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## Water Resources Review - October 1998 Vol 11 No 2

Annis Water Resources Institute

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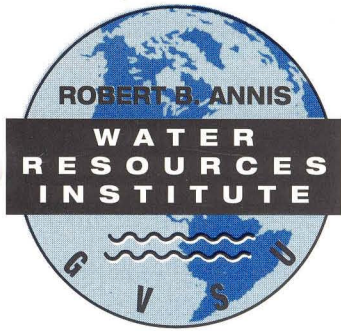
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# Review

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**The Making Lake Michigan**  
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## **W. G. Jackson Gets Permanent Home**

On October 1, Grand Valley State University announced that it will acquire the former Rust Marine property located on Muskegon Lake in downtown Muskegon, Michigan. The property will serve as the permanent home for the Robert B. Annis Water Resources Institute's (WRI) research and education vessel *W. G. Jackson* and will provide storage and other support for the Grand Haven based *D. J. Angus*. The 3 acre site has 1,000 linear feet of dock and several buildings, the largest having 10,000 square feet of storage and offices.

The lead challenge gift of Dr. William and Mrs. Kathleen Jackson, and major

gifts by GVSU alumni John Bultema II and George Bailey, made the acquisition possible. Dr. and Mrs. Jackson made a similar lead challenge gift in the campaign to fund the construction and endowment of the *W. G. Jackson*. The University expects additional gifts to cover the entire cost of the property.

"The University is pleased to have a lakefront property in Muskegon, said GVSU President Arend Lubbers. New facilities on that site will enable our Water Resources Institute to expand its research and outreach education with dockside programs to better serve our Great Lakes region. We also see the University's presence on the

*continued on page 2*



**Ronald W. Ward, Director of the R.B. Annis Water Resources Institute, addresses guests at the public announcement of the planned acquisition.**



# WRI Completes The Development Of An Agricultural Water Quality Index

The Robert B. Annis Water Resources Institute has completed the development of an Agricultural Water Quality Index as part of a grant from the American Farm Bureau Foundation. The Agricultural Water Quality Index (AWQI) is an assessment protocol that is specifically designed to evaluate the relationship between agricultural operations and water quality in agroecosystems. It can be implemented by moderately trained agricultural technicians and does not require complex chemical and biological analyses of water quality. The AWQI is based on a series of assessments that evaluate important land use and environmental variables that are related to water quality and the integrity of the terrestrial and aquatic ecosystems. The AWQI uses assessments performed in the following areas:

- **Soils and Land Use.** Does the relationship between soils, topography, and land use promote infiltration or encourage erosion?
- **Riparian Zone Condition.** Is the riparian zone sufficient to buffer surface runoff and enhance the function of the stream bank?
- **Stream Channel.** Can the stream channel support a balance of aquatic life or is it impacted by sedimentation from upstream and/or local sources?

The output of the AWQI includes numerical scores for each of the above areas, a total water quality score, and general management recommendations that can be implemented to improve problem areas. The AWQI will also provide individual producers with the

option to visually display the potential outcome of a recommended management strategy with respect to improving the numerical score. In summary, the AWQI can provide an assessment of the degree of impact a facility has on the aquatic environment and evaluate changes in farm management that are recommended to achieve the goals of sustainable agriculture.

In addition to the American Farm Bureau Foundation, funding for the project was also provided by the Ottawa County and the Muskegon County Farm Bureaus and the Michigan Turfgrass Association. For more information about the project, contact Dr. Richard Rediske at (616) 895-3047 or [redisker@gvsu.edu].

## Jackson *continued from front*

Muskegon lakefront as a catalyst for the desired development of the Muskegon Lake shoreline.”

Initial improvements of the new property will be determined over the next several months. Classroom and teaching laboratory facilities to complement and expand existing WRI programs are expected to be included in the first phase of development. Discussions with sister universities and state and federal agencies will explore possible partnerships to optimize the potential of the site for vessel support and related programs.



