

Verdigris Basin High Priority Issue

Protecting and Enhancing Instream Flows

January 2009

Issue

Streams in Kansas are to meet water quality standards, support a healthy aquatic and riparian habitat, and maintain access to diversions for beneficial uses. The Verdigris River and associated tributaries have been having increasingly frequent occurrences of low flow conditions. Low flows have caused aquatic life stress and impaired water quality. Threatened and endangered species, especially mussels, in the Verdigris River system are impacted by these conditions. Many streams within the basin are experiencing water quality impairments. *E. coli* bacteria and low levels of dissolved oxygen (D.O.) are the most prevalent stream impairments.

Description

The Verdigris River is an area of high biological importance in the state with populations of freshwater mussels and other sensitive species, and populations that have declined from historic levels. Mussel species are the fauna most consistently in peril throughout the state. Their survival and viability depends on a complex interaction of flow regime, water quality, and the presence of appropriate fish species. Efforts are needed now to begin restoration of streams to a condition where these populations remain viable in the long term.

The droughts of 2000 and 2002 raised concerns in the [Verdigris basin](#), and elsewhere, on maintaining adequate flows for fish and other aquatic life and water quality standards in the Verdigris River. Instream flow needs were not met on several occasions during these droughts. A water issue strategic plan (WISP) working group has been established to evaluate instream flow needs and recommend strategies to meet those needs. The goal of the WISP is to develop instream flow management concepts and apply where flow protection is



Verdigris River. Photo courtesy Kansas Geological Survey.

needed to maintain the ecological functions and processes of a stream. The Upper Verdigris and Fall River were identified as pilot areas for developing these strategies. For more information on the goals of this team effort, refer to the Water Management Policy Section of the *Kansas Water Plan*.

All of the streams in this basin are restricted so that no new appropriation rights are available for the time period July 1 through September 30 (typically the irrigation season). Instream flow needs have been determined for the Verdigris River between Toronto Dam and Neodesha, and the Fall River between Fall River Dam and Neodesha. In 2006, the Kansas Department of Agriculture-Division of Water Resources (DWR) released a report titled "*Instream Flow Assessment of the Neosho and Verdigris River Basins*".⁽²⁾ The concept of instream flow is the idea of protection and recovery of streamflow as it relates to habitat, species, and water quality. The term instream flow recognizes that some minimum flow is needed to maintain suitable aquatic habitat and water quality.

The two key objectives of the study were: 1. To develop and apply a means of evaluating [surface water](#) availability in the basins; and 2. To consider management options available to the State of Kansas, given that a means of evaluating surface water availability could be adopted as a basis for decisions governing further appropriations. The study sought to determine a way to quantify a safe yield in the Verdigris basin in order to determine how much water is available under various conditions and how much could be appropriated for desired uses.

Water right appropriations are based on the diversion of an authorized quantity of water to be applied to an authorized place of use according to the prior appropriation doctrine in Kansas Water Law. The concept of a water right for an authorized quantity of water flowing in a stream is not supported by Kansas Water Appropriation Act (KWAA). The report contains recommendations for necessary changes to statutes and regulations to incorporate this concept.

No changes have been made to the KWAA that would allow for recommendations in the report to be implemented. However, progress has been made toward a means to determine safe yield for surface water similar to ground water that could eventually incorporate instream flow needs.

A memorandum of agreement (MOA) between the Kan-

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ansas Water Office (KWO) and the DWR allows for reservoir operations that maintain target flows at gaging stations in the basin. Target flows recognize the importance of instream flows and the MOA currently serves as an indirect means of ensuring available water for aquatic life. However, many of the challenges for maintaining aquatic habitat and species diversity occur in tributary streams where flow regulation supplemented by upstream federal reservoirs is not an option. In these cases, additional options such as acquisition of abandoned water rights associated with currently unused city water supply lakes need evaluation for providing flow to the tributary and mainstem system.

It is recognized that one solution will not be able to address instream flow problems throughout the basin and that site specific implementation will be needed in many cases. Updated bathymetric surveys are being completed to provide a better understanding of how much water is currently stored in federal and other reservoirs. This information will be used in the Operational Analysis and Simulation of Integrated Systems (OASIS) model to further evaluate the ability of the river-reservoir system to support additional instream flows. The WISP working group continues to meet to consider how other states have responded to similar situations, develop recommendations for changes to statutes and regulations, complete site identification, develop recommendations for pilot implementation for specific areas, and other concerns in need of interagency coordination.

Resources

1. Kansas Water Office. 2003. Fiscal Year 2005 *Kansas Water Plan*.
2. Instream Flow Assessment and Verdigris and Verdigris River Basins. 2006. Kansas Department of Agriculture, Division of Water Resources.

Recommended Actions

1. Continue to work towards coordinated management of the reservoir system to ensure that instream needs are met.
2. Evaluate the potential for using abandoned surface water rights on tributaries to provide flow.
3. Continue water issue strategic plan meetings to ensure intrastate coordination.
4. Identify scenarios and create site specific criteria for improvement. Identify pilot reaches for implementing site specific projects.
5. Participate in interstate discussions to evaluate other states instream flow programs and their applicability to Kansas.
6. Complete the scheduled bathymetry on reservoirs in the basin and use in conjunction with the OASIS model as a decision support tool.