

Spring 4-2000

## Water Resources Review - Spring 2000 Vol 13 No 1

Annis Water Resources Institute

Follow this and additional works at: [https://scholarworks.gvsu.edu/awri\\_reviews](https://scholarworks.gvsu.edu/awri_reviews)



Part of the [Natural Resources Management and Policy Commons](#)

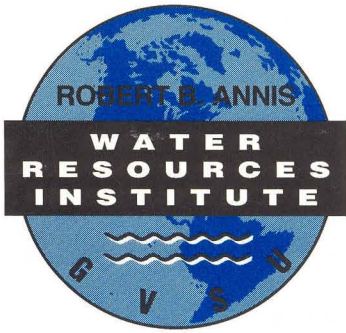
---

### ScholarWorks Citation

Annis Water Resources Institute, "Water Resources Review - Spring 2000 Vol 13 No 1" (2000). *AWRI Reviews*. 39.

[https://scholarworks.gvsu.edu/awri\\_reviews/39](https://scholarworks.gvsu.edu/awri_reviews/39)

This Article is brought to you for free and open access by the Annis Water Resources Institute at ScholarWorks@GVSU. It has been accepted for inclusion in AWRI Reviews by an authorized administrator of ScholarWorks@GVSU. For more information, please contact [scholarworks@gvsu.edu](mailto:scholarworks@gvsu.edu).



# Review

Grand Valley State University • R. B. Annis Water Resources Institute • Spring 2000 • Volume 13, Number 1

## In this Issue...

1999 Vessel Highlights...Page 2

Muskegon County 2025...Page 3

Water Education  
Opportunities...Page 4

Ryerson Creek Stormwater...Page 5

Get WET!...Page 6

Rogue River Update...Page 6

SWAP...Page 6

Habitat Assessment Of Lower  
Muskegon River...Page 7

Newaygo County Land  
Use...Page 7

## Lake Michigan Center Groundbreaking Set

Groundbreaking for Grand Valley's Lake Michigan Center in Muskegon, future home of the Annis Water Resources Institute (AWRI), is scheduled for 4:00 p.m. on June 15. The public is invited to participate in the event at the AWRI Field Station, 740 West Shoreline Drive.

The start of construction of the Lake Michigan Center (LMC) is possible because of significant progress in the campaign to raise \$5.4 million for property and building. Charles E. Johnson II, Chairman of the Lake Michigan Center Campaign

Committee, reports that the campaign has raised \$4.7 million to date, and the Committee is optimistic that the balance will soon be committed. The campaign began with a \$1 million lead gift from the Community Foundation for Muskegon County and has been followed with numerous private donations, including major gifts from SPX Corporation and from W. G. and Kathleen Jackson. The State of Michigan, the federal government, the City of Muskegon and the County of Muskegon have also made contributions of cash, services and land for the project.

Continued on page 3

*Plans for the Lake Michigan Center were approved by GVSU's Board of Control on April 26, 2000.*



## 1999 Vessel Highlights

The 1999 season for the *D.J. Angus* and *W.G. Jackson* provided educational opportunities for over 8,500 students and others in 366 events. Highlights included the twelve port-of-call *Making Lake Michigan Great Tour '99* for the U.S. Environmental Protection Agency (EPA) Lake Michigan Forum, updating the program to include the Global Learning and Observations to Benefit the Environment (GLOBE) protocols, a new home for the *Jackson* at the AWRI Field Station, and an improved dock area for the *Angus* near the Grand Haven Coast Guard Station. The *Angus* hosted a variety of groups that included area schools, Grand Valley



