Environment at MSU:

WATER

‘Networking for Environmental Researchers’

Presented by
Dr. Jon F. Bartholic, Director

Friday, October 3, 3 - 4:30 p.m.
Corniche Room, Kellogg Center
East Lansing, MI
History

Water Resource Research Act (1964) (△ 5’s)
Integrating Themes

• Integrating Science into Water Policy

• A Water Resources Partnership
  – Holistic Water Resource Management
  – Jointly Funded Agreement (JFA)
The Future of Conservation:
*Expanding Impact through Collaboration*

Applying Science to Decision-making
Case Study: Michigan’s Water Withdrawal Tool
Great Lakes Protection Fund - Final Report Available

Restoring Great Lakes Basin Waters Through the Use of Conservation Credits and Integrated Water Balance Analysis System

Organization: Michigan State University, East Lansing
Principal Investigators: Dr. Jon F. Bartholic, Institute of Water Research; Dr. Sandra S. Batie, Dept of Agricultural Economics
Funding Source: The Great Lakes Protection Fund
Starting Date: January 2005
Contact: Dr. Saichon Seedang - Project Coordinator, Institute of Water Research

Topics

Watershed Conservation Credit System
(A Web-based Interface Demonstration)
Watershed Balance Analysis System – Integrating Three Models for Policy/Management and Credit Assessment and Implementation Through a User Assistant Interface

Surface Hydrology
- Rainfall
- Evaporation
- Runoff
- Recharge

Aquifer Model
- Recharge
- Withdraw (wells)
- Horizontal Flow

Streams Aquatic Ecosystem
- Horizontal Flow
- Temperature
- Biological
- Hydrologic Needs

Social, Economic & Institutional Policy
### Current Advisory Team Members

**Representatives from:**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Representative</th>
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<tbody>
<tr>
<td>Consumers Energy</td>
<td>Great Lakes National Resource Center, National Wildlife Federation</td>
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<td>Michigan Turf Grass Foundation</td>
<td>National Association of Conservation Districts</td>
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<td>Ice Mountain</td>
<td>Wisconsin Department of Natural Resources</td>
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<td>Trout Unlimited</td>
<td>Michigan Department of Agriculture</td>
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<td>Michigan Department of Environmental Quality</td>
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<td>Michigan Farm Bureau</td>
<td>Office of the Great Lakes, Michigan Department of Environmental Quality</td>
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<td>Public Sector Consultants Inc.</td>
<td>Michigan Municipal League</td>
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<td>Michigan United Conservation Clubs</td>
<td>Michigan Manufacturers Association</td>
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Trip to Augusta Creek
Birkholz earns Silver Plow Award

Senator Patty Birkholz’s work on water use regulations earned her the 2006 Silver Plow Award. The honor was given Birkholz at a recent Eaton County Farm Bureau Annual Meeting. From left are Eaton County Farm Bureau President Bobbie Garnant, Birkholz, and Farm Bureau President Wayne H. Wood.
For Immediate Release
October 1, 2008

**Water Withdrawal Assessment Tool Introduction**

Michigan recently enacted new legislation that provides the Great Lakes with wide-ranging new protections and makes Michigan a leader in the scientific management of our water resources.

Today, the WWAT has gone online and is available to the public on a trial basis for testing and comment.

Development of the WWAT resulted from a collaborative effort between the United States Geological Survey, Michigan State University, and the Michigan Departments of Environmental Quality and Natural Resources.
The Water Withdrawal Assessment Process

- Oversee the design and development of a “water withdrawal assessment tool”

  - Develop methods, criteria, and definitions for establishing ‘adverse resource impacts’ for streams and lakes.
  - Make recommendations on the policy aspects of the model.

