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Review



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In this Issue...

York Creek project completes its watershed assessment and awaits implementation...Page 2

Pesticide usage and environmental risk potentials in the Grand River Watershed are described in a new WRI report...Page 3

A pilot study involving PCB contamination in bottom sediments from Muskegon, White and Bear Lakes, and Lake Macatawa...Page 4

WRI appoints a new lab director...Page 5

The new Muskegon research vessel campaign receives significant contributions ...Page 6

The D. J. ANGUS completes the 1994 season with a record number of events...Page 7

Plus...

...Future **Pollution Prevention** workshop information.

...A list of **New WRI Publications**.

...The winner of the 1995 **D. J. Angus-Sciencetech Educational Foundation Internship** has been announced.

Brunswick Celebrates 150th Anniversary With Gift To GVSU

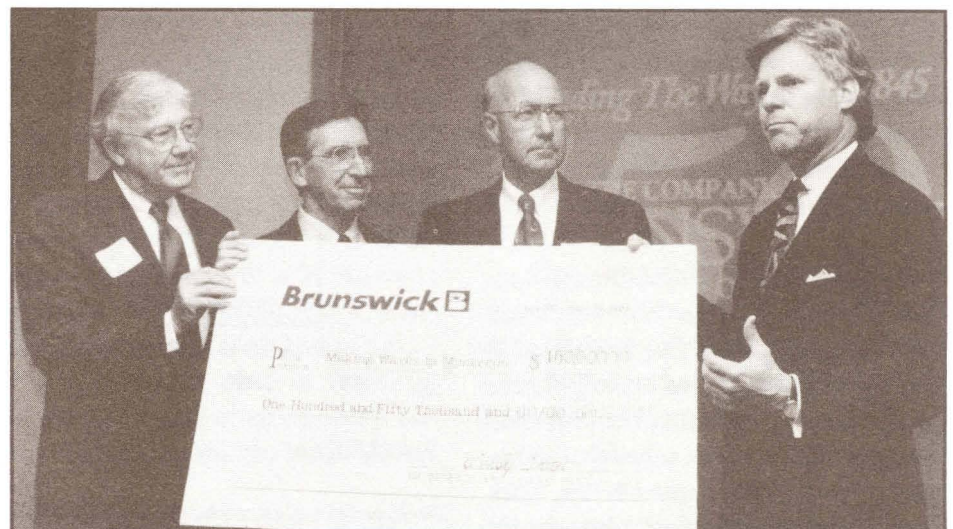
The campaign to fund the *W. G. JACKSON*, a new Grand Valley State University research vessel to be docked in Muskegon, is closer to success thanks, in part, to a \$150,000 grant from the Brunswick Foundation. The grant, given in recognition of the company's 150th anniversary year in 1995, will be used to fund the acquisition and endowment of a new research and education vessel for Grand Valley State University's Water Resources Institute (WRI).

The announcement of the grant was made by Brunswick Corporation

president, Frederick J. Florjancic, Jr., and Brunswick Foundation president, Wendy Smith. The Muskegon based firm has a long history with the west Michigan area. "We have been in Muskegon since 1906," said Florjancic, "and while we are proud of our heritage, we are just as concerned with providing a healthy future for this region by contributing to programs that will create a lasting and valuable education resource."

Over the past few years, the success of the science and education programs have exceeded the capacity of

Continued on page 6



Brunswick Corporation President Frederick J. Florjancic, Jr. (right) presents a check for \$150,000 for the acquisition and endowment of a new GVSU Research Vessel, the *W. J. JACKSON*. Accepting the gift are (left) GVSU President Arend Lubbers and Campaign Co-Chairmen Dr. William Schroeder, Jr. and Roger Andersen.



York Creek Watershed Study Completed, Awaits Implementation

The first phase of the York Creek Watershed Project, a cooperative effort between the Water Resources Institute (WRI) and Alpine Charter Township, has been completed. The study determined that the principal factors impacting water and habitat quality of the creek are related to the virtual explosion of development in the watershed.

Land use changes have increased the amount of impervious surface area in the watershed, resulting in increased volumes of stormwater runoff. That runoff, and the nonpoint source (NPS) pollutants carried by the runoff, have decimated fish populations in York Creek. Trout populations, once described by the Michigan Department of Natural Resources (MDNR) as good, as well as other high water quality indicator species, are no longer present.

The result of this investigative effort, the *York Creek Watershed Project Watershed Management Plan*, is a comprehensive examination of the watershed, including land use changes, water quality, biological surveys, hydrologic measuring and modeling, and erosion studies. A major focus of the report is a series of recommended structural, managerial, and educational actions to improve stream conditions and water quality.

