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## Water Resources Review - October 1993 Vol 6 No 3

Annis Water Resources Institute

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# Review



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## WRI Receives \$55,000 Grant from Frey Foundation

The Water Resources Institute has been awarded a \$55,000 grant from the Frey Foundation to fund the Institute's studies of growth trends in Kent County, particularly the environmental impacts associated with increased population pressures. The analysis of changes in land use over the last 20 years will be used to help formulate environmentally sound guidelines for development.

Rural Kent County is experiencing tremendous pressure from urban development resulting in the loss of

prime agricultural lands, increased pollution and sedimentation of lakes and streams, and the loss of unique and irreplaceable wildlife habitats. The grant, to be administered over a three-year period, will enable WRI to predict where people are likely to live in the future and simulate the impacts to agricultural production, water quality, and wildlife habitats.

The grant will support the purchase of satellite imagery, which the WRI will use, along with its

continued on page 3



*John Koches, WRI Research Associate and Dr. Russell Mawby, Chairman and Chief Executive Officer, the W.K. Kellogg Foundation, discuss groundwater protection at the WRI Open House. See Story on page 5.*



# Urban Watershed Management

## *WRI and Alpine Township Collaborate on York Creek*

The Water Resources Institute (WRI) will assist Alpine Township in developing and implementing a watershed management plan for York Creek, Kent County. The project is being funded by a grant available through Section 319 of the Federal Clean Water Act and administered by the Michigan Department of Natural Resources (MDNR).

York Creek is a tributary of the Grand River and is located almost entirely in Alpine Township, Kent County. The small 3.3 square mile watershed is dominated by urban land use, including commercial development and multi-family residential land use, with considerable pressure to develop the remaining open space and agricultural land.

### York Creek Watershed Land Use

Agricultural	12.3%
(Row Crops	9.4%)
(Livestock	0.7%)
(Other	2.2%)
Urban	53.9%
Forested	16.6%
Wetlands	0.2%
Other	17.0%

In spite of its proximity to Grand Rapids, one of Michigan's largest and fastest growing urban centers, York Creek has until recently supported a viable and healthy fish population. Stream studies conducted by the MDNR indicate that Brook, Brown, and Rainbow Trout were once common in York Creek. These and other game fish are no longer evident in the watershed. This dramatic change is due to loss of habitat from sedimenta-

tion and unstable water flow from urban runoff.

The goal of the York Creek project is to improve habitat with the intent to re-introduce indigenous game fish species. This is to be achieved through evaluation of all sources of nonpoint pollution, implementation of best management practices, and public education and participation.

The WRI will use its Geographic Information Systems (GIS) and data base to model and evaluate nonpoint source pollution contributions to York Creek. The use of the GIS linked to nonpoint models will lead to the development of a computer simulation specifically intended for the watershed. This simulation will allow Alpine Township officials and decision makers to pose questions about future development and predict the associated impacts.

"The lessons learned during WRI's analysis of York Creek will be used to develop information tools for Alpine Township. These tools are intended to enhance the decision making process and will no doubt have implications for other local units of government throughout west Michigan," said John Koches, WRI research associate.

"We are pleased that WRI has agreed to work with us. The information provided to us by the Institute will also be used in the management of other watersheds in Alpine Township," adds Edward Tikkanen, Alpine Township Supervisor.

For more information on the York Creek Watershed Management Project, please contact John Koches at (616) 895-3749.

## EPA Awards Second Bear Creek Grant to WRI

The U.S. Environmental Protection Agency has awarded a second \$25,000 grant to the Water Resources Institute (WRI) for work in the Bear Creek Watershed.

The grant will help fund the second year of the Bear Creek restoration project in Cannon Township, Kent County. Additional funding for this project is provided by The Grand Rapids Foundation through WRI's Grand River Watershed Program.

The objective of the project is to explore the relationship between ecological restoration and water quality. The current study area includes the stream segment flowing through Townsend Park in Cannon Township. By focusing on Townsend Park, the Institute has opened the door for excellent educational opportunities as well as enhance the park's recreational value.