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**Adverse Resource Impact Means:** Decreasing that part of the flow such that the streams ability to support *Characteristic Fish Populations* is *Functionally Impaired*.
Water Withdrawal Assessment Tool Conceptual Model

System User

Dynamically Retrieve Location Specific Data

Withdrawal Information
- Water Source
- Pumping Frequency
- Pumping Capacity
- Aquifer Type

Input Information

Real-time Modeling

Adverse Resource Impact Zones

Administrative Agency
- Real-time Updates
- Water Accounting

Registration

Updated Water Availability

Rerun Model
Finding the Location of Your Water Withdrawal

Please select one of the following options for locating the position of your water withdrawal.

**Locate by Address**

Enter the address and zip code at or near the withdrawal location. Please spell street names correctly in order to ensure system accuracy.

- Address: 1405 S Harrison
- Zip Code: 48823

**Locate by Navigation**

To select the county where the water withdrawal will occur, click the map or choose from the drop down menu.

- County: Alger

**Locate by Latitude and Longitude**

Enter the latitude and longitude coordinates at or near the withdrawal location. Please input data correctly in order to ensure system accuracy.

- Latitude (Y):
- Longitude (X):

Find Address
Find County
Find Point
Pumping Source and Frequency

Withdrawal Source:  ● Surface Water (from stream)     ○ Ground Water
Pumping Frequency:   ○ Continuous               ○ Intermittent

Pumping Parameters

Pumping Capacity (GPM):  70
Coordinates (X,Y):        -84.48342, 42.716036
Well Depth (FT):          93
Aquifer Type:            ○ Bedrock     ○ Glacial

Current Stats at Location

- Depth to Bedrock (FT):  79
- Average Well Depth (FT):  93
- Percent Wells in Glacial:  2
- Percent Wells in Bedrock:  93

Intermittent Pumping Schedule

Pumping Hours/Day:        12
Pumping Days/Week:        4

Months Pumping:

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

(hold Ctrl to select multiple months)

Send to Model
Water Withdrawal Screening Results

**WARNING:** For demonstration purpose only..

**Adverse Resource Impact (ARI) Graph**

The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal has passed in Zone A.

**Screening Results - PASSED**

**Instructions:**

The proposed withdrawal has passed the screening process.

This withdrawal lies within 'Zone A' and is unlikely to have an adverse resource impact. Water withdrawals with a capacity of over 70 gpm are required to register with the Michigan Department of Environmental Quality before beginning the withdrawal, and report the actual water use every year. If you would like to register now press continue.

**Actions:**

- Help
- Rerun
- Register Now
- Feedback
- View Google Map
- Print Report
- Exit
Adverse Resource Information
The proposed withdrawal has 'PASSED' the screening process.

This withdrawal lies within 'Zone A' and is unlikely to have an adverse resource impact. Water withdrawals with a capacity of over 70 gpm are required to register with the Michigan Department of Environmental Quality before beginning the withdrawal, and report the actual water use every year. If you would like to register now press continue.

Summary
Watershed ID: 20733
Pumping Capacity (GPM): 70
Estimated Removal (GPM): 15
Well Depth (FT): 93
Well Type: Ground Water
Aquifer Type: Bedrock
Pumping Frequency: Continuous
Latitude: 42.716036
Longitude: -84.483425

DISCLAIMER:
The Water Withdrawal Assessment Tool is designed to estimate the likely impact of a proposed water withdrawal on nearby streams. It is not an indication of how much groundwater may be available for your use. The quantity and quality of groundwater varies greatly with depth and location. You should consult with a water resources professional or a local well driller about groundwater availability at your location.

WARNING:
This computer program is provided to demonstrate what a water withdrawal assessment tool might look like and how it might operate. It generally follows the recommendations of the Groundwater Conservation Advisory Council. However, the specific allowances and limitations that apply to a particular water withdrawal will be determined after the Legislature adopts changes to the law.
Water Withdrawal Screening Results

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Adverse Resource Impact (ARI) Graph

The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal has passed in Zone A.

Screening Results - PASSED

Instructions:

The proposed withdrawal has passed the screening process.

