

# ***STREAM HABITAT***

## **Instream Habitat Assessment**

The lower Moreau River is a slow moving, turbid river with steep, silty streambanks. The channel is “U” shaped. The substrate is rich in silt, organic matter, gravel, and cobble. The lower reaches of the North Moreau and South Moreau creeks resemble the sluggish Moreau River but farther upstream they become more Ozark-like. They run more swiftly, are clearer and have more gravel, cobble and boulder substrates. Because the Moreau River has a very low gradient (1.6 feet/mile) and it empties into the Missouri River, its water level is greatly influenced by the stage of the Missouri River. For example, if the Missouri River is at flood stage then flooding is likely to occur on the Moreau River as well.

Inspection of aerial photos covering major streams indicate numerous areas of streambank sloughing on outside bends of the channel where the riparian trees have been cleared. These areas are sources of sediment that can fill pools and cause the channel to become shallower and wider.

During periods of severe drought, fish and other aquatic life require either sufficient water flow to sustain life or pools that can provide refuge. A survey to examine these conditions in many major Missouri streams was conducted in 1941-43 by A. H. Denny (Project Leader of P-R 1-5R) and rechecked and tabulated by John Funk in 1968. He reported that during periods of severe drought in the 1930-1950's, 34 miles of Moreau River, 26.5 miles of South Moreau, 42 miles of North Moreau, 11 miles of Burris Fork and 13 miles of Straight Fork creeks maintained flows capable of supporting fish populations (Funk 1968). An additional 4 miles of South Moreau, 8 miles of Burris Fork and 6 miles of Straight Fork maintained permanent pools when water flow became intermittent (Funk 1968).

## **Streamside Forest Condition**

Aerial photographs (1995) covering the mainstem Moreau River (35.2 miles) were examined for width of continuous wooded riparian corridor. A template was used to characterize the condition of the streamside corridor. One hundred and twenty four segments, 300-1200 meters in length, were inspected and each 100 meter section of bank was categorized into one of 6 groupings: 0-scattered trees, 1 row of trees-25 m of continuous tree cover, and continuous tree coverage of 26-50m, 51-75m, 75-100m or =100 meters (Table 1). The results of this analysis indicated 16% (mean of both banks) of 35.2 miles of river had virtually no wooded corridor and 40% (mean) had a corridor consisting of at least 1 row of trees to 25 meters (82 feet) in width. Eighteen percent of streambanks had tree corridors over 100 meters in width. An appropriate goal for a tree corridor width on an order 6 stream like the Moreau River is at least 100 feet (33 meters) wide on each river bank. An adequate tree corridor will foster infiltration of water into the ground, slow velocity of flood and overland runoff waters, trap sediments, provide a source of nutrients for the stream ecosystem, and moderate stream water temperature by providing shade.

Another way to identify potential stream problem areas is to examine land use patterns along streams. For example, where large wooded areas exist we may anticipate fewer streambank erosion and pollution problems and where high cropland and grassland use exists we may expect more problems with siltation, streambank erosion or nutrient enrichment. We obtained basin-wide estimates of land use patterns along basin streams using GIS technology. A computer program, the riparian estimator, developed in 2001 by Mark Caldwell, a MDC fisheries researcher, derived land use adjacent to streams using Landsat 30 meter resolution satellite imagery from 1993-1995 (MoRAP 1997). The program divided streams into 400 meter segments then characterized land use within a 90 meter swath (3 pixel width) centered on the main creek channel. Its accuracy is estimated to be from 15-60 meters. These data suggest 51-54% forest cover along streams in the eastern part of the basin with a gradual decrease to 29% in the western part of the basin. Grassland use exceeded 34% in all areas of the basin and peaked around 56% in the southwest region. Cropland was lowest in the southcentral part of the basin (3-5%) and highest in the western portion (15%). Urban and wetland uses in the stream corridor were insignificant. Figures sf1 and sf2 summarize the sub-basin localities and land use patterns.

### **Channel Alterations**

The mainstem Moreau is a low gradient stream which gently meanders across its flood plain. Its channel has been modified in places to create more cropland and to facilitate road crossings. An exact estimate of the proportion of its length that has been channelized (straightened) is difficult to determine because channel alterations done 50-150 years ago may not be detected without on-site inspection and use of historical notations. Especially straight reaches of stream are highly suspect for past channel alteration activities. The overall effect of channel straightening is a shortening of the overall stream length which decreases storage capacity and increases water velocity and thus erosive forces.

Small impoundments occur on the upper reaches of many small streams but none of the major streams are impounded at this time. There are remnants of an old mill dam at T44N, R16W, S3 on North Moreau Creek near California in Moniteau county.

