LAMINE RIVER

WATERSHED

INVENTORY AND ASSESSMENT

This information is based on the

Lamine River Watershed Inventory and Assessment

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Executive Summary

The Lamine River Basin is located in West Central Missouri in Benton, Johnson, Morgan, Moniteau, Saline and Cooper counties. The Lamine River originates at the confluence of Richland and Flat Creeks in northern Morgan County, and flows 50 miles northward through Cooper County to its confluence with the Blackwater River. The Lamine River above its confluence with Blackwater River is a sixth order stream with an area of 1080 square miles.

The Lamine River Basin is a rural watershed. The largest community in the watershed is Sedalia with a population of about 20,000. The area was settled by European immigrants shortly after the return of the Lewis and Clark expedition in 1804. Early descriptions of the basin indicate forests occurred along the

stream valleys and steeper slopes leading to prairies on uplands. As the land was changed to agricultural use, sediment became a major pollutant affecting the river's ecosystem.

Approximately one half of the watershed is currently being row cropped while the remaining half is divided between forest and pasture. Livestock grazing occurs on approximately 83% of the forested lands in the basin. Nearly 90% of the upland forests are grazed.

Stream life and fishing are both threatened by occasional low dissolved oxygen. Major causes include nonpoint runoff from feedlots and pastures; isolated problems exist due to some point source discharges from the Sedalia vicinity into Muddy Creek. Whole-body recreation and boating on the Lamine River is usually safe but high levels of fecal coliform bacteria are sometimes found during high flows.

Several stream reaches in the Lamine River Basin have had chronic problems supporting fish populations. Low base flows during the summer contribute to these water quality problems. Point source and non-point sources have been documented to cause fish kills.

A major fish kill occurred in November 1989, when sewage effluent from a chicken layer operation polluted Long Branch and Muddy Creek, resulting in high ammonia levels which killed approximately 20,000 fish in 14 miles of Long Branch and Muddy Creeks.

Water quality in streams of the Lamine River Basin is not routinely monitored. One extensive study was done on Muddy Creek in 1997 and 1998 by the Missouri Department of Conservation. That study showed agricultural practices provided moderate levels of nutrients to Muddy Creek. However, the greatest source of excess nutrients was from subwatersheds in the vicinity of Sedalia. Levels of important nutrients increased dramatically and remained high for nearly 20 miles downstream.

The city of Sedalia withdraws water from Spring Fork Lake and has an auxiliary supply on Flat Creek (Pettis County S22, T45, R21). DNR records for 1998 showed six deep well users greater than 100,000 gal/day. The Tyson plant at Dresden had the largest well use at nearly 680 million gallons for the year. This was followed by Whiteman Airforce Base at 273 million gallons for the year.

Although several point source discharges exist in the Lamine River basin, most pollution problems have been associated with effluent from the Sedalia area. Raw sewage commonly enters Sewer Branch during periods of high runoff due to poor diversion of solid waste from the storm sewer system to the north sewage treatment plant. Another point source is the Tyson Plant at Dresden. The plant has been fined for warm water discharges into State waters. Excessive nutrients and warm water are reaching Muddy Creek via Little Muddy Creek subwatershed.

Most nonpoint source pollution in the basin is from soil erosion and animal waste runoff. Levels of dissolved oxygen can be very low during periods of low flow. Livestock waste in the basin is estimated by DNR personnel at over 2.6 million PE (human population equivalent).

The Lamine River Basin lies in two physiographic regions. Muddy Creek and Heath's Creek enter from the Osage Plains to the West while Richland Creek, Flat Creek and the mainstem Lamine River lie mainly in the Salem Plateau.

The Lamine River Basin is unglaciated and overlain by four to eight feet of loess derived soils. The soil overlies dolomite in the upper part of the basin and limestone in the lower part of the basin. Baseflow is not well sustained during dry periods because most water movement in the basin is through the surface

stream network and few notable springs exist.