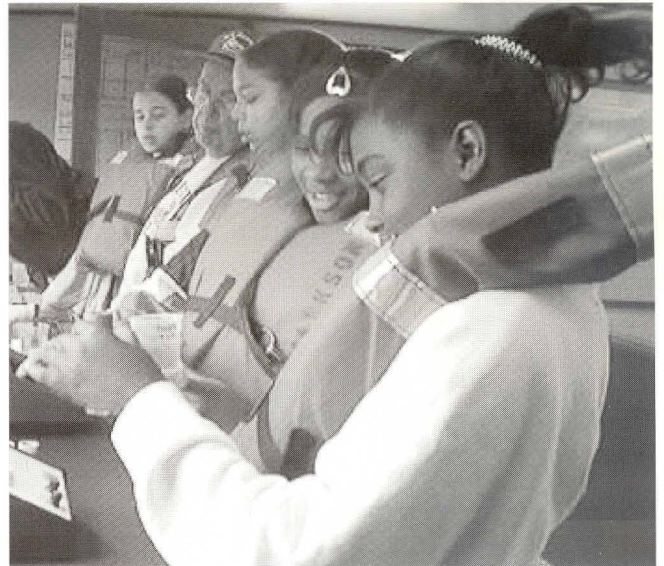
State University classes, other college classes, and adult groups. Nearly 2900 people participated in *D.J. Angus* activities. The cruise participants included high school (10%), middle school (20%), elementary (33%), university (17%), and the general public (19%). An open house during the Coast

Guard festival drew additional visitors to the vessel.

Besides student groups, the *D.J. Angus* hosted the Tri-Cities Museum, Upward Bound from Grand Rapids Community College and GVSU, the Grassroots Environmental Education Center, and Ottawa County Parks and Recreation. All of the students at Spring Lake Middle School were able to experience cruises on the *Angus*. College classes included West Shore Community College, Aquinas College, and Morningside College in Iowa. The Grand Forum spent a day in Grand Haven with an *Angus* cruise as part of the activities.

Over 5,600 people participated in *W.G. Jackson* activities in 1999 with 220 events. The cruise participants included high school (4%), middle school (16%), elementary (25%), university (2%), and the general public plus *Making Lake Michigan Great '99* (38%). Open house activities during the Coast Guard festival as well in the various ports of call for *Making Lake Michigan Great '99* drew almost 900 additional visitors to the vessel (15% dockside visitors).

Besides student groups, the *W. G. Jackson* provided trips for Boy Scouts of America, the National Ocean Sciences Bowl teams, Camp Henry, Upward Bound from Grand Rapids Community College and GVSU, Muskegon Youth Volunteer Corps,



Timberland RC & D, Muskegon Kiwanis Club, the Community Foundation for Muskegon County Youth Advisory Council, and various math and science centers. College classes included West Shore Community College, Calvin College, and a special trip to Chicago for Roosevelt University. The Grand Forum spent a day in Muskegon with a cruise as part of the activities.

The 2000 season is underway with a full cadre of groups ready to enjoy their scientific cruises. Summer events will include a trip to Chicago to work with Roosevelt University and possibly a continuation of the *Making Lake Michigan Great* effort for the U.S. Environmental Protection Agency.

For more information about the *D. J. Angus* and *W. G. Jackson* or the Water Resources Outreach and Education Program, view our homepage at <http://www4.gvsu.edu/wri> or contact Dr. Janet Vail at (616)895-3048 or [vailj@gvsu.edu](mailto:vailj@gvsu.edu).

# Muskegon County 2025 Project

The Muskegon County 2025 Project began in March 1997 with a grant from the Community Foundation for Muskegon County. Divided into three phases, Phase I examined the change in land use and cover in Muskegon County during the period between 1978 and 1991/92. Later in Phase II the AWRI used 1997 aerial photographs to once again update its land use and cover inventory of Muskegon County. This revised inventory was used in Phase III to create a Population Allocation Model (PAM).

PAM uses land use trends, measured changes in Muskegon County's landscape, to predict where people are likely to live in the future. Knowing where people might prefer to live in the future gives us the opportunity to examine the impacts of new development on water quality and other natural resources.

PAM combines various map products to create a composite showing where future residential development is most likely to occur in Muskegon County by the year 2025. Additionally, PAM predicted that residential land use will consume another 9,290 acres in Muskegon County by the year 2025. This area is equivalent to approximately 14.5 square miles or nearly half of a common cadastral township. Approximately 64 percent of this anticipated residential growth is projected to be located in areas currently used for deciduous forest. Another 20 percent will come from areas currently used for agriculture, and the remaining 16 percent from open land. AWRI estimates that the addition of related commercial, industrial, and institutional land uses will consume another 2,973 acres.