In 2002, there were 7 permitted sand and gravel removal operations in the basin. They are located on Straight Fork Creek (2), Burris Fork Creek (1), Neighorn Branch (1), Russellville Branch (2) and South Moreau Creek (1) (MDNR 2002b; Figure gs). Extraction activities have the potential to increase channel instability which leads to channel down-cutting and widening, increase streambank erosion, increase turbidity, and increase sedimentation of downstream aquatic habitat. Consequences of these alterations include threatening fisheries productivity, biodiversity, recreational potential, public infrastructure (bridges, oil, gas, sewer pipelines, utility lines), streamside land use and aesthetics, and real estate values.

### **Unique Habitat**

The Missouri Department of Conservation tracks six high quality natural communities in the Moreau watershed through the Missouri Natural Heritage database (2002). They include Baker Bluff, a mesic limestone/dolomite forest in Moniteau county; Hite Prairie, a dry-mesic chert prairie, which is also an

MDC conservation area in Morgan County; Newcomb Prairie, a dry-mesic prairie in Moniteau county; Straight Fork Forest, a 20-acre dry-mesic limestone/dolomite forest in Moniteau County; North Moreau Creek Forest, a mesic bottomland forest in Cole County; and the mainstem Moreau River in Cole County (Figure uh). The Moreau River is recognized as a good example of a Missouri Ozark Division stream.

There are no natural areas in the basin.

### **Improvement Projects**

MDC staff have been available since 1986 to provide technical assistance to landowners with streambank erosion problems. Advice regarding appropriate streambank stabilization techniques, tree species for riparian plantings and information on various cost share programs sponsored by MDC, DNR, NRCS, and county soil and water conservation districts was made available. Twenty-two contacts involving site visits were made to problem areas on Burris Fork (4), North Moreau Creek (5), South Moreau Creek (5), Straight Fork (3), Smiths Creek (1), Roark Branch (3), and Honey Creek (1) since 1986. Five major stream habitat improvement projects were implemented with government assistance in 1999-2002 (Table 2).

Table 1. Condition of the riparian corridor of the mainstem Moreau River (35.2 miles) by inspection of 1995 aerial photographs.

	<b>Percent wooded riparian corridor</b>		
<b>Tree Corridor width</b>	Left streambank	Right streambank	Mean both banks
0-scattered trees	17%	14%	16%
1 row of trees-25 meters	34%	46%	40%
26-50 meters	15%	10%	12%
51-75 meters	7%	8%	8%
76-100 meters	6%	7%	7%
=100 meters	20%	16%	18%

Table 2. Stream habitat improvement projects implemented in 1999-2002.

<b>Stream</b>	<b>County</b>	<b>Project practices</b>
Roark Branch	Cole	Livestock exclusion from riparian corridor, fencing, well, solar-powered water pump
Tributary to Roark Branch	Cole	Livestock exclusion from riparian corridor, fencing, rock stream crossing
North Moreau Creek	Cole	CRP filter strip, rock stream crossing, rock jetty
North Moreau Creek	Moniteau	Willow stake streambank
Straight Fork	Montieau	Rock jetties (3), trees for planting