"We were very successful in identifying and characterizing the problems in the Bear Creek watershed during our first year. The continued support from the EPA and The Grand Rapids Foundation will ensure that restoration efforts proceed," said Ramon David, WRI research assistant.

During the second year of this multi-year project, in-stream structures will be placed in the study area to reduce sediment loading and stream bank erosion. The Institute will also continue its stream monitoring and local educational activities.

For more information on the Bear Creek restoration project, please contact Ramon David or Mark Luttenton at (616) 895-3749.

## Frey Foundation Grant

*continued from page 1*

existing Geographic Information System (GIS), to project population growth throughout the county. Once integrated with the GIS, the satellite imagery data will help researchers determine the impact of growth on both socio-economic and natural systems. The WRI will identify strategies to cope with development pressures and will encourage the implementation of these strategies through public education efforts.

"When we have a better picture of where people will most likely live, and where businesses and industries are apt to locate, we can plan for growth in a much more logical and effective way," said John Koches, WRI research associate.

James M. Richmond, Frey Foundation president, said, "We applaud the Institute's commitment to meet the area's need for information about development trends, environmental and economic consequences, and more responsible alternatives."

The WRI is organizing a Project Advisory Committee to assist in the development of recommendations and the dissemination of information. The Committee will include representatives from local government, the Michigan Department of Natural Resources, the West Michigan Environmental Action Council, the Kent County Soil Conservation District, Michigan State University Extension Service, and others.

If you would like more information on this project, please contact John Koches at (616) 895-3749.

## Upcoming Conferences

### ***Stormwater and Urban Runoff*** ***A conference for the Kalamazoo River Watershed***

Wednesday, November 10, 1993  
8:00 a.m. - 4:30 p.m.  
Comstock Community Auditorium, Comstock

For information call  
Kalamazoo River Partners Program  
(616) 337-7348

Sponsored by  
The Kalamazoo River Partners Program  
U.S. Soil Conservation Service  
Michigan State University Extension  
Michigan Department of Natural Resources  
and others

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### ***Planning for the Future*** ***A conference on innovative growth management*** ***in west Michigan***

Thursday, November 11, 1993  
8:00 a.m. - 4:00 p.m.  
Eberhard Center, Grand Rapids

For more information call  
Water Resources Institute  
(616) 895-3749

Sponsored by  
Water Resources Institute, Grand Valley State University  
Michigan Department of Natural Resources

# West Michigan Pollution Prevention Project to Assist Business Coalitions

Pollution prevention is the environmental management strategy of choice for the 90s. According to U.S. EPA Administrator, Carol Browner, voluntary pollution prevention efforts by business are being implemented throughout the country. Pollution prevention is reduction or elimination of materials released into the environment through the use of source reduction and environmentally-sound on-site recycling. Source reduction minimizes or reduces the waste at its source before it is generated or released. Recycling focuses on the use, reuse, or reclamation of a waste that has already been generated. The preferred hierarchy of waste management is source reduction followed by reuse, recycling, incineration, treatment, and finally land disposal.

A new initiative of the Grand Valley State University Water Resources Institute (WRI), the West Michigan Pollution Prevention Project, is a proactive, cooperative business, industry, academia and government effort to "spread the word" about pollution prevention (P2) and make available P2 tools to a wide audience in west Michigan. The goal of the project is to create a permanent infrastructure to promote pollution prevention in west Michigan through regional cooperation. Key elements of the project will be production of a newsletter, organization of seminars, and direct assistance to business coalitions. This project will be a part of the ongoing pollution prevention activities for the Lake Michigan Lakewide Management Plan of the Environmental Protection Agency. The West Michigan Pollution Prevention Project will be managed by Janet Vail, WRI research associate. Barb Spitzley of the State of Michigan's

Office of Waste Reduction Services (OWRS) will work in conjunction with WRI during the project.