What are some of the more obvious environmental impacts that will result

from the anticipated growth? Even though the model gives special consideration to areas served by municipal sewer and water, only 3,571 acres (38 percent) projected for residential development are located within an exist-

ing or proposed municipal sewer service area. Approximately 4,974 acres (53 percent) of projected residential growth lies within a municipal water service area. Yet, almost 64 percent of new residential development is pro-

Continued on page 4

---

## Lake Michigan Center *continued* from page 1

The LMC will provide facilities for research, education, and conferencing, as well as docking and vessel support for the research vessels of GVSU and other universities and agencies. It will provide a new home for AWRI and serve as a focal point for partnerships, research, education, and outreach in the Lake Michigan Basin. The Center will facilitate the building of new coalitions of partners throughout the region and foster programs that will effectively disseminate the results of research and other projects in a way that is understandable to the general public and decision-makers. The LMC will help coalesce efforts of state and federal agencies, watershed groups, economic interests, non-profit groups, academia, and others who are working on effective management of Lake Michigan and its watersheds.

AWRI has started to implement LMC programming in advance of the actual construction of the building. The very successful *Lake Michigan: State of the Lake '99 Conference* in November 1999 attracted researchers, policy-makers, and the general public to Muskegon for two days of presentations on current Lake Michigan issues. The conference also served as the culmination of the twelve port *Making Lake Great Tour '99* made by AWRI's *W.G. Jackson* research and education vessel and sponsored by the U.S. Environmental Protection Agency (EPA) Lake Michigan Forum. EPA has complimented AWRI for its initiative in sponsoring the conference and recommended that AWRI host a similar event in 2001.

The Lake Michigan Center will be capable of hosting a variety of groups and events. Meanwhile, the AWRI Field Station conference room is serving as a gathering point for watershed groups, water quality committees, land use task forces and events for teachers. Student summer camps, teacher training, and other group events are planned. AWRI's shoreline presence was key to its selection as the State of Michigan coordinator for Project WET (Water Education for Teachers).

The LMC will provide facilities that will support the expansion of the Annis Water Resources Institute research, service, and outreach programs. GVSU and AWRI are deeply grateful to the Campaign Committee and the Muskegon community for its generosity that will lead to completion of the LMC in summer 2001.

## AWRI Expands Water Education Opportunities

“Thank for all of the great handouts and the information.” “I will do the pH experiments on a river.” “There will be more water education in my classroom.” The proceeding were some comments from teachers who attended the Institute’s Aquatic Education Spring Workshop on March 29, 2000. This workshop was supported by an Eisenhower Professional Development grant from the Michigan Department of Education. It is part of an ongoing effort to provide support for teachers who are using the AWRI vessels and who are integrating water into their curriculum. Other recent activities include a Dune Ecology for Teachers workshop and coordination of the Water Quality Event at the regional Science Olympiad. Additionally, AWRI hosted workshops for the West Michigan Science Festival.

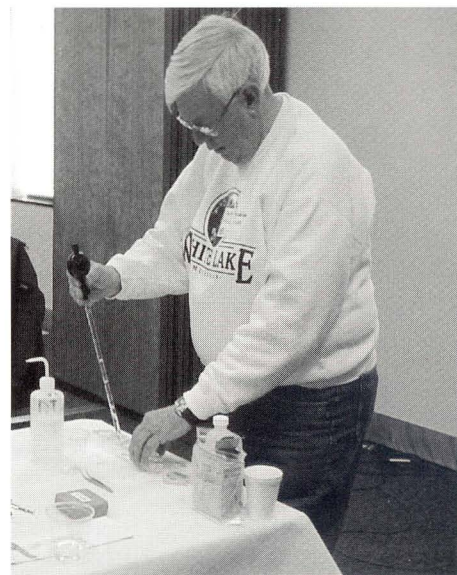
AWRI is planning to offer school-based aquatic education programs as well as continuing to provide pre- and post-vessel trip visits. The program will provide natural history and inquiry-based aquatic ecology programs. A video on the vessel program, *Cruising the Lakes*, is available for loan, and there is a new Teacher’s Manual for the *D. J. Angus* and *W. G. Jackson* written

for Elementary and Middle School teachers. Assistance with curriculum development and teaching resources is also offered.

