# IOWA'S WATER
Ambient Monitoring Program

Year 5 Accomplishments: 2004 Highlights

Wetland Monitoring

By most accounts, Iowa has lost more than 90% of its original wetlands. Recent studies from across the country have shown the beneficial role wetlands play in reducing both nutrient loads to lakes and streams, as well as magnitude and devastating consequences of flooding. Despite this, little is known about the quality of Iowa's remaining wetlands and whether or not they are functioning as they should. In 2004, Iowa began a long-term wetland monitoring program to help gather the necessary information to answer these questions. Through this program, the state will be able to assess whether wetland restoration projects are having the desired result on water quality and habitat resources. During the next several years, this program will collect basic information on water quality, sediment quality, and biological diversity in Iowa's major wetland classes (fens, prairie potholes, marshes, and riverine wetlands) and compare restored wetlands to preserved natural wetlands. The project is also working to update the 1984 National Wetland Inventory for Iowa using color infrared photography completed in 2002. This will help document where wetland losses and gains have occurred during the last twenty years and how these changes have impacted water quality. Eventually, data collected as part of the program will help to guide efforts to protect valuable wetland ecosystems and assist in the management of restored wetlands to maximize their effectiveness in returning wetland function to Iowa's landscapes.
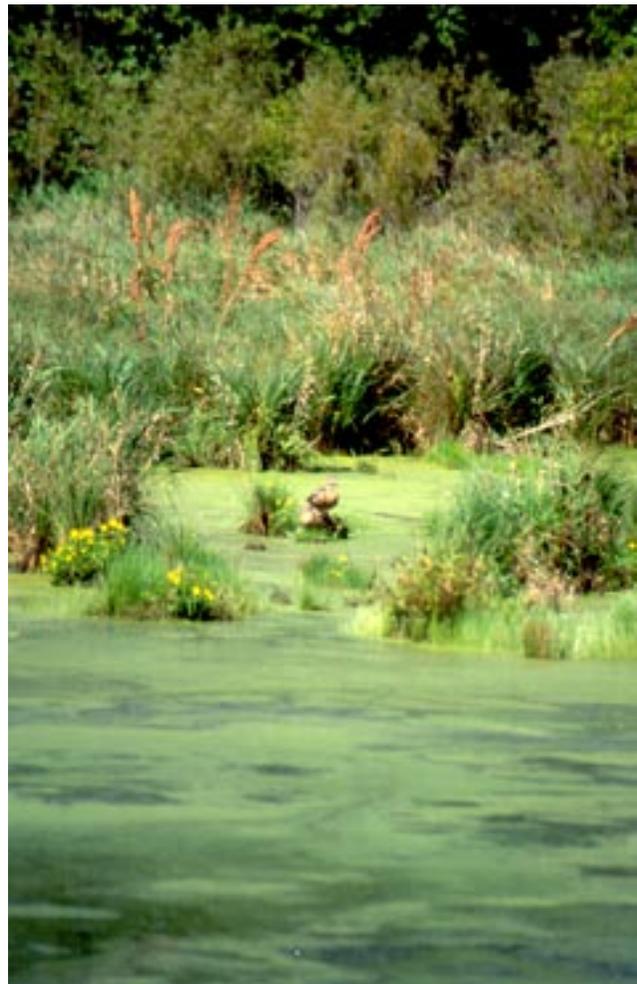
Water quality information will be gathered from wetlands across Iowa.
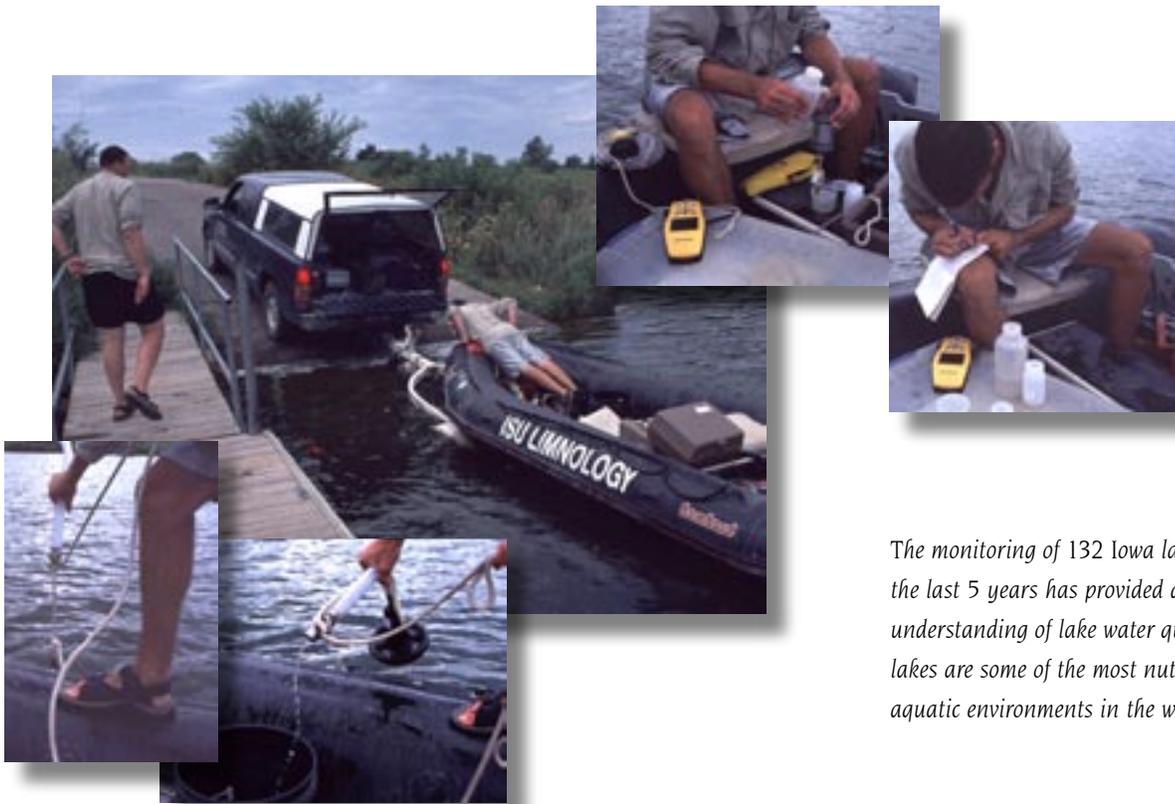
The monitoring of 132 Iowa lakes during the last 5 years has provided a greater understanding of lake water quality. Iowa lakes are some of the most nutrient rich aquatic environments in the world.

