

2009 Innovations Awards Program APPLICATION

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ID # (assigned by CSG): 09-MW-08MI

Please provide the following information, adding space as necessary:

State: Michigan

Assign Program Category: Natural Resources

1. Program Name

Water Withdrawal Assessment Process

2. Administering Agency

Michigan Department of Environmental Quality

3. Contact Person (Name and Title)

David A. Hamilton, Chief, Water Management Section
Land and Water Management Division

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8. Web site Address

www.miwwat.org

9. Please provide a two-sentence description of the program.

Michigan has a new program to prevent surface or groundwater withdrawals that would likely cause an adverse resource impact (ARI) on local stream ecosystems. To facilitate responsible water resources development, an easy to use, internet-based Water Withdrawal Assessment Tool (WWAT or screening tool) was developed that automatically considers the geographic variations in Michigan's stream flows and fish communities to determine whether a proposed withdrawal is likely to cause an ARI.

10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 2, 2009 to be considered.

In February 2006, Michigan passed the first legislation regulating water withdrawals in state history, prohibited a withdrawal that would cause an adverse resource impact, and required the development of the "water withdrawal assessment tool."

11. Why was the program created? What problem[s] or issue[s] was it designed to address?

The program was created to protect Michigan's valuable water resources, without creating an overly burdensome permit process. It is part of a Great Lakes region wide effort to protect the overall water resources and prevent large scale diversions from the basin. The region agreed to a unified regulatory framework, that would be ratified by the federal government, and allow flexibility in each state's implementation.

The governors and premiers of Great Lakes states and provinces, in 2001, committed to develop an enhanced water management system to protect the waters of the Great Lakes basin. A new common, resource-based conservation standard was developed and will apply to new water withdrawal proposals from waters of the Great Lakes basin. The standard is based on the principle that there should be no significant adverse individual or cumulative impacts on the quantity and quality of the waters and water-dependent natural resources of the Great Lakes basin. The states and provinces further committed to: establish programs to manage and regulate new or increased withdrawals; implement effective mechanisms for decision making and dispute resolution; develop a mechanism by which individual and cumulative impacts of water withdrawals can be assessed; and improve the sources and applications of scientific information regarding the waters of the Great Lakes basin and the impacts of the withdrawals from various locations and water sources on the ecosystems. These agreements were embodied in the Great Lakes Compact that was adopted by each of the states and provinces, and Congress, and signed by the President in October 2008. Michigan is the first state to fully implement the compact.

Michigan needed to consider many issues in designing the process. How to measure environmental impact from water withdrawal? How to adequately represent the diversity of streams and aquatic habitats, and how to account for varied sensitivity to changes in flow? How to easily recognize and authorize withdrawals that will not have adverse impacts, and how to identify when there could potentially be a problem? To the extent possible, objective metrics had to be developed to measure the physical environment. And scientifically based response curves had to be developed to inform the policy decision of how much water can be safely withdrawn.

12. Describe the specific activities and operations of the program in chronological order.

February 2006 A new state law directed the Groundwater Conservation Advisory Council (GWCAC), an appointed body representing the wide range of water use stakeholders, to develop a “water withdrawal assessment tool.” A framework was developed of how the overall process would work, and the underlying models described. A nationally recognized panel of experts was brought in to review the process. The panel validated the scientific underpinnings of each of the models and how they were integrated to make an environmental assessment of proposed water withdrawals.

July 2007 The GWCAC recommended to the legislature the overall Water Withdrawal Assessment Process and a screening tool. The Department of Natural Resources (DNR) classified all the streams in the state, and the Department of Environmental Quality (DEQ), DNR, Michigan State University (MSU) and the U.S. Geological Survey (USGS) all continued developing the screening tool.

July 2008 Final legislation was signed into law adopting the overall process and authorizing the Water Withdrawal Assessment Tool. Work now began to implement the screening tool. A new stakeholder council is formed, the Water Resources Conservation Advisory Council, and directed to evaluate the new screening tool.

October 2008 The screening tool is put on-line for review and evaluation by the public. Many user friendly changes were made in the tool, responding to suggestions from the users.

February 2009 The new definitions of adverse resource impact and management zones based on the fish response curves for each stream classification become effective. The evaluation of the automated screening tool found it to be accurate and effective.

July 2009 The scheduled date for full implementation of the screening tool. All new or increased large capacity withdrawals will be required to use the screening tool prior to registering a withdrawal with the DEQ.