Research and environmental education vessel **W. G. Jackson**

## Envirothon Comes To Michigan

On July 30, more than 350 students participating in the National Envirothon boarded the *W.G. Jackson* and the *D.J. Angus* while the vessels were docked at the National Oceanic and Atmospheric Administration (NOAA) field station in Muskegon, Michigan. This event was scheduled more than two years ago as part of the Envirothon's field competition. The students also visited the NOAA facility where the staff of the Great Lakes Environmental Research Laboratory made presentations. Other highlights of the day included a cruise on Muskegon Lake and Lake Michigan and a visit to the sand dunes.



The *W. G. Jackson* and *D. J. Angus* at the NOAA Field Station in Muskegon, Michigan.

The Envirothon began in Pennsylvania in 1979. It is a nationally organized, multidisciplinary, environmental education program. The Envirothon starts at the local level with high school teams that study five natural resource subject areas: wildlife, soils, forestry, aquatic life, and environmental issues. Throughout the school year, students learn about the environment through field trips and guest lectures from scientists and resource personnel.

Local teams travel to a natural area in each state and compete on the environmental topics they have studied. State winners are invited to compete at the National level. Michigan State University hosted this year's National competition.

During the competition, students visited Lake Michigan watersheds and were asked to formulate a plan for those watersheds. Arizona took top honors in the competition. For more information on the Envirothon and forming a team, contact Pat Ruta of the Michigan Association of Conservation Districts at (616) 839-6149.

## Bear Creek Players Entertain And Educate

The Robert B. Annis Water Resources Institute's (WRI) Bear Creek and York Creek Watershed Projects sponsored another successful season of environmental theatre this past spring. The Bear Creek Players performed for 13 elementary and middle schools and 2 community events in and near the watersheds. The total audience for the season was estimated to be 4,000. Playwright/director Max Bush and five actors, three of which were GVSU students, made up the touring theatrical troupe.

The two primary tasks of the Bear Creek Players were to entertain people of all

ages while informing them about water quality issues. The goal was to raise consciousness about these issues by presenting stories that contained metaphors about being good stewards of the environment.

A typical performance consisted of the following three short stories:

### *Raindrop Bugaloo:*

An animated story about the hydrologic cycle and the adventures of four raindrops as they encounter fecal coliform bacteria and sedimentation in Bear Creek.

*continued on page 6*

## Building A Learning Community Through Aquatic Education Continues

As part of the *Building a Learning Community* project funded by the Michigan Department of Education, the Grand Valley State University (GVSU) Robert B. Annis Water Resources Institute (WRI) is pleased to announce that the *Instructor's Manual* for the *D.J. AN-GUS* and the *W.G. JACKSON* can be found on the Internet [<http://www4.gvsu.edu/wri/>]. The manual contains information on the biological, chemical, and physical parameters measured on the GVSU-WRI scientific education vessels. This site also contains environmental links related to the Great Lakes and area watersheds.



Participants in the Sand Dune Workshop prepare a beach profile at P.J. Hoffmaster State Park.



Participants in the WET Workshop make water cycles aboard the W. G. Jackson.

Some of the workshops that were held as part of the *Building A Learning Community* project included: *Project Based Science*, *Water Quality Data*, *Make It & Take It Water Experiments*, *Lake Michigan Shoreline*, and *What Is A Watershed?* The watershed workshop was a cooperative effort with the Muskegon

Conservation District and the Michigan Department of Environmental Quality.

Another creative partnership was a joint workshop series for teachers (one week) organized and facilitated by Dr. Don Williams of Hope College with support