Lake Monitoring

Acre for acre, lakes represent some of the most valuable real estate in Iowa, yet historically, little information on the status of water quality existed for these resources. This data gap began to close in 2000 when the Iowa Department of Natural Resources, in cooperation with Iowa State University, embarked on a five-year monitoring project for Iowa's lakes. The summer of 2004 marked the fifth and final chapter in this unique project. During the five years of monitoring, 132 of Iowa's publicly owned lakes have been tested three times a year to determine water clarity, nutrient levels, oxygen levels, changes in temperature and oxygen with increasing depth in the lake, and the composition of phyto-plankton and zooplankton. Together, these data will provide the first picture of how the quality of lake water changes from year to year and provides a framework for the Department to track the effective-ness of water quality improvement expenditures. Also in 2004, lake sediments were tested for a variety of heavy metals, pesticides, and other contaminants that may threaten aquatic life. This examination of lake sediment quality is the first of its kind for the state and will be linked to simultaneous studies on fish populations, sediment accumulation in lakes, and modeling of lake inputs. A project summary report will be produced in 2005 and will be available on the Iowa DNR Water Monitoring web page.

While the five-year project with Iowa State is ending, the need for continued data collection is still urgent. For the first time, citizens were advised against swimming in an Iowa lake due to high levels of toxins from blue-green algae (cyanobacteria) during the summer of 2004 (see Water Fact Sheet 2005-5). While this may have been an isolated incidence, other Midwestern states have initiated regular testing for blue-green algae and have found levels of toxins above those considered safe by the World Health Organization. The factors that cause blue-green algae blooms and the production of toxins at excessive levels is not well known, so the DNR will continue to monitor lakes in order to collect base-line information that can help us understand how to improve lake water quality for future generations.