The West Michigan Pollution Prevention Project will be working with existing business groups in the area. There are two business coalitions that have been active in on-site visits to businesses to explore waste reduction opportunities: the Business Industry Team for the Environment (B.I.T.E) and the Muskegon Ottawa Pollution Prevention Alliance (MOPP). B.I.T.E. chairperson, Mary Dechow of Spartan Stores, states that the mission of B.I.T.E. is to "assist business and industry to effectively manage waste streams and encourage reduction and recycling through education and resource sharing". The B.I.T.E. group recently met at Amway to tour their recycling facility and will be visiting Butterworth Hospital in November.

The Muskegon-Ottawa Pollution Prevention Alliance (MOPP) is a coalition of representatives from business, industry, government and education whose mission is to foster a healthy economic environment through promotion of business practices that minimize pollution and waste. Membership in MOPP is open to all businesses and industries in Muskegon and Ottawa Counties. Jim Gillespie of Herman Miller, Inc. and Kevin Darby of Trendway Corporation serve as MOPP chairpersons, Brenda Kling of Ottawa County Resource Recovery serves as the newsletter editor, and WRI provides organizational support.

The group has already toured Lorin Industries, Eagle Ottawa Leather, Herman Miller, and Hy-Lift Division of Sealed Power Technologies.

Another new area group that is

likely to play a role in pollution prevention is the West Michigan Chapter of the Air and Waste Management Association. According to West Michigan Chapter Chairperson Jim Lamancusa of Lacks Industries, the A&WMA is a national, nonprofit, technical and educational organization founded in 1907. The Association has members from industry, government agencies, and academic and research communities who exchange technical and managerial information on environmental issues.

It is anticipated that the West Michigan Pollution Prevention Project will help to facilitate the change in philosophy of waste management from disposal and end of the pipe control to reduction and prevention. West Michigan has the opportunity to become a leader in "business to business" cooperation and information sharing to create a regional pollution prevention ethic. Interest in the project has already been international scope. The Ontario Ministry of the Environment and Energy recently invited the project manager to present a briefing on the project in Toronto. To be included on the mailing list for the project, contact Janet Vail at (616) 895-3749 (FAX: (616) 895-3864).

Reduce 

then recycle 

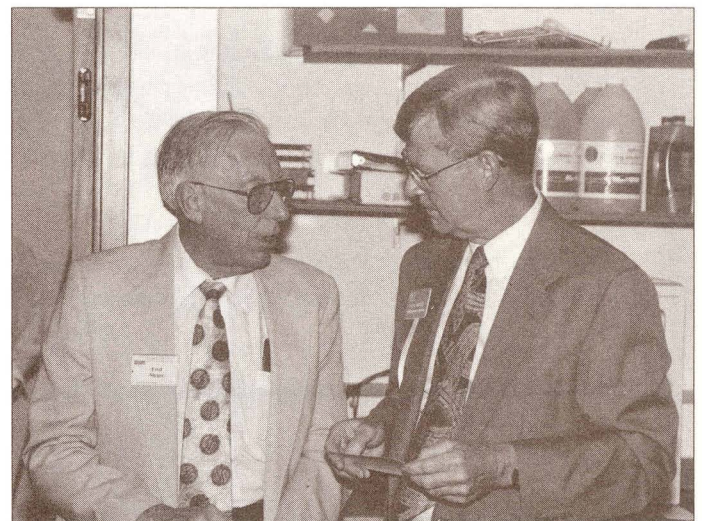
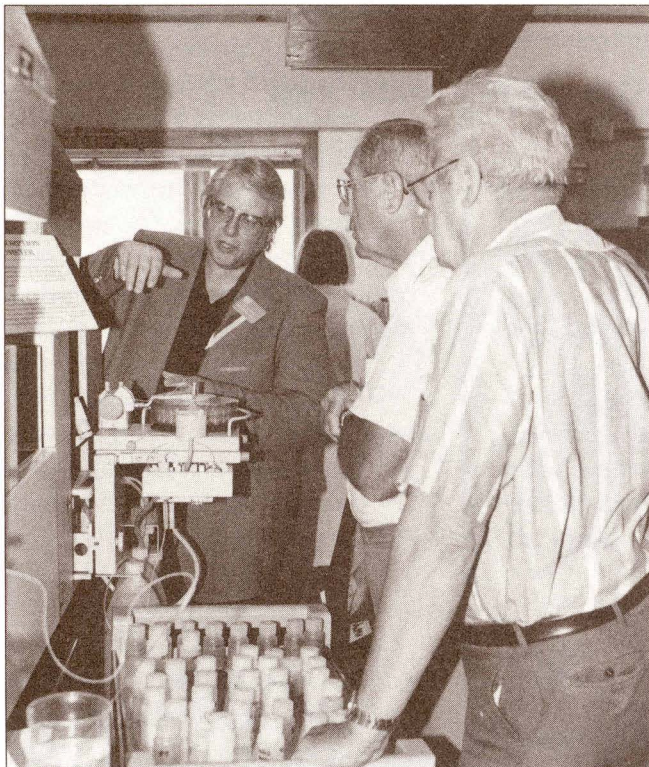
# WRI Council Surpasses Campaign Goal



