

Midwest Spatial Decision-support Systems Partnership – Science and Technology for Environmental Solutions

The Midwest Spatial Decision-support Systems Partnership (Midwest Partnership), founded in 2002, is a unique federal-state-local government partnership focused on applying science and technology to environmental solutions. The Midwest Partnership develops, promotes, and disseminates spatial, decision-support systems to help manage watersheds in the Midwest. In particular, the partnership aims to make these systems freely available via the World Wide Web to local officials, natural resource managers, and the general public.



Primary members of the Midwest Partnership include:

- U.S. Environmental Protection Agency
- Michigan State University
- Purdue University
- University of Wisconsin-Extension
- Wisconsin Department of Natural Resources
- Great Lakes Commission
- U.S. Geological Survey
- Local and regional planning commissions

The Midwest Partnership works to provide information and analytical tools to those levels of government and citizens closest to actual watershed management challenges (i.e. state and local decision makers and practitioners). The partnership offers direct access to its own web-based, decision-support tools, as well as road maps to other websites where additional tools can be found. This factsheet briefly describes some of the Midwest Partnership tools.

Digital Watershed

Michigan State University's Institute of Water Research developed Digital Watershed as a centralized information repository and on-line computing center for watersheds in the United States. This tool is based on the comprehensive, nation-wide database of 8-digit watersheds included in U.S. EPA's BASINS system. The database contains regulated facility, river network, digital elevation model, state soil, and other data layers. Digital Watershed is interconnected with local level watershed information by a scaling function, and provides a portal to various modeling tools. Users can access Digital Watershed online at <http://35.8.121.101/water/index.htm>.

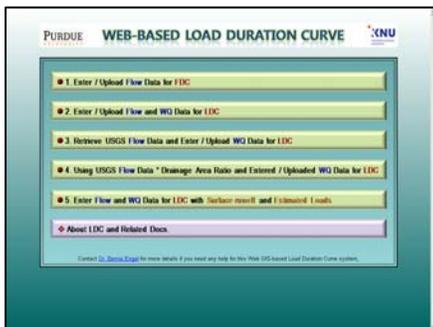


Long-term Hydrologic Impact Assessment Tool

Purdue University's Department of Agricultural and Biological Engineering developed the Long-term Hydrologic Impact Assessment (L-THIA) tool to allow local planners, decision-makers, and the interested public to predict the impact of potential land use changes on stormwater runoff and various nonpoint source pollutants. L-THIA estimates long-term average annual runoff for land use and soil combinations based on actual long-term climate data for a user specified area.

L-THIA, continued.

The model underlying L-THIA is a spatially distributed automation of the widely accepted curve number method developed by NRCS to relate direct runoff to 24-hour precipitation under various conditions. L-THIA couples this method with a polluted runoff model that estimates the loads of various pollutants based on empirically-derived coefficients for different land uses and agricultural practices. L-THIA can be accessed and run via the World Wide Web or as a free extension to desktop ArcGIS software. Users can access several different versions of L-THIA online at <https://engineering.purdue.edu/mapserve/LTHIA7/>.



Web-based Load Duration Curve

This tool from Purdue University helps users create flow and load duration curves. It allows users to download U.S. Geological Survey flow data or input user-supplied flow and water quality data needed to construct these curves. The load duration curve establishes the relationship between stream flow and pollutant loading capacity, allowing the characterization of water quality concentrations (or water quality data) at different flow regimes. This tool also provides a useful interpretation of the stream flow patterns/flow conditions that influence water quality impairments, thus allowing the user to

estimate the frequency and magnitude of exceedances of water quality standards and load reductions necessary to achieve water quality goals. Users can access the Web-based Load Duration Curve tool online at <https://engineering.purdue.edu/~ldc/JG/duration/main.cgi>.