Beach Monitoring

Iowa's beach monitoring program continues to evolve as each additional year of data provides more insight as to the timing and pattern of bacteria spikes at local beaches. Analysis of the previous four years of data showed that 14 beaches had rarely exceeded Iowa's water quality standard for bacteria, therefore the monitoring season at those beaches was shortened in order to free monitoring resources for other beaches (see Water Fact Sheet 2005-3). The water monitoring program expanded beach monitoring efforts in 2004 by including county-owned beaches along with the regularly monitored state-owned beaches. Thirty-four county beaches were monitored for *E.coli* bacteria levels from Memorial Day through Labor Day. This brought the total number of Iowa beaches monitored to 71.

Big Creek (Polk County) exhibited bacteria problems for the first time in 2004.

Higher than normal rainfall during the summer resulted in a greater number of beaches exceeding state water quality standards for bacteria this year, including two beaches that had never exhibited serious bacteria problems in the past. This underscores the importance of consistent and long-term monitoring to provide a view of water quality over a variety of weather conditions. Intensive watershed investigations continued at those beaches frequently experiencing high levels of bacteria in order to determine the potential sources of bacteria. Additionally, a bacteria source tracking project was initiated on Lake Darling in Washington County. Bacteria source tracking employs one or more techniques to isolate the contributing bacteria sources (i.e., human, wildlife, or domesticated animal sources). In Lake Darling, techniques used included multiple antibiotic resistance analysis, DNA ribotyping, pathogen analysis, and sterol/caffeine/cotinine analysis (see Water Fact Sheet 2005-4). The Lake Darling project has shown that while several of the techniques are promising, research and development is still needed in order to improve their use as management tools.

Sixty alluvial wells were monitored to assess water quality of this aquifer system.

Groundwater Monitoring

Tracking long-term trends in Iowa's groundwater quality has been a goal of the Cooperative Groundwater Monitoring Program with the United States Geological Survey and the University of Iowa Hygienic Laboratory since 1992. During the past twelve years, 90 municipal wells, randomly selected from Iowa's major aquifers, have been sampled annually to determine the basic water chemistry and examine any impacts from human activities. Based on historical data and the use of tritium analyses, the water monitoring program has tailored the monitoring program to include contaminants based on the vulnerability of the municipal well and its aquifer. Elevated levels of tritium, a radioactive form of hydrogen, in the groundwater can be traced to atomic bomb testing above the ground. Groundwater resources located deep within the earth's surface and protected by layers of impermeable rock are tested for radionuclides and the natural occurrence of minerals, while shal-

lower groundwater resources are tested for contaminants (pesticides, volatile organic compounds, and gasoline by-products) that may seep in from the land surface due to human activities.

During 2004, sixty additional municipal wells were randomly selected from alluvial aquifer systems around the state in order to gain a greater knowledge of the natural quality of this resource and highlight potential threats to this valuable drinking water source. For the first time, alluvial systems in the state were routinely sampled for perchlorate – a chemical found in rocket fuel, fireworks, and fertilizer. The U.S. Environmental Protection Agency has documented more than 20 states with perchlorate contamination problems, including Iowa (http://www.epa.gov/safewater/ccl/perchlorate/perchlorate.html). Prior to 2004, no routine monitoring for perchlorate had been done in Iowa. In 2003, private alluvial wells in the community of Hills (Johnson County) were found to contain high levels of perchlorate. In order to assess whether other communities faced similar problems, perchlorate was added to the regular monitoring for these vulnerable aquifer systems.

Data Management

The goal of creating a comprehensive water quality database for the state continues to be a high priority for the water monitoring program. To meet this goal, water quality data collected by volunteers was uploaded from the IOWATER database into the state's primary water quality database, STORET. To ensure the credibility of this data and to maintain its identity as volunteer collected data, the IOWATER data can be found under its own organization listing. Similarly, long-term water quality data collected on the Des Moines River for the U.S. Corps of Engineers through a contract with Iowa State University is now available in the STORET database under its own organization heading.

Accessing water quality data also became easier this year through the creation of the state's *Water Monitoring Atlas*, a web-based, interactive mapping program that allows the user to view Iowa's water monitoring sites and to retrieve data from the STORET database using the map interface. The atlas is located on the DNR web page at: http://igsims.igsb.uiowa.edu/website/water_monitoring/viewer.htm.