The project is funded through Section 319 of the Clean Water Act and administered by MDNR. Local match funding is incorporated into all phases of the project, including the proposed implementation phase scheduled to begin in April, 1996. In the interim, York Creek Watershed Project Manager Ed Frye, a WRI research assistant, will be working with individual watershed property owners to develop Resource Man-

agement Plans for their properties. The site specific plans are to be incorporated into the implementation period of the project, allowing for an extended partnership between WRI, watershed residents, and federal, state, and local officials.

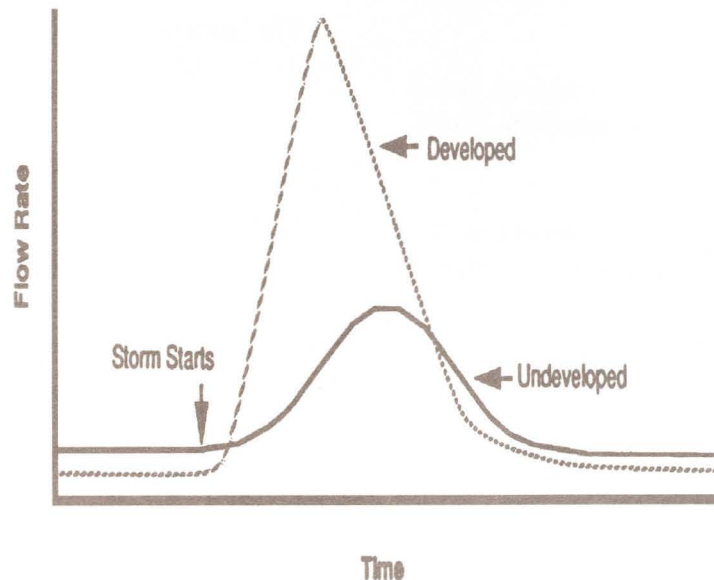
Recommended actions for York Creek restoration incorporate a combination of activities, including the following:

- * Stormwater runoff control - to reduce volumes and velocities of water reaching the stream, both from existing and proposed developments
- * Streambank stabilization - to protect streambanks from erosive

stream velocities, decrease sediment inputs from eroding banks, and restore habitat for instream and riparian species

- * Grade stabilization - to reduce the velocities in the Alpine-Walker Drain, a tributary to York Creek
- * Public education - to promote the concept of watersheds and the sensitivity of them to pressures by encroaching development

For more information about the York Creek Project, contact project manager Ed Frye at (616) 895-3722.



Source: R.R. Horner.

Urban, or developed, watersheds are heavily influenced by excessive stormwater runoff resulting from large areas of impervious surfaces. This surge in runoff typically results in excessive bank erosion which plays a key role in the loss of fish and macroinvertebrate populations and a reduction in water quality.

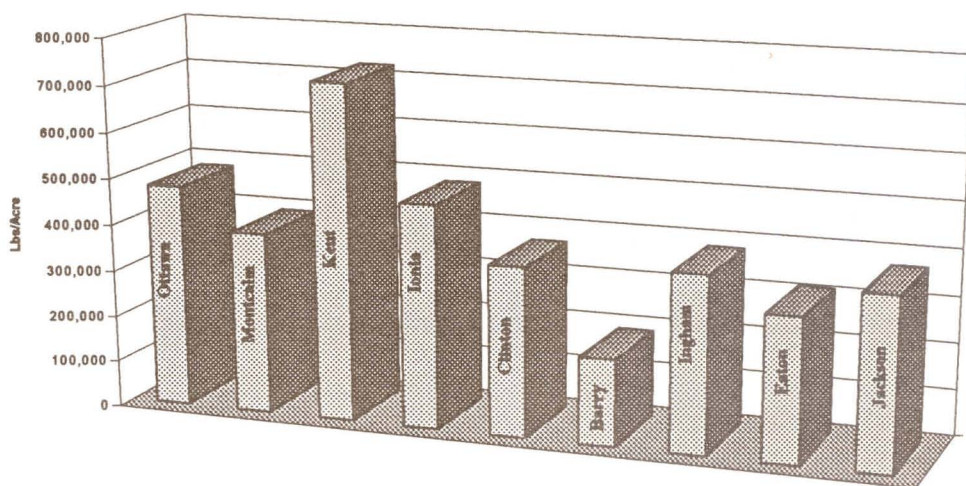
WRI Report Details Pesticide Usage In The Grand River Watershed

Did you know that 3.6 million pounds of pesticide active ingredients are applied on agricultural crops, golf courses, and lawns in the Grand River Watershed? Did you know that 20 percent of those 3.6 million pounds of active ingredients are used in Kent County alone? Would it surprise you to know that although the Grand River Watershed covers just 13 percent of the total Lake Michigan drainage basin, it receives 22 percent of the total amount of pesticides applied annually within the basin?