Another opportunity for teachers is a GLOBE training workshop to be held August 7-11, 2000. In conjunction with the Michigan Environmental Council with funding from the Dart Foundation, this workshop will train teachers in GLOBE environmental monitoring protocols. Students at GLOBE schools can enter their data into a worldwide database via the Internet. The education program on the both the *D.J. Angus* and the *W.G. Jackson* was modified to incorporate the GLOBE protocols for hydrology during the 1999 season. GLOBE a world-wide student network for environmental monitoring. Students take measurements in four areas: hydrology, land cover, atmosphere, and soils. Scientists and other students can access the data collected via the Internet. Replicates and standard methods are an important component of GLOBE. Teams from schools will have priority for the workshop for this summer.

The 1998-99 water quality data from the *D.J. Angus* and the *W.G. Jackson* are now available on the Internet at

<http://www4.gvsu.edu/wri/education>. Teachers and students are encouraged to use the online database for projects. The *Instructor’s Manual for the D.J. Angus and the W.G. Jackson* is also online. AWRI would like to hear from data users so that educational materials can be developed from data. The data-



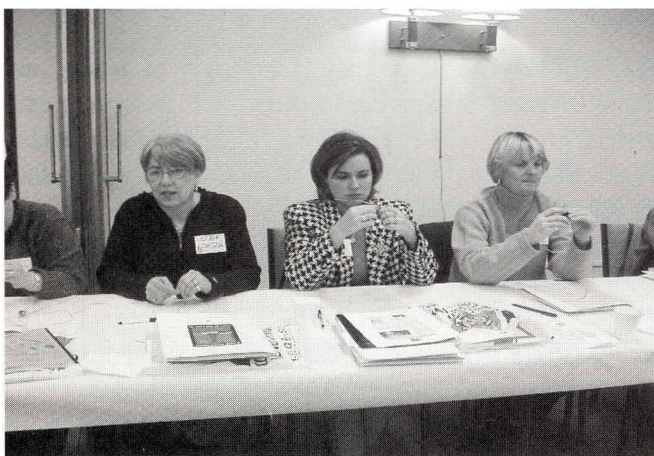
base is searchable and can also be downloaded.

Contact Janet Vail at [vailj@gvsu.edu](mailto:vailj@gvsu.edu) or (616)895-3048 if you need assistance with downloading and Jeff Auch at (231)728-3285 or [auchj@gvsu.edu](mailto:auchj@gvsu.edu) if you are interested in programming.

### Muskegon County *continued from page 3*

jected to occur on soils considered unsuitable for septic systems. In addition, approximately 58 percent of all projected residential development lies within 1/2 mile of surface waters. The use of on-site septic systems, future road construction and improvements, and other earth moving activities related to residential growth could result in further deterioration of aquatic habitats and water quality.

For more information about PAM and the Muskegon County 2025 Project, contact John K. Koches at 616-895-3792 or at [kochesj@gvsu.edu](mailto:kochesj@gvsu.edu).

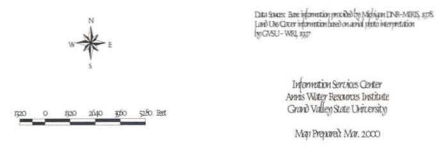


# Ryerson Creek Watershed Stormwater Management Plan

The Annis Water Resources Institute (AWRI) has been collaborating with the Muskegon Conservation District and Westshore Consulting of Muskegon to create a Stormwater Management Plan for the Ryerson Creek Watershed in Muskegon County. The Ryerson Creek Watershed is an urbanizing watershed of approximately 5193 acres found within the City of Muskegon, Muskegon Township, and Egelston Township.

As part of this effort, AWRI has created an extensive database of various geographic information systems (GIS) data layers. These layers were used to map existing land use/cover, zoning, impervious surfaces, and soils information within the watershed. For each of the seven subbasins within the watershed land use/cover statistics were calculated and associated to impervious surfaces to get an indication of where stormwater was being generated. The GIS data will be provided to project

Land Use/Cover 1997  
Ryerson Creek Watershed  
Muskegon County, Michigan



partners along with a set of hardcopy map products.

