Hole is a beautiful place. The habitat for aquatic animals is excellent. The fish collection is missing a few of the sensitive species that live in the spaces between the cobbles and gravel in the bottom of the stream. Considering that this area has travertine deposition and that there are few spaces in the bottom of the stream, this does not mean that the creek is suffering. The aquatic invertebrate collections are comparable to pristine conditions. The water chemistry falls well within normal ranges. This is a good place to swim except for the two days that the *E. coli* was over 400 CFU/100 mL. The bugs, fish, and water chemistry all seems pretty healthy. This is just another reason why Oklahoma is #1.