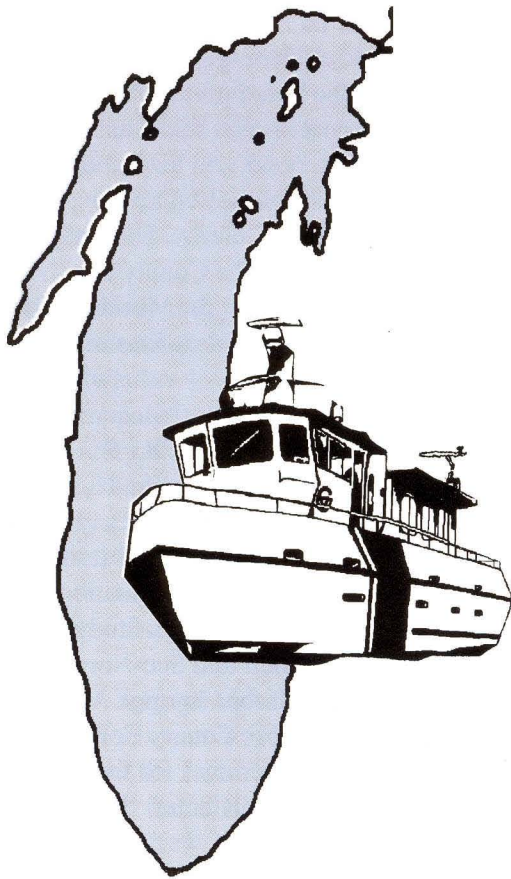
from the Macatawa Area Coordinating Council. The GVSU research vessel *W.G. Jackson* and staff helped to provide training for teachers on Lake Macatawa. The teachers were able to use the new spectrophotometers on the vessel to study phosphorus levels.

The GVSU aquatic education instructors have reached 34 teachers and their classes through on-site visits with more visits scheduled for fall. Teachers have been mainly interested in pre-and post-vessel activities for their students and preparing their students for cruises.

*Building a Learning Community* continues this fall with the aquatic education extravaganza on October 29, 1998. This event is from 4 p.m. to 7 p.m. at Kirkhof Center on GVSU's Allendale campus. Teachers with water-related projects are encouraged to present results at the extravaganza. Customized workshops and visits by aquatic education instructors to classrooms are available. Contact Dr. Janet Vail at (616) 895-3048 or [[vailj@gvsu.edu](mailto:vailj@gvsu.edu)] for information on the project or to present at the October 29<sup>th</sup> event.

# Making Lake Michigan Great

## A project of the U.S. EPA Lake Michigan Forum



“How is Lake Michigan doing? Can we safely swim in the lake? Can we drink the water? Can we control zebra mussels?” These were some of the questions the public had as the *W.G. Jackson* vessel of the Grand Valley State University Robert B. Annis Water Resources Institute (GVSU-WRI) made its way around Lake Michigan on the *Making Lake Michigan Great* tour in the summer of 1998.

### The Lake Michigan Forum

The *Making Lake Michigan Great* tour is a project of the Lake Michigan Forum. The Forum provides input from broad interests around Lake Michigan for the development of the U.S. Environmental Protection Agency (U.S. EPA) Lake Michigan Lakewide Management Plan. The Forum is a diverse stakeholder group of academia, government, business, industry, sport fisheries, and others. Its home page can be accessed at <http://www.lkmichiganforum.org>.

### The Tour

The purpose of *Making Lake Michigan Great* is to spread the word about the U.S. EPA Lakewide Management Plan for Lake Michigan. It was funded primarily by a challenge grant by the SC Johnson Wax Fund and the U.S. EPA. The Petoskey-Harbor Springs Area Community Foundation, Charlevoix County Community Foundation, Community Foundation for Muskegon County, Macatawa Area Coordinating Council, and GVSU-WRI were also key supporters. The tour provided hands-on experience in water issues aboard the *W.G. Jackson*, a 65 foot university research/education vessel. At the ten ports of call, there were cruises, open houses, and community forums.

### The Ports of Call

In June, the *W.G. Jackson* left her home port of **Muskegon, Michigan** and headed north to **Traverse City, Petoskey, Harbor Springs, and Charlevoix** for a week-long northern tour. This was followed by travel to **Holland and White Lake, Michigan**.

The *Making Lake Michigan Great* tour continued in August with visits to **Milwaukee, Racine, and Chicago**. The Wisconsin Lake Schooner Association in Milwaukee and the Nature Museum of the Chicago Academy of Sciences hosted events on the vessel. The Racine events were organized by the Racine Water & Wastewater Utility. Muskegon welcomed the *W.G. Jackson* home in late August.

### The Results

Information about water quality was collected at each port of call. Participants at the open houses and on cruises signed a log book and shared their concerns about Lake Michigan. Scenes from the tour were documented in a photograph album and displayed on the Forum Internet site [<http://www.lkmichiganforum.org>]. Building on the success of *Making Lake Michigan Great*, there are plans for another tour in the summer of 1999.