Members of the Water Resources Institute Council were invited to an Open House held at Grand Valley State University's Water Resources Institute. The event was planned to celebrate the successful conclusion of the Water Resources Campaign. "With your support, we raised \$5.3 million for the Water Resources Institute and the sciences at Grand Valley - that's 200,000 over our goal," said Richard M. DeVos, WRI Council Chairperson. Council members were encouraged to explore the Institute's analytical and computer laboratories as well as the new Environmental Resources for Business room.

The Water Resources Institute would like to thank all of the Council members for the commitment they have shown for the quality of life in west Michigan.

*Thank you WRI Council!*



# COMBINED SEWER OVERFLOWS

## in the GRAND RIVER WATERSHED

A Publication of the Grand River Watershed Program

Water Resources Institute

### About Combined Sewer Overflows

**CSOs are a problem in over 1200 cities throughout the United States.**

Commonly found in older communities, combined sewer systems were designed to carry both sanitary sewage and storm water. During wet weather events, rainfall and snowmelt, the combined system is unable to handle the increased flow and, as a result, untreated sewage is discharged to a receiving body of water. The discharge is referred to as a combined sewer overflow (CSO).

CSOs contain high levels of nutrients, fecal coliform bacteria, metals, oil, grease, road salts, and suspended material. As a result, combined sewer overflows degrade water quality and represent a risk to public health.

In 1989, the U.S. Environmental Protection Agency (EPA) developed the *National Combined Sewer Overflow Control Strategy* which created a uniform approach to developing and issuing NPDES (National Pollutant Discharge Elimination System) permits for CSOs.

Following the EPA's national strategy, the Michigan Department of Natural Resources developed the *Michigan State-wide Combined Sewer Overflow Permitting*



**In the Grand River watershed, Jackson, East Lansing, Lansing, Grand Ledge, and Grand Rapids currently have CSO problems.**

*Strategy* (1990). The strategy includes specific requirements for communities applying for NPDES permits.

In 1993, Michigan passed legislation aimed at eliminating CSOs throughout the state. This legislation will effectively increase the state's financial assistance to local communities for improvements to their waste-water treatment and sewage disposal systems. It also enables the State of Michigan to match the federal funds available for CSO improvements.

## Jackson

Jackson's CSOs are a result of storm catchbasins connected to the sanitary sewer. The city is separating all catchbasins from the sewer and inspecting and identifying unauthorized connections, excessive infiltration, and inflow sources. The city will eliminate CSOs by 1997.

From June, 1992 through May, 1993, the City of Jackson discharged 2 million gallons (MG) of combined sewage to the Grand River. This is a decrease of 0.53 MG from the previous 12 months.

