# **HABITAT CONDITIONS**

### **Aquatic Community Classification**

The Ozark Highlands are an area of very old, highly weathered, low plateaus. The time span over which the region evolved has created a very physiographically diverse area with many associated unique endemic species (MDC 1998). The Elk River basin is located in the western portion of this area. The Elk River basin as delineated in this document is part of the Ozark-Neosho Division Community, a small portion of the Ozark Aquatic Faunal Region (Pflieger 1989). Streams in the Elk River basin tend to be very clear and more Ozarkian in nature than streams in the northern and western portions of the Neosho Division. Stream gradients are generally less than in other Ozark divisions. Springs tend to be numerous but small. The fish fauna of this division includes several species that are found in no other area of Missouri including redspot chub, bluntface shiner, cardinal shiner, southwestern mimic shiner, western slim minnow, Neosho madtom, Arkansas darter, Neosho orangethroat darter, redfin darter, and channel darter. Other fauna unique to this area are the yellow mud turtle, Neosho midget crayfish, and Neosho mucket mussel (Pflieger 1989).

#### **Channel Alterations**

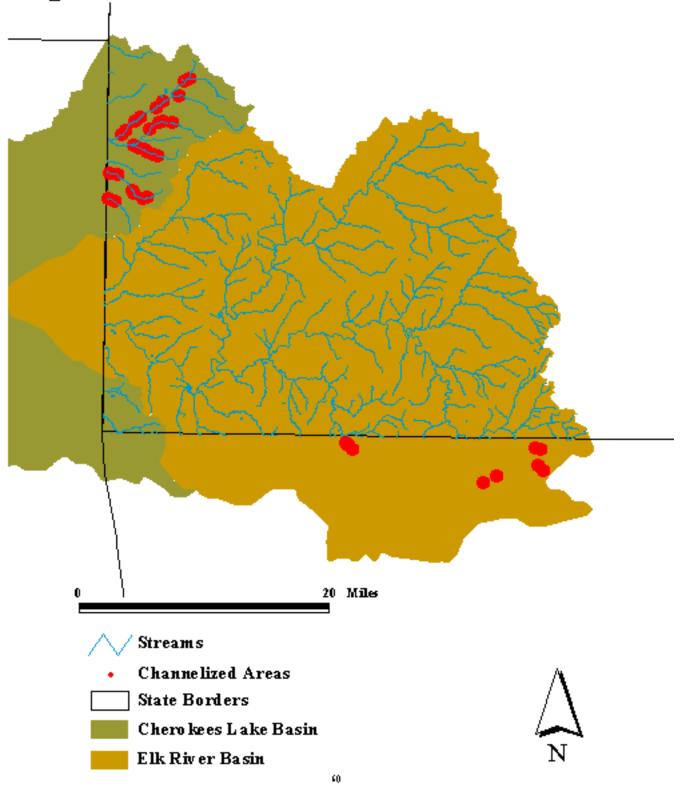
Channel alterations in the basin include modifications to urban stream courses, channelization associated with road and bridge construction, several small impoundments, channel modifications related to gravel removal, and efforts by individuals to control streambank erosion. Larger scale channelization seems to have been concentrated in the Lost Creek and Buffalo Creek drainages. Lost Creek and its tributaries above Seneca, Missouri, have been extensively channelized in an effort to control flooding. Another area where channelization was noticed on topographic maps was in the Big Sugar Creek sub-basin near Pea Ridge, Arkansas. Two other areas of noted channel disturbance are Little Sugar Creek at Bella Vista, Arkansas, and the Elk River along Highway 71 just south of Pineville, Missouri (Gordon 1980). Areas where channelization was apparent on topographic maps are shown in Figure 18. Instream commercial gravel mining operations are scattered throughout the basin. However, they seem to be more prevalent in the Big Sugar Creek and Little Sugar Creek sub-basins. There are several areas of small scale channel disturbance (probably gravel removal) presumably for purposes such as driveway and field road maintenance, beach/bank reshaping, and low water ford maintenance. The cumulative effect of these activities is not known.

## **Unique Habitats**

The only designated natural area in the Elk River basin is Buffalo Hills Natural Area in northwest McDonald County. It is a 340-acre area consisting of dry-mesic and dry chert forest. It is owned and managed by MDC (Kramer et al 1996). Running buffalo clover, a federally endangered species, is present on this area. Several notable natural communities are found in the area encompassed by the Elk River basin including: caves, dry chert forests, dry-mesic chert forests, limestone glades, dolomite glades, shale glades, dry-mesic chert prairies, hardpan prairies, dry limestone/dolomite cliffs, Ozark headwater streams, and Ozark creeks/small rivers.