Ports of Call	
June 3	Muskegon
June 8	Petoskey
June 8-9	Harbor Springs
June 9	Charlevoix
June 12-13	Traverse City
June 23	Holland
July 26	White Lake
August 14-15	Milwaukee
August 16-17	Racine
August 18	Chicago
August 26	Muskegon





## **Muskegon - June 3 and August 26**

The kick off of the tour was held at Heritage Landing in Muskegon on June 3rd. This is the home port of the *W.G. Jackson* which provides educational cruises for over 3,000 students and others each year. The event was held in conjunction with an Environmental Summit hosted by the Community Foundation for Muskegon County. The vessel was welcomed home at a celebration by the County of Muskegon and the Community Foundation for Muskegon County on August 26th. A special presentation was made to Dr. William G. Jackson.



## **Petoskey, Harbor Springs, Charlevoix - June 8 - 9**

Students from the Petoskey-Harbor Springs area and Alanson High School enjoyed cruises and dockside events. An open house and informational meeting was held at the Little Traverse Historical Society Museum. Presentations were made on the Lake Michigan Mass Balances Study and by the Tip of the Mitt Watershed Council and See-North. The local sponsor was the Petoskey-Harbor Springs Area Community Foundation. The Charlevoix County Community Foundation sponsored educational cruises for the community and the Raven Hill Discovery Center.



## **Traverse City - June 12 - 13**

Following a series of cruises organized by the Grand Traverse Bay Watershed Initiative, the *W. G. Jackson* was available for public tours. Over 500 people were able to board the vessel which was part of the Bay Day celebration. Sampling was done on the Grand Traverse Bay by the Water Watch Group.

## **Holland - June 23**

A special event, *A Look Around the Lake*, was presented in conjunction with the Macatawa Area Coordinating Council. State representatives and community leaders cruised Lake Macatawa and Lake Michigan with water quality experts. A highlight of this event was a presentation of a pair of wooden shoes by the Mayor of the City of Holland to the *W.G. Jackson* captain. A workshop for teachers in conjunction with Hope College and Grand Valley State University was also an activity at this port.



# Summer 1998

## White Lake - July 25

The *W.G. Jackson* joined the festivities at Celebrate White Lake with a whole day of public cruises. The tours were part of the White Lake Remedial Action Plan public education and outreach program. As with the other ports, there were presentations on the Lake Michigan Mass Balance study as well as lakewide planning efforts.

## Milwaukee - August 14 - 15

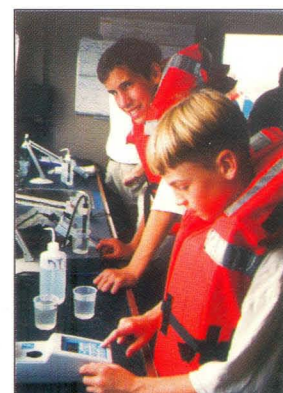
The Wisconsin Lake Schooner Association was the host for the Milwaukee visit. Boy scouts, student groups, and adults all participated in hands-on water sampling. Public meetings on mercury, the Lake Michigan Mass Balance Study, and Milwaukee Remedial Action Plan were held. The Mayor of the City of Milwaukee issued a proclamation declaring August 14th - 15th "Making Lake Michigan Great Days." Trips through the harbor and up river provided opportunities for water testing.

## Racine - August 16 - 17

The Racine event was held in conjunction with the summer meeting of the Lake Michigan Forum. A public meeting highlighted the Sustainable Racine initiative. Open houses and cruises drew a diverse audience including nature center groups, the general public, children, and public officials. Water quality testing was done on the Root River and Lake Michigan. A special cruise was held for the Lake Michigan Forum, the U.S. EPA, the LaMP Management Committee, and the Technical Coordinating Committee. There were also displays at Festival Hall at the port of Racine where the Lake Michigan Explorer software was highlighted.

## Chicago - August 18

Navy Pier was the location for the visit of the *W.G. Jackson* to Chicago. Girl scouts and their leaders as well as a professional geologist group had an opportunity to sample Lake Michigan. The Nature Museum of the Chicago Academy of Sciences was on hand as hosts. Over 360 people visited the vessel during the open house.