## East Lansing

East Lansing is separating combined sewers and will begin construction of a retention treatment basin in 1994. The city will eliminate CSOs in approximately 2017.

From June, 1992 through May, 1993, the City of East Lansing discharged 300 MG of combined sewage to the Red Cedar River. This is a decrease of 8.1 MG from the previous 12 months.

## Grand Ledge

Grand Ledge is separating all combined sewers and may construct a retention basin based on the success of the sewer separation project. The city will eliminate CSOs in 1994.

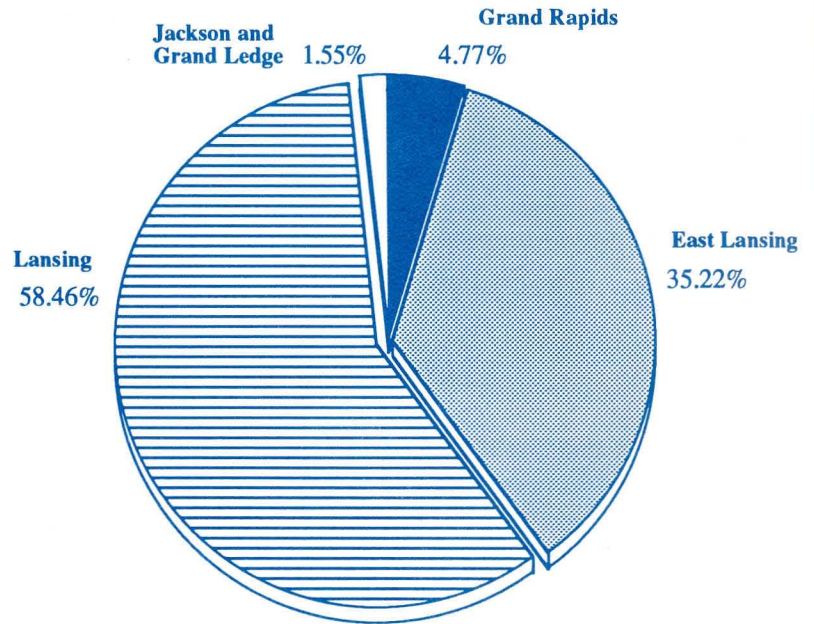
From June, 1992 through May, 1993, the City of Grand Ledge discharged 13.8 MG of combined sewage to the Grand River. This is an increase of 12.2 MG from the previous 12 months.

## Lansing

Lansing is separating combined sewers and alleviating sewer pipe size. The city will eliminate CSOs by 2020.

From June, 1992 through May, 1993, the City of Lansing discharged 597.6 MG of combined sewage to the Red Cedar and Grand Rivers. This is an increase of 105.1 MG from the previous 12 months.

Total Volume:  
1.022 Billion Gallons



Percent of the total volume of combined sewage each City discharged to the Grand River watershed from June, 1992 through May, 1993.

## Grand Rapids

Grand Rapids is separating some of its combined sewers and completed its 30.5 MG retention basin in March of 1992. The basin has significantly reduced Grand Rapids' CSO problem. The city will eliminate CSOs in 2006.

From June, 1992 through May, 1993, the City of Grand Rapids discharged 48.8 MG of combined sewage to the Grand River. This is a decrease of 292.2 MG from the previous 12 months.

Overall, 1.022 billion gallons of combined sewage was discharged in the Grand River watershed from June, 1992 through May, 1993. This is a decrease of 124 MG from the previous 12 months. The major reason for this reduction is the City of Grand Rapids' 30.5 MG retention basin.



## GRAND RIVER WATERSHED PROGRAM

Water Resources Institute  
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# Study Examines Heavy Metals in Sediments

Sediments of lakes and rivers may accumulate heavy metals and consequently act as a sink where these contaminants may be stored over time. Chemical processes or resuspension of sediments may result in the release of these contaminants that could continue for years. Therefore, it is necessary to identify the extent of metal contamination in order to assess the need for remediation and the potential risks to human health and the ecosystem.