## **Improvement Projects**

Figure 18. Channelization in the Elk River basin.



Many contacts about stream improvement projects have been made in the Elk River basin, but relatively few have been constructed. This is due in part to inability or unwillingness by private individuals to commit funds necessary for cost share projects. Also fluctuations in the availability of government agency funding for these programs has limited installation of projects. Some improvement projects have been completed in the Elk River basin by both government agencies and private landowners.

#### **Public Lands -**

Three improvement projects have been done on the MDC Deep Ford Access. The first project was completed in 1986. It consisted of a 400' rock blanket, a series of six hard points, and tree planting. It was designed to reduce bank erosion and encourage natural revegetation of the protected bank. Excessive erosion was still occurring downstream of the last hard point in 1987, so additional work was done during the spring and summer of 1988. This consisted of a two row tree revetment using cedar trees and planting of willows and sycamores in an area extending downstream about 75 feet from the last hard point. High water flows washed away several of the anchored cedar trees and a number of the planted trees. The third project consisted of repairing the original revetment, replanting trees, and adding two new revetments between the lower three hard points in 1989. Additional planting of trees was conducted through 1992.

#### **Private Lands -**

There are four documented projects carried out in the Elk River basin involving private landowners and MDC. One is on the Kings Valley tributary of Big Sugar Creek (T22N, R30W, Sec. 4). A rock blanket and willow stakes were used to stabilize a bank downstream from a low water crossing to protect a spring that is the landowner's water supply. The project was completed in 1994. Another project is located on Indian Creek (T23N, R31W, Sec. 4) and consists of a cedar tree revetment and stream corridor tree planting to stabilize a rapidly eroding bank. This project was completed in 1992. The third project was along Big Sugar Creek (T22N, R32W, Sec. 34) in McDonald County. It consisted of a cedar tree revetment (225 feet long) and two acres of streambank planted with trees. This project was completed in September 1990. Another project done in the Elk River basin was a tree planting and willow staking project covering 800 feet of streambank along Little Sugar Creek (T21N, R32W, Sec. 2).

Another project that will impact water quality and protect a stream in the Elk River basin is a rotational grazing system that utilizes alternative watering and riparian corridor fencing. This project was installed as a cooperative effort between the NRCS and a private landowner. Water is provided for the cattle by a well, pipelines, and water tanks. This allowed a 50-foot wide fenced corridor to protect about 2,800 feet of Sugar Fork Creek in McDonald County (T23N, R32W, Sec. 3) from cattle grazing and watering activity. A second part of the project was a 20-foot wide corridor around a spring that feeds the creek. It was

fenced to protect it from cattle activity that would adversely affect water quality in Sugar Fork Creek. This project was completed in June 1998.

#### **Stream Habitat Assessment**

Based on information used for MDC Southwest Regional Management Guidelines the following are habitat features of areas found within the Elk River basin. Sub-basins with greater than 50% forest cover include Little Sugar Creek, Big Sugar Creek, and Elk River. (MDC 1998b). The Big Sugar Creek Hills land type association has outstanding large forested blocks (MDC 1998b). Big Sugar Creek Landscape Conservation Area (includes Big Sugar Creek and Elk River sub-basins) is an exceptional region due to the outstanding creek system, its associated rare aquatic fauna, and several caves that are home to endangered bats. It also has great potential for glade and savanna restoration (MDC 1998).

Based on aerial videotape examination, there are some characteristics that apply to most, if not all, streams in the Elk River basin. Wooded riparian corridors in the Elk River basin seem to be a function of terrain. If the land can be safely negotiated by farm equipment, it tends to be maintained as pasture. Areas of significant tree lined corridor generally are too steep to be used for any other purpose. For example, the corridor is typically a good mixture of trees and shrubs on the bluff side of the river and often pasture will run to the water's edge across from the bluff. In areas where both sides are relatively flat there often is no wooded riparian corridor. Streambank stability is often determined by the quality and width of the streamside wooded corridor. The patchiness of the wooded corridor throughout the Elk River basin probably does very little to stabilize the streambanks. Instead, streambank stability in the Elk River basin seems to be a function of bedrock, limestone bluffs, and gravel bedloads.

All streams, from the air, appeared to have large gravel bars, shoals, and islands in and along them. Sample site notes throughout the basin mentioned gravel, pebble, and cobble as the dominant substrate materials, corroborating the composition of these depositional areas. Extensive channel braiding was noted in Big Sugar Creek and Little Sugar Creek. These features indicate excessive bedloading. During flood flows this material can be moved, but during normal periods of lower flow it drops out, creating extensive gravel bars/shoals and numerous braided channel areas.