# Lake Michigan Forum Members

Co Chair: Dr. Ronald Baba, Oneida Nation  
Co Chair: Dr. Janet Vail, Grand Valley State University  
Robert B. Annis Water Resources Institute

Maxine Appleby, Web Mariner  
David Bonistall, The Mead Corporation  
Tom Bunker, Racine Water & Wastewater Utility  
Tanya Cabala, Lake Michigan Federation  
Adriane Esparza, East Chicago Waterways Management District  
Kathy Evans, Muskegon Conservation District  
Bill Hafs, Brown County Land Conservation Department  
Bruce Johnson, Fox-Wolf Basin 2000  
Mary Powers, Kalamazoo County  
Mark Reshkin, Indiana University Northwest  
Steve Skavroneck, The Crane House  
Al Smith, Friends of the St. Joseph River Association  
Dan Thomas, Great Lakes Sport Fishing Council  
Mel Viser, Audubon Society  
Pamela Wallis, Great Lakes Nonpoint Abatement Coalition  
Chris Wright and Onalee Marsh, Grand Traverse Bay Initiative

Judy Beck, U.S. Environmental Protection Agency Lake Michigan Team  
Tim Brown, Delta Institute (Facilitator)

## Special Thanks to:

Maxine Appleby, Judy Beck, Ray Johnson, Tim Brown, Dr. Ronald Ward, Dr. William Jackson, Tonya Cnossen, Tanya Cabala, Kathy Evans, Arn Bozaart, Maureen Nicholson, Dr. Mary Whitmore, Ann Baughman, Karen Morison, Bob Tambollini, Chris Wright, Onalee Marsh, Bill Queen, Dr. Don Williams, Karen Kosky, Sue Higgins, Rep. Jessie Dalman, Rep. Patricia Birkholz, Bill Nimke, Tom Bunker, Ron Thomas, Kira Berman, Dr. Jennifer Blitz, Phil Parfitt, Rita Garner, Phillippa Cannon, Bob Paulson, Captain Bob Burns, Chuck Vanderlaan, Gus Unseld, Dave Strand, Bonnie Cowles, Ron Dykstra, Roger Tharp, John Gort, Roger Hillstead, Maia Alfred, Dr. Rick Rediske, Dr. Janet Vail, the Harbor Masters at the ports of call, and the many others who helped Make Lake Michigan Great.



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## WRI Goes Global

The Robert B. Annis Water Resources Institute (WRI) recently became affiliated with the Global Learning and Observations to Benefit the Environment (GLOBE) program, an international environmental monitoring program for students. Supported by the federal government, GLOBE has scientists designing and implementing projects using data collected by students from all over the world. GLOBE links students, teachers, and the scientific research community in an effort to learn more about worldwide conditions through student data collection and observation.

Over 5,600 schools in 70 countries participate in GLOBE. There are over 90 GLOBE schools in Michigan with 20 schools in west Michigan. Scientists, U.S. partners, and GLOBE international partners from 17 countries recently met in Colorado for a networking conference. Some of the overseas attendees included China, Denmark, Germany, Benin, Iceland, Japan, Madagascar, the Netherlands, Costa Rica, Peru, Poland, Russia, Spain, the United Kingdom, and Finland.

Guided by trained teachers, students take environmental measurements that are sent to scientists via the Internet. Using the theme of earth as a system, students study hydrology, soils, land cover, biology, and the atmosphere. New GLOBE projects include budburst studies, atmospheric haze and ozone measurements, and watershed studies. Two west Michigan area schools, Alto Elementary and Lincoln Environmental Science Academy, have put numerous pieces of data into the GLOBE system.

The measurements taken by students serve two important purposes. First, participating scientists use these data in their research programs to improve understanding of the global environment. Second, students not only learn how to carry on a rigorous scientific program of earth observations, but also learn to use their own measurements and those of other GLOBE schools to study the environment. According to GLOBE Director Tom Pyke, specific measurement protocols are essential and the data must meet high standards to be useful to scientists. With the addition of weather stations on WRI's research and education vessels, teachers and students will be able to practice GLOBE protocols.