As part of the Grand River Watershed Program, James Salisbury, visiting WRI researcher from Kingston University, England, examined the extent of heavy metal contamination in sediment cores from along the Grand River. The results are available in *The Assessment of Heavy Metal Contamination in the Sediments of Selected Sites in the Grand River Watershed, Michigan*.

Sediment cores were taken from

three sites along the Grand River (Smithville Dam, Webber Dam and Pottawattomie Bayou), one site along the Thornapple River (Ada Dam), and one site in Lake Michigan at the mouth of the Grand.

Salisbury found that based on U.S. Environmental Protection Agency (EPA) criteria, the Smithville Dam site is “heavily polluted” with zinc, chromium, nickel, and arsenic; the Webber Dam site is “heavily polluted” with copper; and the Pottawattomie Bayou site is “heavily polluted” with chromium, nickel, and copper. Both the Lake Michigan and Ada Dam sites are considered non-polluted according to U.S. EPA criteria.

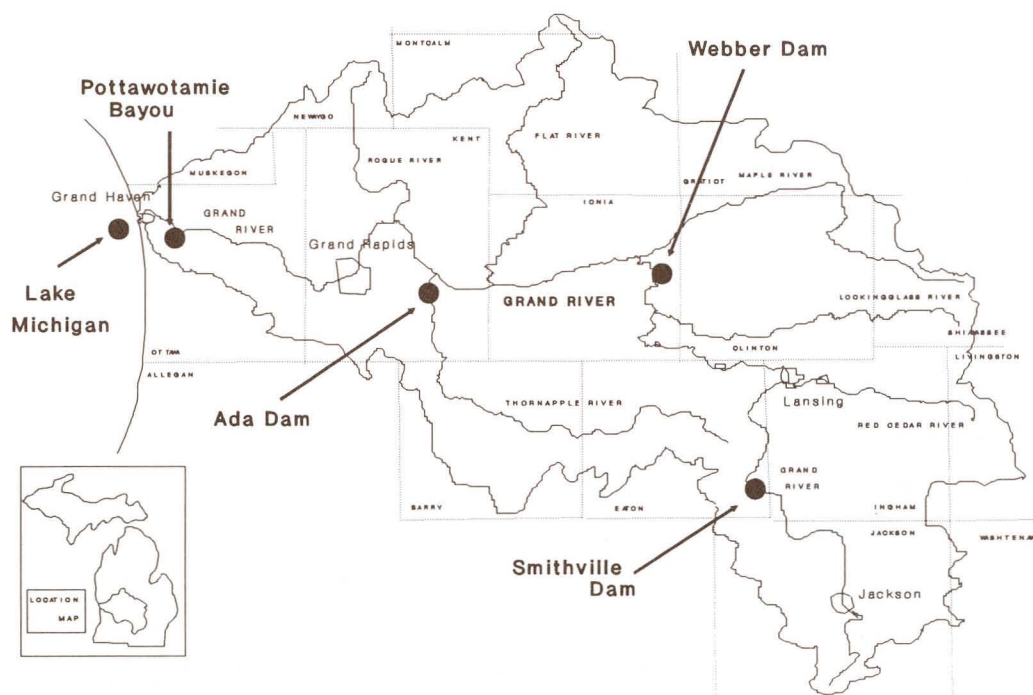
Because metal levels in the three Grand River cores are much greater than those of the background reference core (Ada Dam), Salisbury suggested that the heavy metal contamination

could be attributed to human activities. A few possible sources of metals include the steelworking (iron, aluminum, manganese, and zinc), electroplating (chromium and nickel), and leather tanning (chromium) industries.

In addition to Salisbury’s work, Dr. Patrick Thorpe, WRI research associate and GVSU assistant professor of biology, has been examining current and historic trends of heavy metal contamination in the lower Grand River watershed. Results from Thorpe’s studies will be available later this year.