Vehicular activity in stream channels throughout the basin was evident. Large numbers of shallow water fords, and ruts in stream channels could be seen on the aerial video tapes. The combination of firm streambeds and shallow areas likely promote this activity.

Another trait common to all basin streams is free access of ranging cattle. All streams exhibited some symptoms of cattle activity in and along them. This included bank erosion, poorly vegetated riparian corridors, and nutrient enrichment from cattle wastes in and along the stream. Several areas with cattle access to the river were seen between Pineville and Highway 43 during a survey of the Elk River. These areas were sparsely vegetated and had steep banks with large ruts or grooves in them where cattle walked down to water. The upper reaches of Buffalo Creek, Lost Creek, and Indian Creek all had very restricted wooded corridors and exhibited signs of intensive cattle activity.

The following observations for individual streams are based on information recorded during fish collections in 1997 and 1998.

## **Big Sugar Creek:**

The reaches sampled along Big Sugar Creek had good to poor streambank stability. The majority of the stream had sections with vertical banks and no vegetation capable of preventing scour. A few locations exhibited excellent streambank stability characterized by good vegetation cover and no vertical banks. Streambank vegetation was dominated by herbaceous vegetation (30 to 40 percent) or no vegetation (20 to 40 percent). Tree cover ranged from 10 to 30 percent and shrub cover from 20 to 30 percent. The width of the wooded riparian corridor exceeded 75 feet in upstream locations, but progressively narrowed downstream to 25 feet or less. Land use in the region varied, but was dominated by pasture. Forest and residential/commercial land uses were present. The substrate was composed of all categories except clay, silt, and bedrock. The gravel, pebble, and cobble forms were dominant.

#### **Buffalo Creek:**

The reaches of Buffalo Creek sampled had good streambank stability. Most of the reaches had little to no visible erosion. One small section had a vertical bank with no vegetative cover. Streambank vegetation consisted of herbaceous vegetation (40%) interspersed with an equal amount of trees, shrubs, or bare banks (20% each). Land use was pasture for all locations. The upstream location had a wooded stream corridor of less than 25 feet. The downstream location had a wooded corridor width of greater than 100 feet. The substrate consisted of all forms except clay. Pebble and cobble were dominant upstream, while gravel was the dominant substrate downstream. Bedrock was noted only in the downstream location.

#### **Butler Creek:**

One site was sampled on Butler Creek. The reach had excellent to good streambank stability with no sign of active erosion. Streambank vegetation consisted of 40% herbaceous vegetation, 30% shrub, 25% tree, and 5% had no vegetative cover. The land use for the area was residential/commercial. The width of the wooded corridor varied along the reach sampled. The right bank upstream had over 100 feet of wooded corridor and the left bank, cut by the highway, had 25 feet of corridor with tree cover. Downstream, the city park at Noel reduced wooded corridor widths to less than ten feet. Finer sediments dominated the substrate composition.

#### Elk River:

The streambank stability of the Elk River ranged from good to poor. Upstream, just after the confluence of Big and Little Sugar creeks, streambank stability was poor with little to no vegetation. The streambank cover types were bare bank (40%), herbaceous vegetation (30%), shrubs (20%), and trees (10%). Upstream, the width of wooded corridor, if present, was less than 25 feet. Vertical banks were not noted. Streambank stability increased downstream. Streambanks were covered with herbaceous vegetation (40%), shrubs (30%),

and trees (20%). Only ten percent of the streambank was bare. Where present, wooded riparian corridor widths exceeded 50 feet. Land use beyond the corridor was primarily residential/commercial with some forest and row crop. The substrate consisted of all forms except clay and silt, with pebble, gravel, and cobble being the dominant forms.

#### **Indian Creek:**

Streambank stability ranged from excellent to good with no visible signs of erosion. Streambank vegetation was dominated by herbaceous vegetation (40%), shrubs (30%), and trees (20%). Only ten percent of the reaches sampled had no vegetation cover. Predominant land use beyond the corridor was pasture with some row crop and residential use noted. Width of the wooded corridor was greater than 100 feet in most locations. A small section had a wooded stream corridor width of only 25 feet. The substrate composition was dominated by larger forms. One location was primarily bedrock (75%).

## **Little Sugar Creek:**

Streambank stability for this stream ranged from good to poor. Several locations had vertical banks with no vegetation. Streambank vegetation consisted of mostly herbaceous vegetation with some shrubs and trees. The land uses consisted of mostly residential/commercial and pasture with a small area set aside as forest. The width of the wooded stream corridor in all locations sampled was greater than 100 feet. The substrate consisted of all forms except clay with gravel, pebble, and cobble as the dominant forms.