The WRI, along with the Regional Math & Science Center, will be formulating a strategic plan for assisting existing GLOBE schools and training teachers interested in the program. Essential to

the plan will be identifying specific training needs for teachers. An advisory group will be formed, and GLOBE teachers, as well as anyone interested in the program, are invited to be a part of this group. Planning for the first meeting of the advisory group is currently underway.

Dr. Janet Vail of the GVSU Robert B. Annis Water Resources Institute is a local point of contact for GLOBE. The GLOBE site can be visited at [<http://www.globe.gov>]. For more information about the implementation of GLOBE, contact Dr. Vail at (616)895-3048 or [[vailj@gvsu.edu](mailto:vailj@gvsu.edu)].



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## Pentwater River Watershed Project Begins

The Robert B. Annis Water Resources Institute recently began development of a natural resource based Decision Support System (DSS) for the Pentwater River Watershed Project. The DSS will include land use, soils, vegetation and other layers of information to aid local decision-makers in the Pentwater River Watershed and will focus on environmental concerns. Co-sponsored by the Oceana County Soil and Water Conser-

vation District and the West Michigan Shoreline Regional Development Commission, the Pentwater River Watershed Project is funded by the U.S. EPA through section 319 of the Clean Water Act and administered by the Michigan Department of Environmental Quality.

For more information on the Pentwater DSS, contact Christy Heisler at (616) 895-2527 or [[klingec@gvsu.edu](mailto:klingec@gvsu.edu)].

## New Project With Little Traverse Bay Bands Of Odawa Indians

The Robert B. Annis Water Resources Institute (WRI) and the Little Traverse Bay Bands of Odawa Indians located in Petoskey, Michigan are collaborating on an information management initiative. This project will provide environmental information to local officials and the tribal government in an easy to use format, along with guidance on its use.

Color Resource Map Atlases containing relevant environmental information such as soil textures, erosion potentials, wetland locations, and environmental contamination sites. The data collected and created for the Map Atlases will also be used to create a Resource Decision Support System supported by ArcView GIS for use by the tribes Planning Department. The Atlases will also be shared with local governmental units within the project area.

The project is funded by a grant awarded to the Little Traverse Bay Bands of Odawa Indians from the U.S. Environmental Protection Agency. For more information about the project, contact Rod Denning at (616) 895-3793 or [denningr@gvsu.edu].

## Land Use Study Completed For Muskegon County

The Robert B. Annis Water Resources Institute (WRI) has recently completed phase II of a land use study funded by a grant from the Community Foundation for Muskegon County. Using aerial photographs provided by the United States Department of Agriculture Farm Service Agency, WRI updated its existing land use and cover database to 1997 conditions. The new information will allow researchers to compare historical land use data with that of today, providing a picture of where and how land use patterns are changing in the County. For example, between 1978 and 1997 the County gained 14.7 square miles of new residential development and lost 29.8 square miles of cropland. Moorland, Casnovia, and Ravenna Townships lost the largest amount of cropland while Dalton, Fruitport, and

Egelston Townships gained the largest amount of residential land use.

As part of the public information and education program for the project, WRI 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, 1992, and 1997 land use and cover statistics for each political entity in the County. The information will also be shared with the Muskegon County Land Use Planning Initiative Task Force to help disseminate the information to local units of government.

For more information about the Land Use Study for Muskegon County, contact Rod Denning at (616) 895-3793 or [denningr@gvsu.edu].

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## Bear Creek Players *continued from page 3*

### *Snapshots From Bear Creek:*

A series of very short scenes of people gathering at the creek for various recreational activities depicting their relationship with the creek.

### *Wiley And The Hairy Man*

A contemporary folk tale of the old swamp inspired from southern culture. This story stresses the responsibility we all share in using our land wisely.

Each performance lasted approximately 45 minutes and was usually viewed by multiple classes if not the entire school.

Prior to the scheduled performance, the schools received educational packets to familiarize students with the concepts presented in the play. The packets contained vocabulary words, newsletters, and other resource materials related to water quality issues.