13. Why is the program a new and creative approach or method?

The program is integrated and scientifically based. The interconnection between surface and groundwater is explicitly recognized and accounted for in the models. A hydrology model predicts the stream flow at any location in the state. A groundwater model estimates the amount of water depleted from streams caused by groundwater withdrawals. Where appropriate, the stream depletion is spread over two or more streams. Decisions are resource based, fish are used as a surrogate for the aquatic ecosystem. Fish response models are developed to predict how changes in flow will impact fish populations. Maximum allowable withdrawals are determined through the fish models. Decisions can be rendered either through the automated screening tool or a site specific review by professional staff. Based on testing, it is expected that the screening tool will authorize about 80% of the requests. This accurately reflects the abundance of water across much of the state. The process recognizes increasing levels of risk of causing an adverse resource impact, and determines the appropriate response. This includes site specific review if the water resource is sensitive or the proposed withdrawal is close to the available amount. Cumulative impacts are considered

through an accounting system. Watershed based user groups are formed to educate other water users, and help resolve potential overuse of the local water resources.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

The Water Withdrawal Assessment Tool (WWAT) development costs were funded by \$250,000 from the Clean Michigan Initiative bond fund. Program development was contracted to the USGS from a joint funding agreement with the State of Michigan, Department of Environmental Quality. The USGS subsequently subcontracted with Michigan State University for creation of the WWAT web application. Additional staff time was provided by the DEQ and DNR to develop the WWAT.

15. What are the program's annual operational costs?

The program staffing is budgeted at \$925,000 and contracts at \$325,000.

16. How is the program funded?

The program is funded through general funds for staffing and bond funds covering contractual costs for data management development and site specific data acquisition and third party stream flow data collection training and certification.

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.

Yes. Part 327, Great Lakes Preservation, 1994 PA 451, Natural Resources and Environmental Protection Act, as amended (MCL 324.32701 – 324.32730).

18. What equipment, technology and software are used to operate and administer this program?

The Water Withdrawal Assessment Tool is housed at the Institute for Water Research, Michigan State University. Three windows based servers are used, two of which are configured in a clustered environment to share client requests and provide data redundancy. The mapping services are powered by a customized ERSI ArcIMS application with realtime geanalysis passed through an esrimap.dll. Registrations and water accounting are handled through Active Server Pages (ASP) server side scripting and stored in a Microsoft SQL Server for retrieval. The screening tool is accessible for review at the following web address: www.miwwat.org.

19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address.

Yes. Part of the innovation of this process was the collaborative model used in its development. A stakeholder group developed the overall process and oversaw the development of the automated screening tool. The stakeholder group, "Groundwater Conservation Advisory Council," was appointed by the Governor, MDEQ director, and legislative leaders. The seventeen members were:

Jon Allan (co-chair), Consumers Energy Company
Sumedh Bahl, City of Ann Arbor Water Treatment Services
Rich Bowman, The Nature Conservancy, Michigan Chapter
Jim Cleland, Michigan Department of Environmental Quality
James Clift, Michigan Environmental Council
Jon Coleman, Tri-County Regional Planning Commission
Michael R. Gregg, Michigan Department of Agriculture
Kurt L. Heise (co-chair), Wayne County Dept of Environment
Fred Henningsen, District Agriculture and Irrigation Agent Emeritus
Craig Hoffman, Golf Course irrigator
Rod Mersino, Mersino Dewatering Inc.
Thomas Newhof, Prein & Newhof Consulting Engineers
Michael Newman, Michigan Aggregates Association
William F. Pearson, Pearson Drilling Company
Scott D. Piggott, Michigan Farm Bureau
Dr. Paul Seelbach (co-chair), Institute for Fisheries Research, MDNR
Dr. Alan Steinman, Annis Water Resources Institute, Grand Valley State University

Development of the Water Withdrawal Assessment Tool (screening tool) was also a collaborative effort. The principal developers are:

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20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?

We are not aware of any other similar program in the United States. Several states are considering how they might evaluate environmental impacts from water withdrawals, and have expressed interest in what Michigan has done.

21. Has the program been fully implemented? If NO, what actions remain to be taken?

Full implementation will begin with the assessment tool being given the force and effect of law as established in statute on July 9, 2009.

22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

Michigan chose to pass its implementation package (the Water Withdrawal Assessment Process) at the same time it approved the Great Lakes Compact. The collaborative process built widespread support among water user groups. The overall framework proposed by the Great Lakes states and provinces was successfully adopted by each of them. The support and strength of the Compact were further demonstrated by Congressional and Presidential approval in less than three months.