If you would like a copy of *The Assessment of Heavy Metal Contamination in the Sediments of Selected Sites in the Grand River Watershed, Michigan* WRI MR-93-5, please call the WRI office at (616) 895-3749.

## Sediment Sampling Sites in the Grand River Watershed



# Stormwater Management Plan Developed

The Water Resources Institute (WRI) has been assisting with the development of a Stormwater Management Plan for Brooks Creek located in Newaygo and Muskegon Counties. The project is funded by a grant available through Section 319 of the Federal Clean Water Act. The grant is administered by the Michigan Department of Natural Resources and locally managed by the Newaygo County Soil Conservation District (SCD).

WRI was asked by the Newaygo County SCD to use its GIS and several hydrologic models to prepare a *Resource Book* for Sheridan Township and the City of Fremont. This *Resource Book* characterizes the Brooks Creek watershed and describes the steps needed to protect important areas.

To develop the *Resource Book*, the Institute had to determine land use and land use change in the watershed.

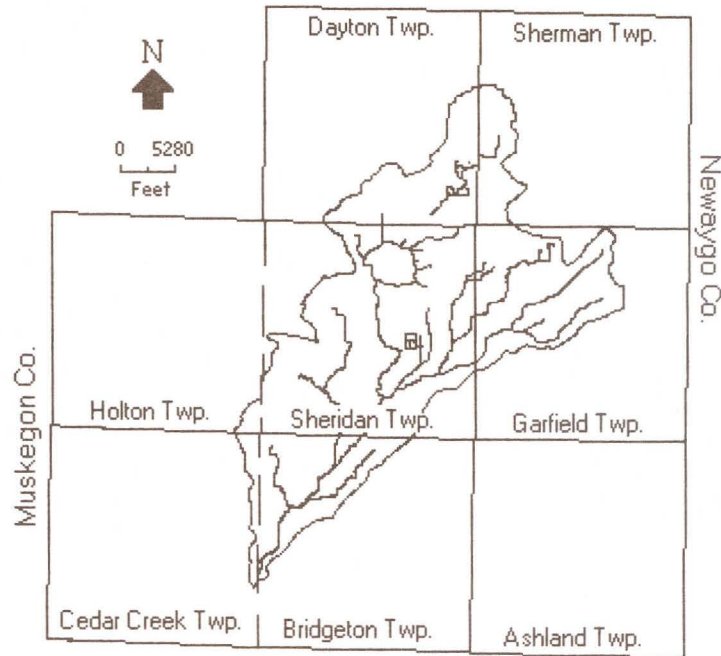
The Institute found that over 60% of the land area in the Brooks Creek watershed is used for agricultural activities. Between 1978 and 1992, crop/pasture land use decreased by 1071 acres while orchard, single-family/duplex, herbaceous range, and Christmas tree land use all increased. Wetland change and urban expansion was minor.

Hydrologic modeling of the watershed indicates that surface runoff in the watershed has not changed significantly since 1978, this is attributed to the lack of urban expansion.

For more information on the Brooks Creek Watershed Project, contact the Newaygo County Soil Conservation District at (616) 924-2060.

## BROOKS CREEK WATERSHED

39,460 Acres  
61.6 Sq. Miles



## West Michigan Science Festival Planned

A community celebration of science, mathematics, and technology is being planned for April 17-23, 1994. Sponsors include businesses, colleges, professional, and community organizations. Events focusing on science, mathematics, and technology will take place at various sites throughout the area.

The projected audience includes students, teachers, parents, and community at large. It is expected that approximately 100 companies will be participating in this first festival, sponsoring events for individuals and groups at a variety of locations and at various times throughout the week.

Companies wishing to be involved or individuals or organizations needing further information should contact Karen Meyers or Mary Ann Sheline at (616) 895-2267.



***Mona Shores Students for Environmental Awareness (SEA) received the 1993 Grand River Watershed Program Pollution Prevention Award for their recycling efforts in Muskegon County.***

## WATER RESOURCES **Review**

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