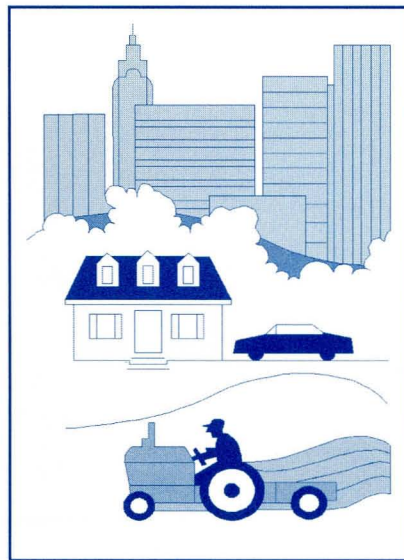
Feedback from students and teachers has been overwhelmingly positive. WRI will continue future performances in the York Creek Watershed and, hopefully, in other watersheds throughout west Michigan. For more information about the Bear Creek Players contact Andrea Pickens at (616)895-3749 or [pickensa@river.it.gvsu.edu].

# Farmland Preservation Requires Education

Education about farmland preservation has been a primary focus of the second year of the Robert B. Annis Water Resources Institute's (WRI) Farmland Preservation Project. The Project is a three-year effort funded by the Frey Foundation that focuses on the interests of the North Kent Townships Association (NKTA). NKTA is an association of the twelve northern townships in Kent County whose principal mission is to pursue ways to preserve prime, unique, and valuable farmland.

Education about farmland preservation has taken on many forms. WRI chose to begin with a survey developed by Kent County MSU Extension in partnership with WRI. The results of the *Agricultural Landowner's Opinion Survey on Farmland Preservation* emphasized:

- that preserving farmland is important;
- the concern over the loss of farmland; and
- the need for landowner education about state and local farmland preservation policies.



Other educational initiatives accomplished in the second year of the Project include:

- the development of PUV-LESA, applied in Courtland Township (a system to test prime, unique, and valuable farmland assessment factors and land evaluation/site assessment analysis);
- the review of farmland preservation policies with local officials involved in NKTA;
- the presentation of PUV-LESA to the Courtland Township Board, Planning Commission, and Township residents;
- the presentation of PUV-LESA to the 7th Annual Statewide IMAGIN Forum in May 1998 (Forum for data users and sharers);
- the creation of a simulation to show land values as they relate to Transfer of Development Rights (policy used to preserve farmland in various areas of the nation); and
- the creation of Resource Map Atlases for Solon, Algoma, Cannon, and Nelson Townships in Kent County.

## Bear Creek Watershed Open House

An Open House was held September 23 at Cannon Township Center to highlight various activities conducted throughout the Bear Creek Watershed Project. The Project's grant officially ended on September 30, 1998. Project staff from the Robert B. Annis Water Resources Institute and Cannon Township were present at the Open House to discuss the educational and technical programs implemented and the lessons learned in this U.S. EPA funded project.

Cannon Township has committed to continuing the goals of the Bear Creek Watershed Project and has recently appointed Bonnie Shupe as Cannon Township Watershed Administrator. For information on watershed events and activities contact Bonnie Shupe at (616)874-6966.

For more information about WRI's Farmland Preservation Project, contact Christy Heisler at (616) 895-2527 or [klingec@gvsu.edu]. More about the Farmland Preservation Project can also be found on the Internet at [<http://www4.gvsu.edu/wri/>].

## Two New Videos Available

The Robert B. Annis Water Resources Institute (WRI) and the Grand Rapids Community Media Center's GRTV have partnered to produce two videos for the Bear Creek Watershed Project. The first video introduces the Bear Creek Players, a touring theatrical troupe, and showcases the creations of Playwright/Director Max Bush. Max was contracted by WRI to write and produce a play about water quality issues surrounding Bear Creek. The video gives an indepth look into the preparations for the play, the educational messages within the stories of the play, and the reactions and feedback of the school children who watch the play.

The second video highlights water quality preservation activities and programs that have been implemented in the Bear Creek Watershed Project. This video is a creative representation of the lessons learned and partnerships formed throughout this U.S. EPA funded project. For more information about the videos, contact Andrea Pickens at (616) 895-3749 or [pickensa@river.it.gvsu.edu].

WATER RESOURCES

# Review

Dr. Ronald Ward, Director

*Water Resources Review* is a publication of the Robert B. Annis Water Resources Institute, Grand Valley State University. For further information write:

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