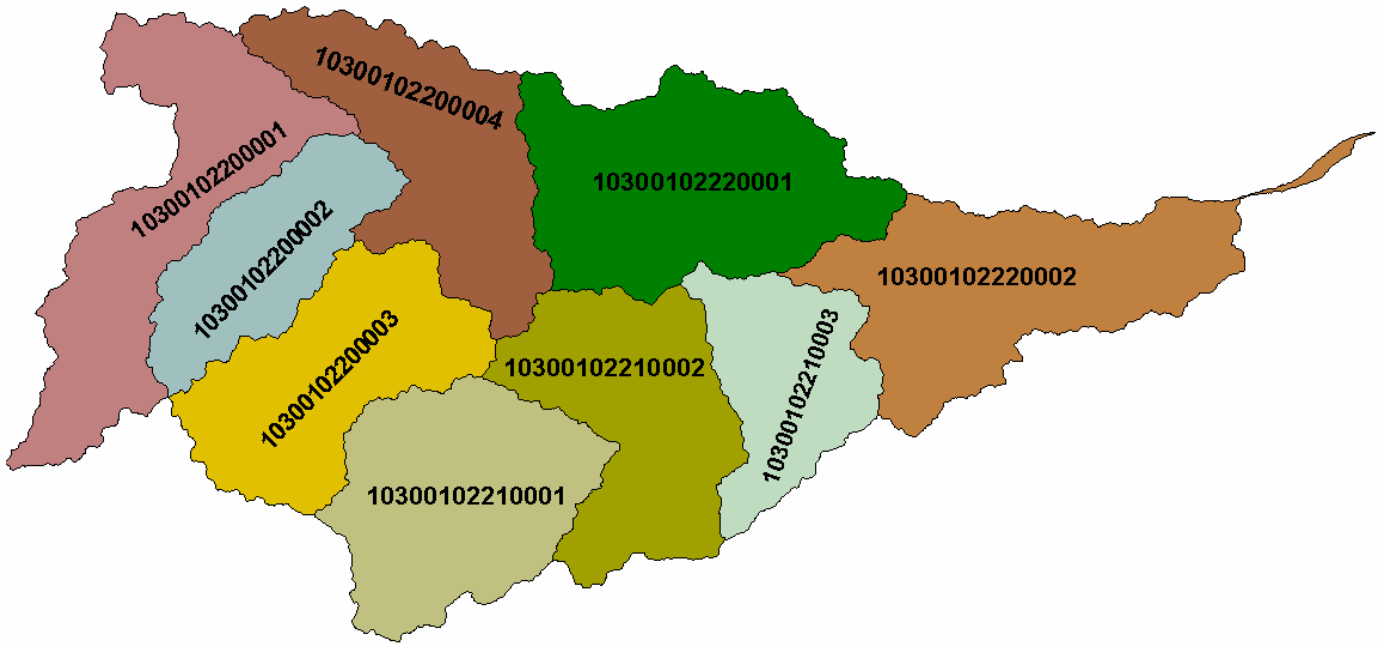
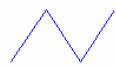
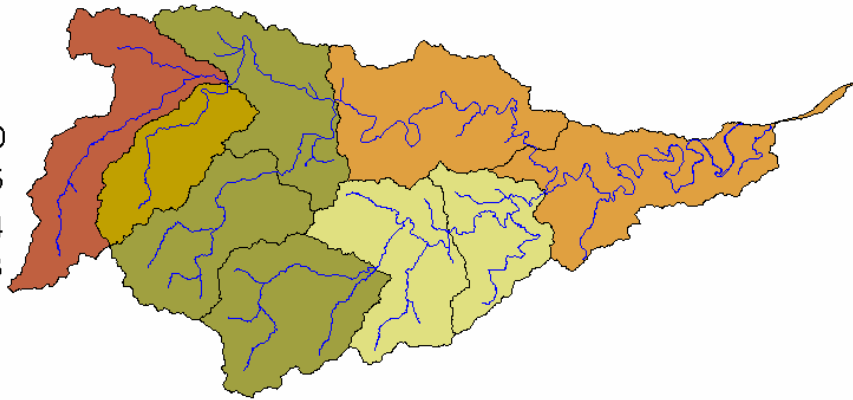
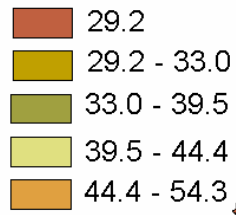


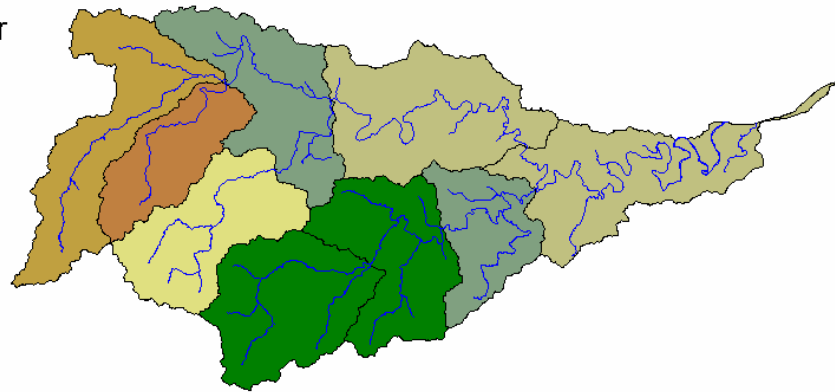
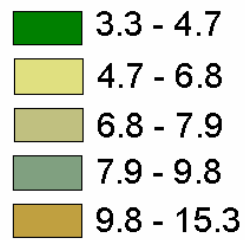
Figure sf1. Subbasins of the Moreau River Watershed in Missouri.