The Lamine River Basin lies primarily in the Cherokee Prairies soil region. Highly erodible loess soils are well drained in most areas but poorly drained in other areas. Sheet and rill erosion from tilled land (9-13 tons/acre) is relatively high. Erosion from permanent pasture is much lower (2.5-5.0 tons/acre). Gully erosion is considered severe 200 - 500 tons/acre.

Major streams (fifth order and larger) in the Lamine River Basin have average gradients from 1.5 ft/mi to 19.1 ft/mi. Streams entering from the western portion of the watershed, including Heath's Creek, Muddy Creek and Flat Creek, have lower gradients than streams farther to the east. This shift in gradient reflects the transition from Prairie to Ozark border streams within the Lamine River Basin.

Average precipitation for the region is 38.5 inches. While most of the permanent flow in the Lamine River Basin is represented by the mainstem Lamine River, Flat Creek, Richland Creek, Muddy Creek and Heath's Creek, there are 64 third order or larger streams in the basin. Many of these streams have permanently flowing reaches during years of normal precipitation.

Approximately 92% of the mainstem Lamine River and Flat Creek are unaltered. Many small channelization projects are evident on topographic maps and some are associated with road building or agriculture. Levees are also limited in the Lamine River basin. Most levees in the basin are associated with channelization projects.

Streambank erosion was a problem in all streams sampled in the Lamine River basin. Most erosion problems were associated with barren or narrow corridors. Alterations of the channel were detrimental to bank stability in the reach. Streams with the most extensive bank erosion problems were near the lower end of the subbasin (Heath's Creek and Clear Creek). These streams possess little to no wooded corridor and most banks are denuded of vegetation. Middle Richland Creek and Haw Creek were among streams having the most stable banks.

In-stream fish cover in pools consisted mainly of snag habitat such as rootwads and logs. Woody cover was limited along heavily farmed reaches and some clearing of debris was evident, especially on the mainstem Lamine River. Boulders were present in some pools. Fish cover in pools of all streams generally was rated fair. Stream depths in pools were rated good to excellent at almost all habitat sampling sites. Increased depth associated with snags and boulders was documented at several sites. The mainstem Lamine River was not as deep as expected for a sixth order stream. Most sites possessed maximum depths of eight feet or less. Gravel and cobble were the predominant substrate forms in almost all streams regardless of their location in the basin. Little silt or other fine substrate was found and when it did occur, it was usually in a strip near the bank. One exception was the mainstem Lamine River which possessed a high proportion of silt at downstream sites.

Streams within the Lamine River Basin suffer from water quality problems associated with point and non-point pollution. Siltation in the main stem of the Lamine River and Heath and Muddy Creeks is excessive. Public awareness and education of city and county officials, industrial and residential developers and the general public are one of the best ways to reduce pollution from both point and non-point sources.

Compliance with existing laws as well as upgrades of sewage facilities will help reduce problems with point sources in the basin. Non-point sources can be improved by supporting watershed projects such as the USDA EQIP underway for Flat Creek.

The Lamine River Basin supports a diverse assemblage of fishes with 69 species re-collected by MDC personnel since 1940. Because over half of these species are from the "large" size group they are particularly desirable to anglers.

Due to the large and diverse number of sportfish present in the Lamine Basin management of target species is the highest priority. These target species in order of priority are: channel and flathead catfishes, largemouth and spotted bass, and crappie. Management of nektonic species will be limited to sampling for species community information to document changes over time that measure improvements in stream water quality or habitat that result from strategies outlined in previous sections. Periodic fish tissue sampling will occur to monitor contaminant levels in selected fish species.

Public use of streams has not been determined in the basin even though this is the second largest free flowing river system in the state. Public access to streams is limited. Only five access areas exist on Lamine River. To date, public awareness efforts publicizing recreational opportunities in the basin have not been conducted.

The large number of miles of quality float streams, a diverse sportfish fauna, and the proximity to Sedalia and surrounding communities provides a good potential for increasing public use by increasing public access. Increasing the awareness of Lamine River Basin recreational opportunities would increase use and awareness of the resources value.