Atlas of Ecosystem Services

U.S. EPA is leading an effort to develop a National Atlas of Ecosystem Services. The Atlas will use the principles of landscape ecology and spatial analyses in order to display the production and beneficiaries of ecosystem services (i.e. Nature's benefits). The Atlas will enable users to view or "stack" multiple ecosystem services simultaneously in order to visualize trade-offs when making decisions. Ecosystem services included in the Atlas fall into six broad benefit categories: 1) water quality, quantity, and timing, 2) climate regulation, 3) food, fiber, and fuel, 4) storm surge and wave/tidal energy protection, 5) aquatic and terrestrial habitat, and 6) human health, cultural values, and recreation. The Internet-based Atlas is relevant at multiple spatial scales, includes historical perspectives, as well as future scenarios, and is continuously updated as new spatial data become available and as the science of ecosystem services matures.



Virtual Beach

Developed by U.S. EPA's Office of Research and Development, the Virtual Beach software helps users construct site-specific, multiple linear regression (MLR) models to predict pathogen indicator levels at recreational beaches. Virtual Beach reads input data from a text file or Excel document, assists the user in preparing the data for MLR analysis, enables automated model selection using various model evaluation criteria, and provides predictions using a chosen model and new observational data. Data can be examined visually using simple scatter plots to gage relationships between the response and independent variables. Users can learn more about Virtual Beach at <http://www.epa.gov/ceampubl/swater/vb2/>.

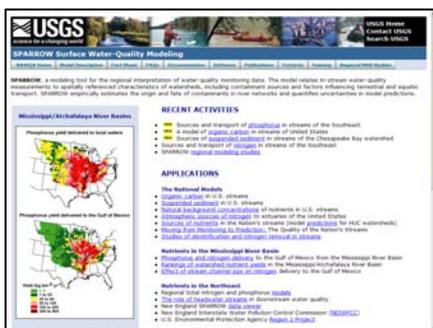
Networked Neighborhoods for Eco-Conservation Online

Networked Neighborhoods for Eco-Conservation Online (NECO) is a new and innovative web-based system developed by the Institute of Water Research at Michigan State University to help citizens map and share environmental practices that they have put in place or are interested in implementing. NECO helps users map and share photos, experiences, and information about their rain barrels, rain gardens, or other water conservation practices. Users can also connect with others in their geographic neighborhoods who are doing similar things.

NECO uses the concept of social networking and mapping technology to link people together with common goals of improving the environment in the Great Lakes Basin or in their own backyards. The tool includes:

- Real-time mapping of low impact developments and environmental stewardship practices,
- Photographs, how-to's, and examples of environmental practices,
- Tools to inform individuals of environmental practices they could adopt and their benefits to the environment and Great Lakes health,
- Integration of **Facebook** and **Flickr** to network environmental groups and neighborhoods, and
- Automated notification for weather alerts during ecologically sensitive days and actions they can take.

To learn more about NECO online, visit <http://www.networkedneighbors.org/>.



SPARROW

The U.S. Geological Survey has developed a modeling tool for the regional interpretation of water-quality monitoring data. SPARROW relates in-stream, water-quality measurements to spatially referenced characteristics of watersheds, including contaminant sources and factors influencing terrestrial and aquatic transport. SPARROW empirically estimates the origin and fate of contaminants in river networks and quantifies uncertainties in model predictions. To learn more about SPARROW, visit <http://water.usgs.gov/nawqa/sparrow/>.

Water Withdrawal Assessment Tool

Michigan State University developed the Water Withdrawal Assessment Tool (WWAT) to estimate the likely impact of water withdrawals on nearby streams and rivers. In Michigan, use of WWAT is required for anyone proposing to make a new or increased large quantity withdrawal (over 70 gallons per minute) from the waters of the state (groundwater and surface water sources) prior to beginning the withdrawal. Permit applicants must use WWAT to determine if a proposed withdrawal is likely to cause an adverse resource impact and to register the withdrawal. The tool's results page provides a quick link to submitting a registration. Users can find WWAT online at www.miwwat.org/.



Prepared by the Bureau of Science Services, Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, WI 53707.



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