More information on the Ryerson Creek Watershed Stormwater Management

Project can be obtained by contacting Rod Denning, AWRI Research Assistant, at (616)895-3793 or [denningr@gvsu.edu](mailto:denningr@gvsu.edu).

## AWRI Gets WET!

Michigan Project WET (Water Education for Teachers) has found a new home at the Annis Water Resources Institute. WET is an interdisciplinary water education program intended to supplement a school's existing curriculum. The original WET Program was developed in 1984 by the North Dakota State Water Commission and was updated by Montana State University. It joins Project Learning Tree (PLT) and Project WILD as a premier environmental education program.

The core of the program is the Project WET Curriculum and Activity Guide (Grades K-12), a collection of water-related, fun, hands-on, and easy-to-use activities. The 90+ activities incorporate a variety of formats such as large and small group learning, laboratory investigations, and community service projects. AWRI will be coordinating Project WET teacher and facilitator training workshops. Dialogue is underway with Michigan PLT and Project WILD to better integrate the three programs.

On September 22, 2000 water festivals will be held throughout the nation to celebrate Project WET. This is the day before the annual coastal beach cleanup. AWRI will host the Michigan Project WET Water Festival at Heritage Landing in Muskegon. Students especially are invited to join the festivities which will include water testing, displays from groups interested in water issues, and Project WET activities. For more information, please contact Dr. Janet Vail at (616)895-3048 or [vailj@gvsu.edu](mailto:vailj@gvsu.edu).

---

## AWRI Performs Preliminary Habitat Assessment Of The Lower Muskegon River

The Environmental Research Group of AWRI recently completed work on a preliminary assessment of the lower Muskegon River Watershed with funding provided by the Community Foundation for Muskegon County. A report on the findings of the assessment is expected to be made available by June 2000.

The lower Muskegon River watershed is located in Muskegon County and contains an extensive marsh/wetland environment that provides critical transitional habitats for fisheries and wildlife. The river gradient flattens in this area and forms a large freshwater estuary consisting of wooded wetlands, emergent beds, and open water marshes. Much of this area is part of the 10,000 acre Muskegon State Game Area (MSGGA) and is managed for the protection and enhancement of fisheries and wildlife habitat. The MSGGA acts as a buffer zone around the river and protects it from urban development and

local runoff. Two smaller tributaries of the Muskegon River are also located in the area of the MSGGA. Cedar Creek and Mosquito Creek are important waterways that support coldwater fisheries and provide a transitional environment from the larger river to first and second order streams. While the wetlands and tributaries of the lower Muskegon River watershed are recognized as natural features significant to the region and to the Great Lakes, very little is known about their ecology and overall function in the system. It is therefore important to conduct an initial survey of the lower Muskegon River Watershed that documents current environmental conditions and identifies any areas of significant change.

The objectives of this project were to conduct a preliminary assessment of the aquatic and terrestrial habitats present in the lower Muskegon River watershed and to identify areas of significant change. In addition, a series of

benthic macroinvertebrate and water chemistry samples were collected to further assess the nature of the aquatic habitat and water quality. Because of the size of the study area, the aerial data and interpretations from the Michigan Resource Information System (MIRIS) were used. This project has developed a set of baseline data that will be important in the identification of areas of concern in the watershed and to the development of environmental management plans. These data will be useful to scientists who are involved in conducting detailed assessments of fisheries and wildlife habitats. In addition, the report will serve as an important tool for public education about the ecological importance of the lower Muskegon River watershed and the significance of problem areas.

For more information on the Lower Muskegon River Habitat Assessment, please contact Dr. Rick Rediske at (616)895-3047 or [redisker@gvsu.edu](mailto:redisker@gvsu.edu).

---

## Update On Source Water Assessment Program (SWAP)

AWRI personnel are now entering the third year of the SWAP program run by the Michigan Department of Environmental Quality Drinking Water and Radiological Protection Division (MDEQ-DWRPD). MDEQ-DWRPD and Michigan State University's Institute of Water Research (MSU-IWR) developed the program under a MDEQ grant "Facilitating Michigan's Source Water Assessment Program for Non-Community Water Supplies". This program offers assistance to local health departments in their SWAP efforts by way of education, facilitation, and utilization of a Geographic Information

System to complete a groundwater vulnerability assessment.

