IOWA'S WATER
Ambient Monitoring Program

Highlights 2005

Several stream sites throughout the Yellow River watershed were sampled for aquatic insects.

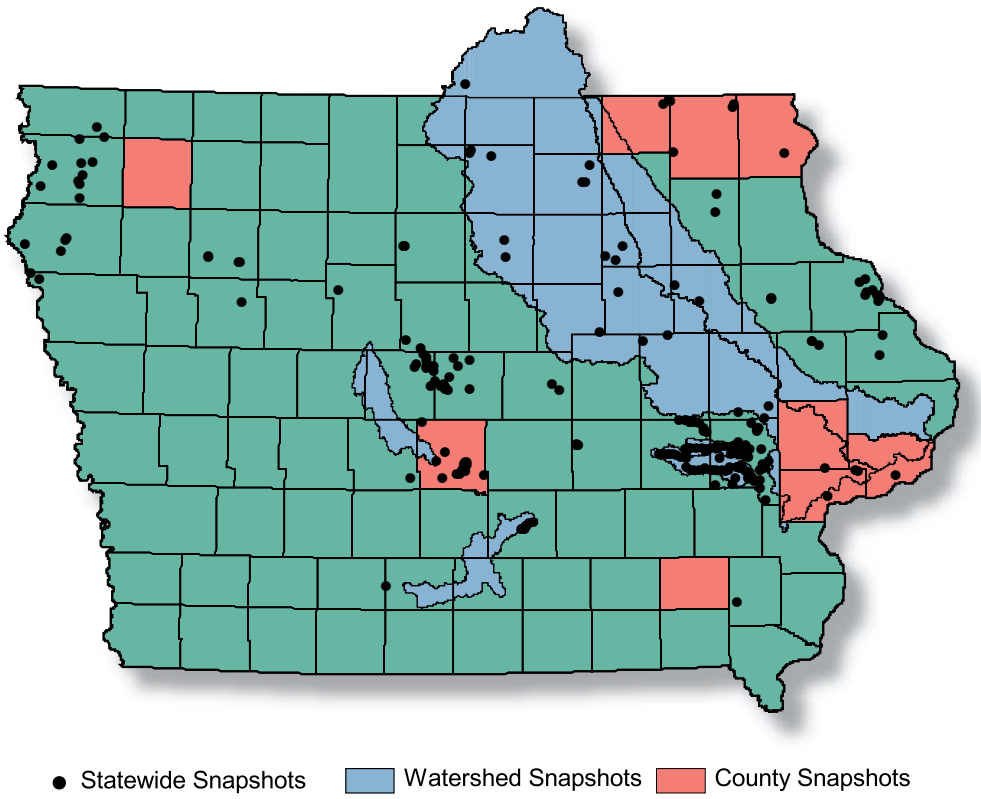
Yellow River Partnership

One of the on-going challenges to improving water quality in the state of Iowa is gathering enough information within a watershed to be able to accurately focus various management activities on areas with the greatest need. For the past two years, a coalition of state, federal, and local officials* have been working together to collect baseline data in the Yellow River watershed in northeast Iowa. This unique coalition was forged from a mutual concern for regional water quality and the desire to share resources effectively. The Yellow River watershed encompasses 154,500 acres in Winneshiek, Clayton, and Allamakee counties, and a portion of the Yellow River is currently listed on Iowa's impaired waters list for high levels of fecal coliform bacteria (Iowa's 2002 303[d] list). The high levels of bacteria are cause for concern due to the recreational value of the stream and also because the impaired segment runs through Effigy Mounds National Monument.

In order to understand the potential sources of bacteria and other contaminants, intensive sampling was conducted on a weekly basis at twelve sites within the Yellow River watershed during 2004 and 2005. Samples were analyzed for *E.coli* bacteria, chloride, nutrients, and sediment. In addition, one site was equipped with a real-time sensor to monitor dissolved oxygen, water temperature, pH, specific conductance, and turbidity. The resulting data provided a roadmap for local officials to begin developing plans for Best Management Practices throughout the watershed. In January of 2006, the Yellow River watershed was identified to receive a State of Iowa Watershed Improvement Grant. Continued monitoring over the next few years will provide valuable feedback as to the success of the initial targeting of the management practices.

Real-Time Monitoring

The condition of Iowa's water quality is a dynamic phenomenon. Water quality constantly changes as the forces that shape it – rain, sunshine, biological and human activity – shift and change. Monitoring



During 2005, a total of 26 IOWATER snapshot events occurred at the watershed, county, and statewide level. Through the involvement of hundreds of citizen volunteers, intensive water quality information is gathered for targeted geographic areas.

in this environment can be difficult, especially when events such as rainfall often happen during the night or when field staff are not available to take samples. To handle this problem, the Water Monitoring Program and the United States Geological Survey (USGS) embarked on a pilot project in 2005 to deploy five real-time water quality probes to measure the water quality in eastern Iowa streams. The probes continually measured pH, dissolved oxygen, temperature, specific conductance, and turbidity and were co-located with existing USGS stream-flow gages. While these units are fairly expensive and do require staff time to calibrate and clean, they provide a much more detailed picture of the water quality in the stream. The Water Monitoring Program plans to continue implementing these types of devices as the technology continues to improve and associated costs decrease.