This withdrawal lies within 'Zone A' and is unlikely to have an adverse resource impact. Water withdrawals with a capacity of over 70 gpm are required to register with the Michigan Department of Environmental Quality before beginning the withdrawal, and report the actual water use every year. If you would like to register now press continue.

Actions:

- Help
- Rerun
- Register Now
- Feedback
- View Google Map
- Print Report
- Exit
Welcome to the water withdrawal registration form. By completing and submitting this form, you will register your water withdrawal with the Department of Environmental Quality.

### Contact Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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<tbody>
<tr>
<td>First Name</td>
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### Well Information

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<td>Watershed ID</td>
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Water Withdrawal Screening Results

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**Adverse Resource Impact (ARI) Graph**

The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal has passed in Zone A.

**Screening Results - PASSED**

**Instructions:**

The proposed withdrawal has passed the screening process.

This withdrawal lies within 'Zone A' and is unlikely to have an adverse resource impact. Water withdrawals with a capacity of over 70 gpm are required to register with the Michigan Department of Environmental Quality before beginning the withdrawal, and report the actual water use every year. If you would like to register now press continue.

**Actions:**

- Help
- Rerun
- Register Now
- Feedback
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- Print Report
- Exit
A Water Resources Partnership

Jointly Funded Agreement between Michigan State University and the Michigan Department of Environmental Quality

Focused on Source Water Protection and Holistic Water Resources Management

Jon Bartholic, Ph.D.
Institute of Water Research, MSU

Shu-Guang Li, Ph.D., P.E., GSA, F.ASCE
Department of Civil and Environmental Engineering, MSU

David Lusch, Ph.D.
Department of Geography, MSU

Ruth Kline-Robach, M.S.
Institute of Water Research and Department of Community, Agriculture, Recreation and Resources Studies, MSU
JFA Agreement

The project will take advantage of the significant strength MSU has in different colleges and departments in hydrologic and environmental modeling research, web-based data applications and community outreach.

MDEQ’s input includes its massive statewide development of comprehensive environmental databases on a statewide scale.

By capitalizing on MDEQ’s statewide databases and MSU’s new computational thinking, the project has the potential to produce paradigm-shifting advances in science and subsequently MSU’s Outreach and Engagement.
http://www.iwr.msu.edu/JFA
A Center with a Mission

A Michigan Cyberinfrastructure & A New Paradigm for Integrated Hydrologic Modeling, Visualization, & Water Resources Management

Computational Discovery & Innovation
Realtime hypothesis testing, realtime complex problem solving, realtime experimentation of management, sampling, & cleanup options, realtime discovery learning

PARTNERSHIP
MDEQ + MSU + USGS

Statewide streams, lakes, wetlands
Statewide RS/GIS, DEMs
Statewide geophysical boreholes
Statewide stream gages
Statewide rain gages
Statewide water wells
Statewide monitoring wells
Statewide oil/gas wells
Statewide pollution sites
Networked-Neighborhoods for Eco-conservation

We propose to develop a Networked-Neighborhood for Eco-conservation decision support system, which will stimulate the adoption of and track the implementation of environmental stewardship practices (ESPs) throughout watersheds and networked communities in the Great Lakes Basin.

The adverse effects of these decisions or activities can be mitigated, or even reversed, if individuals collectively adopt environmental stewardship practices. While a single individual practice, such as creating a rain garden or filter strip, may seem inconsequential, these practices can collectively make a significant impact if they are adopted across an entire watershed or community. The Networked Neighborhood for Eco-conservation decision support system will aggregate these actions and behaviors over space and time to demonstrate the collective impact of individual ESPs on the health of Great Lakes streams and aquatic ecosystems.
New Team Members

Dr. Cliff Lampe and the IWR team will examine a variety of incentives and motivational tools to encourage system participation.

Dr. Jeff Grabill will evaluate initial system prototype for improvement and redesign based on feedback from early user groups.

Jeff Grabill (JG)
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Cliff Lampe (CL)
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lampecli@msu.edu
Questions & Answers

http://www.iwr.msu.edu