AWRI was selected to participate in the project as a Groundwater Education in Michigan (GEM) site and has worked with six regional and local health departments in western Michigan. Previous SWAP efforts included training local health department staff on the collection of global positioning system points representing Type II non-community well sites and compiling well construction and water quality information. New to this third year effort is Wellogic, a new computer program with

Internet access developed by MDEQ, designed to house all the well information collected by the SWAP program and eventually all groundwater information for the state. AWRI will be processing this groundwater information and using other environmental information to create groundwater vulnerability maps that the local health departments can use to protect the public and water resources in their communities.

For more information about SWAP, please contact Kurt Thompson at (616)895-3091 or [thompson@gvsu.edu](mailto:thompson@gvsu.edu).

## Rogue River Progress

The AWRI at GVSU and the Grand Valley Metropolitan Council (GVMC) are the recipients of a Watershed Management Planning grant for the Rogue River Watershed.

AWRI and GVMC are devising a plan to keep the natural river and its tributaries accessible. Presently, the most significant threat to the watershed comes from urban sprawl. AWRI's goal is to identify all of the negative impacts that are affecting the watershed and to produce a land management plan for implementation in the fall of 2000.

On February 17, 2000 individuals gathered at Rockford United Methodist Church to learn about the Rogue River Watershed Project. The event provided the general public with an opportunity to voice their concerns and meet the project staff and stakeholders that are collaborating to develop a Land Management Plan for the Rogue River Watershed.

Mark Luttenton, GVSU Biology Professor, presented a summary of his

water quality research on the Rogue River. Using fish shocking data, macroinvertebrate surveys, stream temperature measurements, and stream discharge, Dr. Luttenton concluded that the Rogue River could be characterized as both a warm and cool-cold water fluvial system. The cool-cold water in the Rogue is maintained by groundwater fed from the Rogue's tributaries and is limited to areas principally downstream of Sparta. If this groundwater transport is reduced or the delivery of warm water increases from surface runoff, the cool-cold water species that the Rogue River supports will be threatened.

Additionally, Project Staff and partners have been exploring ways to increase community involvement, water quality education, and environmental improvement. All agree that it will be easier to achieve these objectives if assistance from those people living in the Watershed can be obtained. AWRI is thus working toward establishing an organization of local volunteers called "stream stewards". The Stream Stewards consist of school groups,

neighborhoods, local environmental organizations, and other individuals concerned with the state of the Watershed. These volunteers would measure and quantify physical and biological characteristics of the stream.

Prospective stewards were given an opportunity to learn how to collect this data at the Kent County Stream Search Event hosted by the West Michigan Environmental Action Council on Saturday, May 6, 2000. This half-day event was dedicated to collecting samples of living organisms from the stream. The presence or abundance of these organisms, called macroinvertebrates, will help in determining the level of water quality. It is believed that stewardship teams and volunteer monitoring will help people establish an "ownership" of the Watershed and become more conscious of their actions.

For more information on AWRI's Rogue River Watershed Project please contact Nichol Stout at (616)895-3092 or stoutn@gvsu.edu.

## Land Use Study Completed For Newaygo County

The Annis Water Resources Institute (AWRI) has recently completed a land use study of Newaygo County funded with a grant from the Fremont Area Foundation. Using aerial photographs provided by the USDA Farm Service Agency, the AWRI updated an older land use and cover database to 1998 conditions. The new information allowed researchers to compare historical land use data with today's to get a picture of where and how land use patterns are changing in Newaygo County. AWRI was also able to compare today's land use and cover types with information about presettlement vegetation patterns within the County.

As part of the public information and education program for the project the AWRI produced a full color Land Use/Cover Atlas. The Atlas contains land use and cover maps for each of the survey townships in the County along with bar charts comparing 1978 and 1998 land use and cover statistics for each political entity in the county.

For more information about the project, contact Rod Denning at (616) 895-3793 or e:mail denningr@gvsu.edu.