 Streams

Percent of Forest Cover



Percent of Cropland Cover



Percent of Grassland Cover

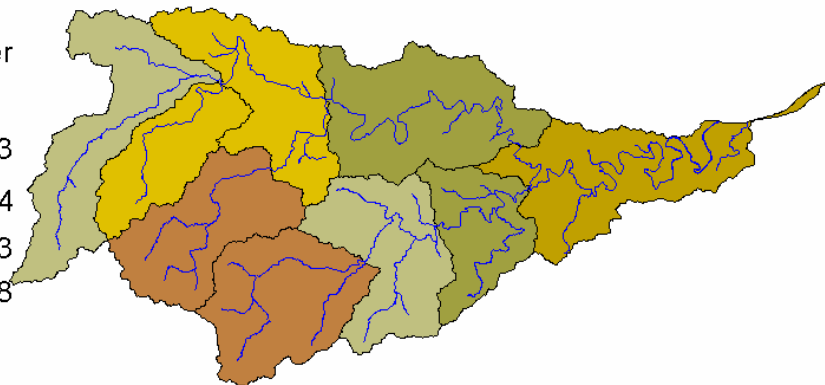
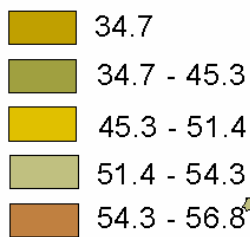


Figure sf2. Riparian 90-foot wide land use in the Moreau River sub-basins, 1993-1995.

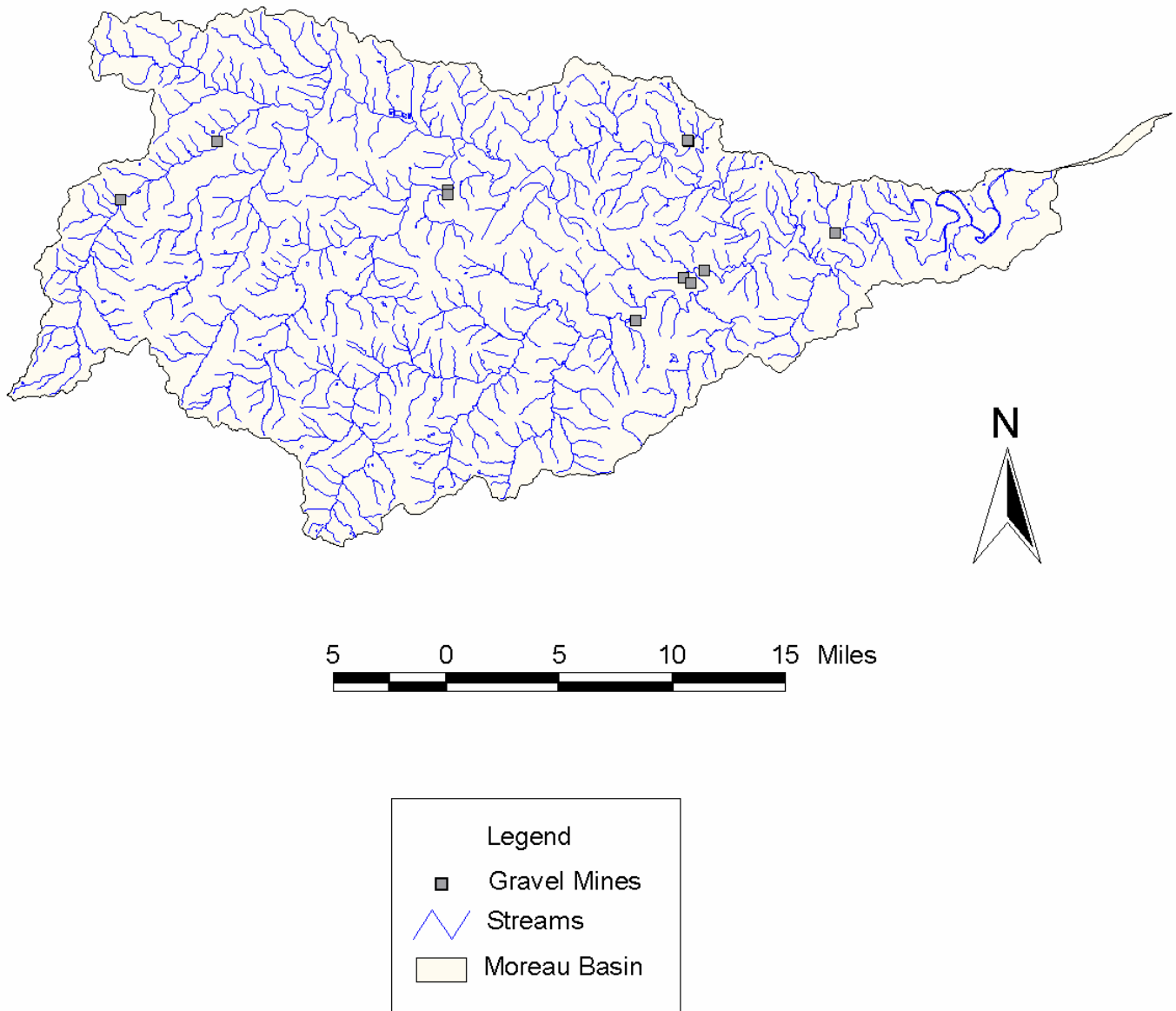


Figure gs. 2002 gravel removal sites in the Moreau River Watershed, in Missouri.