The many technical and policy issues were successfully met. Fish response curves were developed to measure the environmental impact of water withdrawals. The process was favorably reviewed by an expert panel. A national group promoting "Ecological Limits of Hydrologic Alteration," recognizes the importance and validity of the work Michigan has done (see www.nature.org/eloha). A statewide stream classification system was developed to account for the diversity of streams and their habitats. One of the stream types resulted from analyzing the data and resulted in a class of streams that are very sensitive and now have additional protection from over use. A stream classification map was developed through modeling, it was taken to every DNR district office for verification and enhancement based on

local knowledge from fisheries division staff. The final policy decisions (legislation) were informed by the response curves and stream classification system. And the screening tool was developed to recognize and authorize withdrawals with little impact, as well as flag those with the potential to cause adverse resource impacts.

The Water Resources Conservation Advisory Council evaluated the screening tool and found its determinations accurately reflect the distribution of water availability across Michigan. It gives an automatic authorization in 80% of typical cases statewide, and further detailed inspection of these substantiated an abundant water supply. And the screening tool flags a smaller set of cases either where proposed withdrawals are large enough to warrant further attention by DEQ staff or where aquatic ecosystems are especially sensitive. They concluded the screening tool provides an efficient statewide program tool and carries out the appropriate screening function.

The DEQ did nine site specific reviews and compared the results with the screening tool. In every case, the screening tool results were logical and appropriate. This can be effectively illustrated by describing two situations where the tool determined that an Adverse Resource Impact was likely. The first example was a proposed surface water withdrawal from a relatively small stream. The tool appropriately determined there was not enough water in that stream to support the withdrawal. However the site specific review, confirmed by a site inspection, found the location was in backwater from a dam located on a much larger river. Therefore, since the water would actually be from the large river, the impact would be in Zone A and the withdrawal could be approved. The second example was a proposed well located in the watershed of a large river but near a small cold stream. The screening tool indicated an Adverse Resource Impact was likely to the cold stream. The site specific review determined that the proposed well would be in a deep aquifer that is not connected to the shallow aquifer that sustains the cold stream. Therefore, the proposed well would not adversely impact the stream and it could be approved. This determination could not have been reached without the site specific review.

In evaluating whether the screening tool is operating well, the WRCAC considered aspects such as: ease of use; provision of rich information on water management, science, and policy; provision of a confidential and comfortable environment for exploring alternative withdrawal proposals (thinking about wise withdrawals); clear communication of complex information from integrated disciplines, and clean function of technologies. Educational efforts were made through the Screening Tool internet site, focused hands-on workshops, and other presentations; while structured user feedback was obtained through the internet site and a workshop survey form. Overall the feedback confirmed the effectiveness of the process and especially the screening tool. The feedback also provided valuable suggestions that have been incorporated into the tool and further improve its effectiveness.

The technical and policy developers of this process consider it a great first step. They all recognize the importance periodic review and updating. There must be ongoing monitoring (data collection) to continue to evaluate effectiveness and provide data necessary for future updating. This requires long term commitment, which is very difficult in these budget times. The program has already had its first budget cut.

23. How has the program grown and/or changed since its inception?

N/A

24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?

The process methodologies are readily transferable to other states. However, there are significant data needs if local data are to be used in developing the models. The most difficult to obtain may be the fisheries data to determine the fish response curves. The streamflow data are readily available through the USGS streamgaging network. If statewide hydrogeologic analysis has not been done, that is a significant effort.

The need to make social value judgments, through the legislative process, is easier if the science is in place. Because of the collaborative process, the fish response curves were accepted by all sides. The Michigan success relied on collaboration in developing the science, and a broadly based stakeholder workgroup to work out the difficult policy issues and agree upon the process.

2009 Innovations Awards Program Program Categories and Subcategories

Use these as guidelines to determine the appropriate Program Category for your state's submission and list that program category on page one of this application. Choose only one.

Infrastructure and Economic Development

- Business/Commerce
- Economic Development
- Transportation

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- Elections
- Public Information
- Revenue

Health & Human Services

- Aging
- Children & Families
- Health Services
- Housing
- Human Services

Human Resources/Education

- Education
- Labor
- Management
- Personnel
- Training and Development
- Workforce Development

Natural Resources

- Agriculture
- Energy
- Environment
- Environmental Protection
- Natural Resources
- Parks & Recreation
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- Corrections
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- Public Safety

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This application is also available at www.csg.org, in the Programs section.

Deadline: March 23, 2009