United States
Environmental Protection
Agency

Use Attainability Analysis and Water Quality Assessment of Coffee Creek, Mossy Lake, and the Ouachita River

The purpose of this investigation was to perform a water quality assessment of the Ouachita River, which is the receiving water of the Georgia-Pacific (GP) Crossett paper mill discharge, and to determine if the current "no aquatic life use designation" for Coffee Creek and Mossy Lake is appropriate. The area of the Ouachita River for this study is located in southern Arkansas below the Felsenthal Lock and Dam and upstream of the Louisiana state line. The study area consists of Coffee Creek, Mossy Lake, and a portion of the Ouachita River, a short distance upstream and downstream of the confluence with Coffee Creek.

This study performed an analysis of water samples, sediment samples, aquatic species, and aquatic habitat. The study area contains six sampling stations:

- a Reference Site that is a tributary of Coffee Creek;
- Coffee Creek downstream of the confluence with Georgia-Pacific's (GP) manmade effluent ditch and the Reference Site tributary;
- Mossy Lake;
- Coffee Creek downstream of Mossy Lake;
- Ouachita River upstream of the Coffee Creek below Mossy Lake confluence; and
- Ouachita River downstream of Coffee Creek below Mossy Lake.

Three biological and habitat assessments were also performed at Coffee Creek downstream of Mossy Lake. No water or sediment samples were collected within Coffee Creek below Mossy Lake. No biological or habitat assessments were performed within the Ouachita River.

There were three series of biota assessments (habitat, fish, and macroinvertebrates) starting in June 2005, one in February 2006 and ending in June 2006. The June 2005 biological and habitat assessment was supplemented with biological and habitat data at other stations in August 2005. The study included five water sampling events that occurred in August, October, and December 2005 and May and June 2006. Two sediment sampling events occurred and coincided with the August 2005 and May 2006 water sampling events. Flooding by the seasonal monsoon prevented sampling from February through April 2006.

The water and sediment samples were analyzed for a comprehensive list of potential pollutants. These included general field measurements such as dissolved oxygen and pH, conventional pollutants such as ammonia-nitrogen and sulfate, toxic metals, semi-volatile organic compounds, and pesticides. Additionally, sensitive aquatic species were exposed to the water samples and elutriate water from sediment samples to determine toxicity.

Coffee Creek and Mossy Lake have been exempt from Arkansas' Regulation 2, Chapter 5 specific standards and color since 1984 due to the "no aquatic life use" designation. Therefore, the laboratory analysis results were compared to the generic Gulf Coast Ecoregion (GCER) surface water quality standards (SWQS) for these water bodies. Applicable Arkansas SWQSs were compared to the laboratory analysis results for samples collected from the Ouachita River.

Conclusions

The purpose of this investigation was to determine if the current "no aquatic life use designation" for Coffee Creek and Mossy Lake is appropriate. From the biological data collected it is apparent there is a diverse and abundant, though seasonal, aquatic community in the Reference Site stream. The fish and macroinvertebrate samples from the Reference Site are indicative of an aquatic community that is seasonally variable and tied to flood flows from the Ouachita River. Coffee Creek had very few fish and was dominated by a highly pollution-tolerant macroinvertebrate community. The same was true for the Mossy Lake biological community with the exception of a slightly more diverse macroinvertebrate assemblage. The Coffee Creek site below Mossy Lake had higher numbers of large predatory fish, due to the proximity of the Ouachita River, but otherwise exhibited an aquatic community much like the other effluent-dominated sites.

Aside from the fish and macroinvertebrate communities using Coffee Creek and Mossy Lake, other wildlife live in or

frequently contact the GP effluent. Muskrat, beaver, nutria, turtles, and ducks are known to use Coffee Creek and Mossy Lake, sometimes in very large numbers. Other animals, including deer, turkeys, raccoons, and other large mammals are likely to come into contact with the GP effluent on a frequent basis.

The waters of Coffee Creek and Mossy Lake have the potential to support aquatic life indicative of streams in the ecoregion. They also show evidence of degradation from the effluent of the Georgia Pacific Outfall 001. There were exceedances of several numeric GCER standards in these water bodies, and signs of ecological impairment, including loss of habitat and toxicity to aquatic organisms from both the water column and sediment. The water quality of all the sites showed deviations from the applied standards, including the Reference Site.

Reference Site

The Reference Site stream does not meet the GCER standards for DO, mercury, and water and sediment toxicity. The deviations from the GCER standards at the Reference Site may have been caused by local pollution, such as the dumping of trash at the road crossings, non-point source pollution, and possibly by natural processes associated with seasonally low flow systems.

Coffee Creek, Mossy Lake, and Coffee Creek below Mossy Lake

The water quality observed in Coffee Creek, Mossy Lake, and Coffee Creek below Mossy Lake was not of high enough quality to support a viable and diverse aquatic community year-round. However, an aquatic life use is potentially attainable in Coffee Creek and Mossy Lake downstream of the Georgia Pacific discharge based upon the habitat and reference site data collected during the study. Without the GP discharge, Coffee Creek and Mossy Lake may be able to sustain a diverse aquatic community during and after inundation by the Ouachita River and a limited aquatic community during the annual dry seasons. Coffee Creek below Mossy Lake is likely to sustain a viable and diverse aquatic community within the back waters of the Ouachita River.

Ouachita River

The sample reach of the Ouachita River where Coffee Creek converges is maintained as a barge canal. The field crew noted dredging occurring upstream of the sampling sites during Event 4. Sediment samples from each station for that event were toxic to sensitive species in the laboratory. Turbidity also exceeded the SWQS for that event.

Two out of five water samples taken from the upstream site exhibited toxicity. Both sediment samples from this site were toxic. Water from the downstream station exhibited toxicity in the laboratory for two out of five sampling events. Again, both sediment samples were toxic.

Recommendation

Part 3 (Streams) of designated use F (Fisheries) on page 3-2 of Arkansas Regulation 2 states: Water which is suitable for the protection and propagation of fish or other forms of aquatic life adapted to flowing water systems whether or not the flow is perennial. The presence of indicator species [Reg 2.302(F)(3)(e)] within the Reference Site, and occasionally within the sites downstream of the outfall, supports an aquatic life use designation for Coffee Creek and Mossy Lake. Data collected in this survey indicate that the aquatic life in the Mossy Lake and Coffee Creek systems is impaired. The source of that impairment is likely the outfall from the Georgia Pacific facility in Crossett, AR.

The recommendation that Coffee Creek and Mossy Lake warrant an aquatic life use designation is based upon the physical, chemical, or biological sampling results presented in this report. As described in EPA's *Technical Support Manual: Waterbody Survey and Assessments for Conducting Use Attainability Analyses* (1983), the assessment of potential (i.e., attainable) uses will require additional study beyond these physical, chemical, or biological sampling results.

For More Information

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