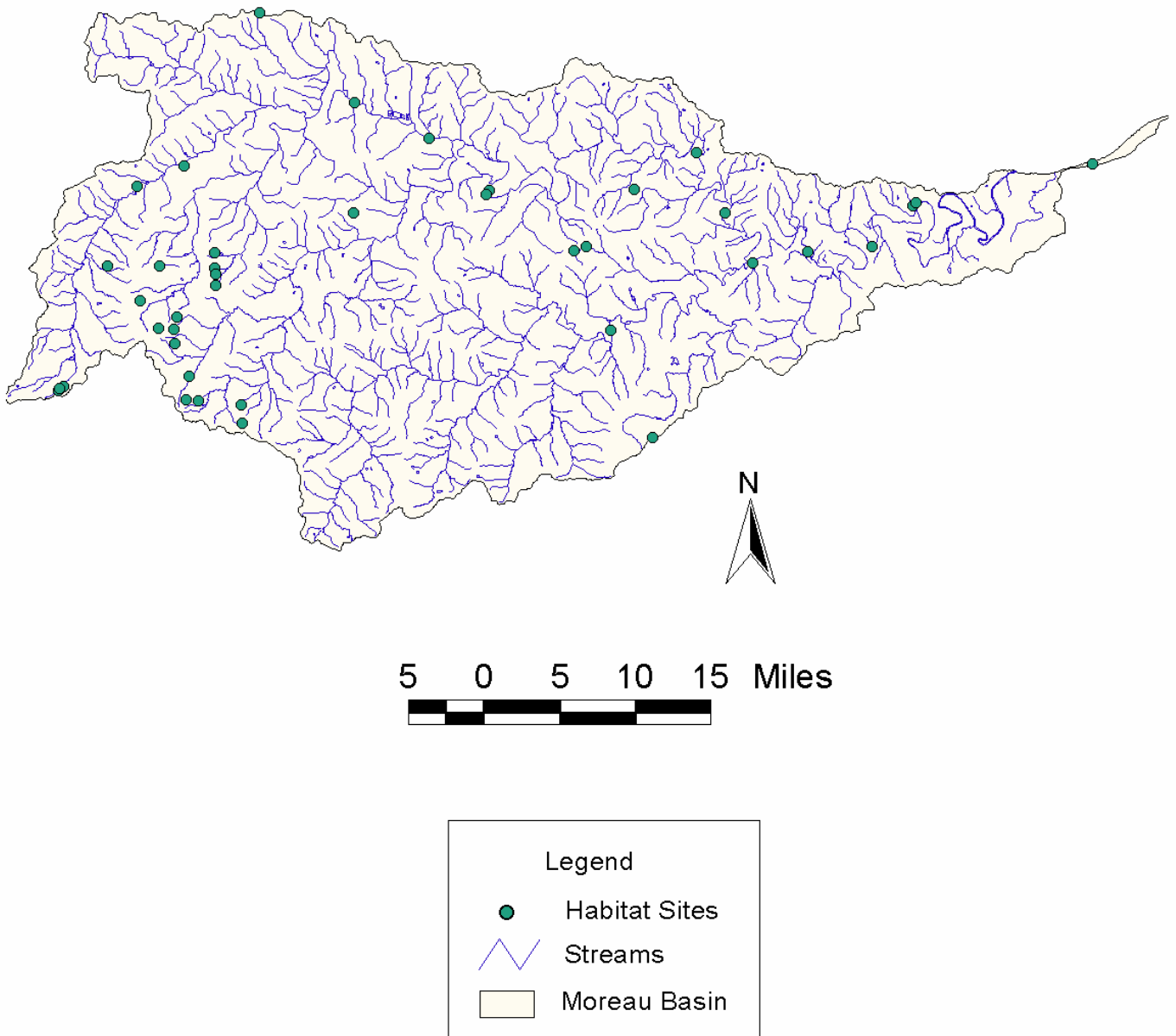


Figure uh. Unique habitat areas tracked in the Natural Heritage Database (2002).