Snapshot Monitoring

Limited staff resources often limit the number of locations that can be monitored within a watershed of interest. The statewide volunteer monitoring program, IOWATER, continues to provide invaluable assistance in this area through the use of snapshot sampling events. Snapshots are a collaboration between the professional monitoring program and the citizen volunteers who are enthusiastically willing to help gather the intensive data needed to better understand the water quality in their watershed. In this extraordinary partnership, trained citizens collect samples using established protocols. These samples are analyzed by the state laboratory (University of Iowa Hygienic Laboratory), as well as the Des Moines Water Works and the City of Cedar Rapids Water Laboratory. In 2005 alone, twenty-six different snapshot events were conducted throughout the state of Iowa. This effort covered more than 1,600 sites and ranged in size from Beaver Creek watershed in central Iowa to the Cedar River water-

Cyanobacteria, or blue-green algae, are monitored in waters across Iowa. Some species of cyanobacteria have the ability to produce toxins. Monitoring for cyanobacteria toxins in 2005 showed low levels in Iowa lakes.

shed in eastern Iowa that covers the state from the Minnesota border to the City of Cedar Rapids. More than 700 citizens spent 3,900 hours collecting the samples and, in return, received a thank you and the knowledge that the state and local officials have the information they need to target best management practices and water quality improvements effectively.

TDS/Chloride Study

One of the objectives of the statewide Water Monitoring Program is to provide baseline data on the status of Iowa's waters. For many contaminants, little to no information exists on their "background" concentrations in Iowa streams. The lack of background or ambient condition information can be especially problematic when the state is faced with setting appropriate water quality standards. Such was the case for two constituents (total dissolved solids and chloride), which were to have water quality standards promulgated or established in 2004. In order to help shed light on the issue of what are ambient conditions and to provide information on the potential economic impact of passing a total dissolved solids (TDS) or chloride water quality standard, the Water Monitoring Program conducted a study of wastewater effluent during the late winter of 2004 and fall of 2005.

Together with the Iowa Water Pollution Control Association (IWPCA), officials from municipalities were trained to gather samples from their wastewater effluent as well as from the city tap water and the stream immediately upstream and downstream of their outfall pipe. Samples were collected at low stream-flow conditions to provide an assessment of the "worst case scenario" for how much a wastewater effluent might impact the receiving stream. Twenty-three cities participated in the pilot study in the late winter of 2004 and another 100 cities collected samples in the fall of 2005. Results are currently being compiled and analyzed to determine the background condition of these receiving streams and the relative impact of wastewater discharges on TDS and chloride levels in the stream. Final study results should be available by the summer of 2006.

Emerging Contaminants

In 2005, the Water Monitoring Program continued its surveillance of contaminants that are newly emerging as potentially harmful to human health or aquatic environments. Following the 2004 closure of Carter Lake near Council Bluffs in western Iowa to recreational activities, due to the presence

In 2005, more than 100 municipalities throughout Iowa participated in the collection of water and wastewater samples to assess the impact of wastewater effluent on receiving streams. This study was conducted to collect data on total dissolved solids and chloride concentrations.

of blue-green algae toxins, the state expanded the algal toxin monitoring to include the 132 publicly owned lakes. Results from 2005 did not show widespread problems with elevated levels of cyanobacteria toxins; however most lakes did show detectable levels sometime during the summer. Further investigation is needed to understand when these toxic algae blooms are likely to occur and what the state can do to prevent these conditions from developing.

* The Yellow River Cooperative Project involves the U.S. National Park Service, USDA-Natural Resources Conservation Service, Iowa Department of Natural Resources, University of Iowa Hygienic Laboratory, U.S. Geological Survey-Water Resources Division, and Allamakee County Soil & Water Conservation District.

Reference

U.S. Environmental Protection Agency, 2004, Primer for municipal wastewater treatment systems, EPA 832-R-04-011, 29 p.

Acknowledgements

The Iowa DNR would like to acknowledge the contributions of partners involved with the water-monitoring program including the University of Iowa Hygienic Laboratory, Iowa Department of Public Health, Iowa State University, United States Geological Survey, Environmental Protection Agency - Region VII. Staff from Iowa DNR Conservation and Recreation Division and Environmental Services Division - Water Quality Bureau have graciously provided many hours in the development and implementation of this program. Special recognition goes to all the IOWATER volunteers who have graciously given of their valuable time and never ask for anything in return. The dedication, hard work and vision of the current Watershed Monitoring and Assessment Section staff are also greatly appreciated.

Photos on page 1 by Michelle Kilgore. Large photo on page 3 by Don Kline, inset photo by Vance Polton. Photo on page 4 from U.S. EPA 2004.

Funding

Water monitoring activities of the Iowa Department of Natural Resources are funded by Iowa Infrastructure - Environment First Fund appropriations, as well as grants provided by the U.S. Environmental Protection Agency from Sections 106 and 319 of the Clean Water Act. The TDS/Chloride study was funded through EPA Region VII.

Iowa Watershed Monitoring and Assessment Program Web Site – wqm.igsb.uiowa.edu

Prepared by
Iowa Department of Natural Resources, Geological Survey
109 Trowbridge Hall, Iowa City, IA 52242-1319

Printed on Recycled Paper