

# INSTITUTE OF WATER RESEARCH

## Michigan State University

The Institute of Water Research at Michigan State University is responsible for coordinating research and educational programs on surface water and groundwater quality and quantity. Established in 1961, the Institute addresses multi-disciplinary issues arising from the dynamic interaction of land and water resources and strengthens MSU's commitment to finding effective solutions to contemporary water resource problems. The Institute has



developed water-related programs across a wide spectrum of issues. Ongoing support from the U.S. Geological Survey, U.S. Department of Interior, Michigan Agricultural Experiment Station, and MSU Extension helps fund important research

and outreach on water issues with regional and national significance.

The Institute's goal is to provide the most accurate and complete information on contemporary land and water issues to citizens, stakeholders, government agencies, and resource managers. To achieve this goal, the Institute consistently collaborates and forges partnerships with other research and resource conservation organizations and agencies. The result of these collaborations is the development of science-based information for use by decision makers faced with complex land and water issues. The increasing use of information technologies and geographical information systems (GIS) for better decision-making is a fundamental part of the Institute's mission in the 21st century.

## Programs

The Institute functions in a coordinating role to support education, research, and outreach through partnerships with University departments, agencies, and organizations in the broad water arena. Efforts focus on three major areas:

- ◆ integrated watershed systems including both surface and groundwater
- ◆ extended education and outreach
- ◆ networking infrastructure

## Integrated Watershed Systems

The Institute continues to develop decision support systems that utilize data, models, and spatial analysis to provide an increased

understanding of land-water relationships. These systems are made available through interactive web-based GIS/graphic tools. Some examples are highlighted below.

### High Impact Targeting

The web-accessible High-Impact Targeting (HIT) system is a new tool that is designed to focus limited conservation resources on the most serious erosion and pollution problems. The HIT system can be used to identify and target the specific areas in agricultural fields that cause the greatest volumes of sediments deposited in waterways and adversely impact water quality and aquatic habitat. The intent is to get 'the biggest bang for the buck' by maximizing the beneficial impacts from the installation of new conservation practices on the highest-risk sediment yield areas.

HIT is an interactive system so users can choose the appropriate scale to visualize GIS data on high-risk areas that are of the greatest interest to them. The use of HIT supports important NRCS, MDA, and other state agency conservation goals such as the reduction of soil



*Institute staff works with agency personnel to verify results of the HIT model*

erosion and sedimentation, improvement of water quality, and enhancement of wildlife habitat. Conservation districts and farmers can use this targeted approach to realize the maximum impact of conservation programs to reduce wasteful soil erosion, improve valuable water quality, and restore wildlife habitat.

### Digital Watershed

Many of the programs being developed by the Institute are evolving into the National Resources Spatial Decision Support



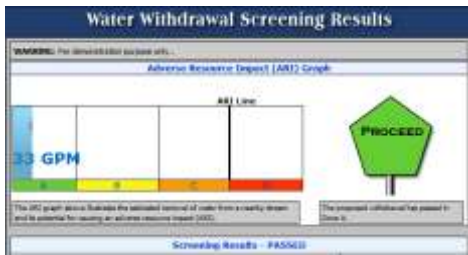
System to allow users to view any watershed in the continental United States. Called digital watershed, the system allows users to access an area by state, address, or watershed.

A number of tools are incorporated into the

program including a user-friendly adaptation of the EPA Basins tool, direct linkage of the selected watershed to rectified aerial photography through Google Earth, and automatic forwarding of a delineated watershed to a hydrologic model that computes runoff, peak flow and associated nonpoint source pollution.

### **Water Withdrawal Assessment Tool**

In 2006, legislation was enacted to manage large water withdrawals in the state. The Groundwater Conservation Advisory Council (Council), originally formed in 2003, was appointed to develop a water withdrawal assessment screening tool that can assess the impact of a new or increased water withdrawal on local water resources and associated ecosystems. The tool, designed to be used by individuals preparing a new or



The screening process provides individuals with information on whether their proposed water withdrawal will have an adverse resource impact.

University. The web-based interface, developed by the Institute, helps users with potential water withdrawals to determine whether their proposed withdrawal will have an adverse resource impact on nearby streams.

### **Extended Education and Outreach**

The Institute promotes the dissemination and application of science-based information and research results through a variety of extended education programs, networking, and strong partnerships with other organizations. Consistent with a watershed approach, emphasis is placed on assisting individuals in understanding the interactions of human land use practices and activities on surface and groundwater.

#### **Virtual University**

The Institute, through the Department of Community, Agriculture, Recreation, and Resource Studies, offers a four course series in Watershed Management for both University students and off-campus professionals. The courses are:

- ◆ Watershed concepts
- ◆ Building and implementing watershed management plans
- ◆ Watershed assessments and tools
- ◆ Legal, financial, and institutional arrangements for watershed management.

These courses are designed to address the need for a multi-disciplinary approach to watershed management.

### **Training, Workshops, and Conferences**

The Institute develops and participates in a number of outreach programs that provide information, hands-on experience, and various options for addressing current and emerging issues and problems. Conferences, workshops, demonstrations, publications, and training programs have been developed on topics such as land use impacts on water quality; lake and stream ecology and management; Great Lakes water quality; wellhead and source water protection; volunteer stream monitoring; and exotic species. Local, state, and federal agency personnel, riparians, students, and other citizens are given the opportunity to hear and interact with outstanding researchers and have access to a variety of written materials and presentations. Participants have been able to use the information gained from these programs in their decision making processes concerning water resources.



Students are given opportunities for hands-on water testing through a variety of programs.

### **Campus Water Resources Management**

Management of campus water resources, particularly storm water, is a priority area for MSU. The Institute plays a significant role in helping to manage the campus water resources through MSU WATER -- Watershed Action through Education and Research. A team of faculty, staff and student representatives are building upon baseline work conducted as part of the MSU WATER initiative to implement the Red Cedar River Watershed Management Plan. The plan was developed in partnership with communities located throughout the urbanized portion of the watershed, and emphasizes cooperative storm water management activities that meet federal storm water management regulations.

### **Partnerships and Networking**

A commitment to effective networking with other MSU academic units and outside local, state, and federal agencies and organizations is reflected in a wide range of cooperative efforts and partnerships. Effective networking includes an increasingly broader use of technologies to provide a firm foundation of science-based, real-time information for cooperative initiatives. The Institute staff share joint appointments with various MSU Departments and works closely with a number of agencies on a variety of water related issues and projects.

### **Further Information**

For more information on Institute programs visit [www.iwr.msu.edu](http://www.iwr.msu.edu) or contact:

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