These statistics and more are included in the *Atlas Of Pesticide Usage Trends And Environmental Risk Potentials In The Grand River Watershed*, written by Matthew Hester, student research assistant at the WRI. The atlas presents data on the quantity and quality of existing farmlands in the Grand River Watershed, estimations of the various agricultural crops grown on these lands, and the names and application rates of common pesticides used for each individual crop grown. Included in the data are estimations of the total amount of golf course and lawn turfgrass cultivated and treated with pesticides.

The data points out trends in pesticide usage in the watershed. For example:

- Over half of the pesticide active ingredients used in the watershed are applied on crops that are grown for livestock consumption.
- Nearly one fifth of the pesticides are used for aesthetic purposes on



Total Pesticide Active Ingredients Applied Annually On Agricultural Crops And Turfgrass In The Grand River Watershed

golf courses, lawns, and nursery crops.

- Almost ten times more pesticide active ingredients are used per acre on apple orchards than on corn fields.

The atlas goes further than just describing how many pounds of chemicals are applied on a certain crop or turfgrass type. It provides background information on pesticides, their chemical characteristics, and their potential threat to the environment. This information, combined with land use characteristics, is formulated into a *Pesticide Environmental Risk Potential Factor* which can be used in assessing current and future environmental impacts from pesticide use in the watershed.

Finally, the atlas gives an example of how geographical and geological factors influence the environmental risk factor in a given watershed. Soil maps describing pesticide leaching and runoff potential were created by WRI's Geographic Information System (GIS) specialists for the York Creek Watershed in Kent County, Michigan. Identification of areas with a high risk potential for ground or surface water contamination were then made by using information presented in these map products.

For more information on pesticide usage in the Grand River Watershed, or how to obtain a copy of the new pesticide atlas, contact the WRI at (616) 895-3749.

WRI Addresses PCB Contamination Of Lake Michigan Watersheds

Researchers at Grand Valley State University's Water Resources Institute (WRI) have begun a pilot study designed to investigate the levels of specific PCB contaminants in four Lake Michigan watersheds. Sediment samples have been taken from Muskegon, White, and Bear Lakes, and Lake Macatawa in an effort to determine any potential hazard these toxic compounds might represent.

Polychlorinated biphenyl's, or PCB's, are part of a broad classification of chemicals known as *organochlorines*. One of the noteworthy characteristics of organochlorines is their persistence or ability to remain in the environment for many years. This persistence allows many of these compounds to accumulate in animal tissue and bottom sediments.

PCB's were once used in products such as liquid insulators for electrical capacitors and transformers, inks, adhesives, and plastics. In the late 1960's, PCB's were identified as possible cancer causing agents as well as being responsible for genetic defects in many animals including birds, fish, and humans. The total amount of PCB's in the environment has reportedly been reduced nearly 10 fold in the past two decades. However, some forms of these chemicals remain available to the food chain.

PCB's were typically sold as individual mixtures called *aroclors* which were based on the number of chlorine atoms attached to the molecule. Past studies have looked at the amount of the aroclor mixtures that exist in the environment. The results of these

studies were expressed in terms of total PCB's. What is different with WRI's study is that researchers are looking at individual PCB components, or *congeners*, and identifying the most persistent congeners that still exist.

Dr. Min Qi, WRI Research Associate and principal investigator for the



According to Dr. Qi, "Even though the total number of PCB's found in animal tissues and sediments is much lower than 20 years ago, the persistent congeners that remain may represent the greatest long term threat to the environment."

project contends that current measurements only reflect the groups of PCB's present in the aroclor mixtures. According to Dr. Qi, "Even though the total number of PCB's found in animal tissues and sediments is much lower than 20 years ago, the persistent congeners that remain may represent the greatest long term threat to the environment". She adds, "A better esti-

mate of future impacts from PCB's may come from identifying the individual congeners that are known for their high degree of persistence."

Dr. Qi, whose research background includes PCB accumulation in human tissues, has been examining lake sediments from four separate watersheds in western Michigan. A special sampling technique freezes a vertical profile of undisturbed sediments while still on the bottom of the lake (see page 5). The frozen samples will allow Dr. Qi to determine both the level of PCB contamination as well as the sediment depth where the greatest level of contamination occurs.

Dr. Qi is assisted in the project by Dr. Blair Miller, associate professor of chemistry at GVSU.

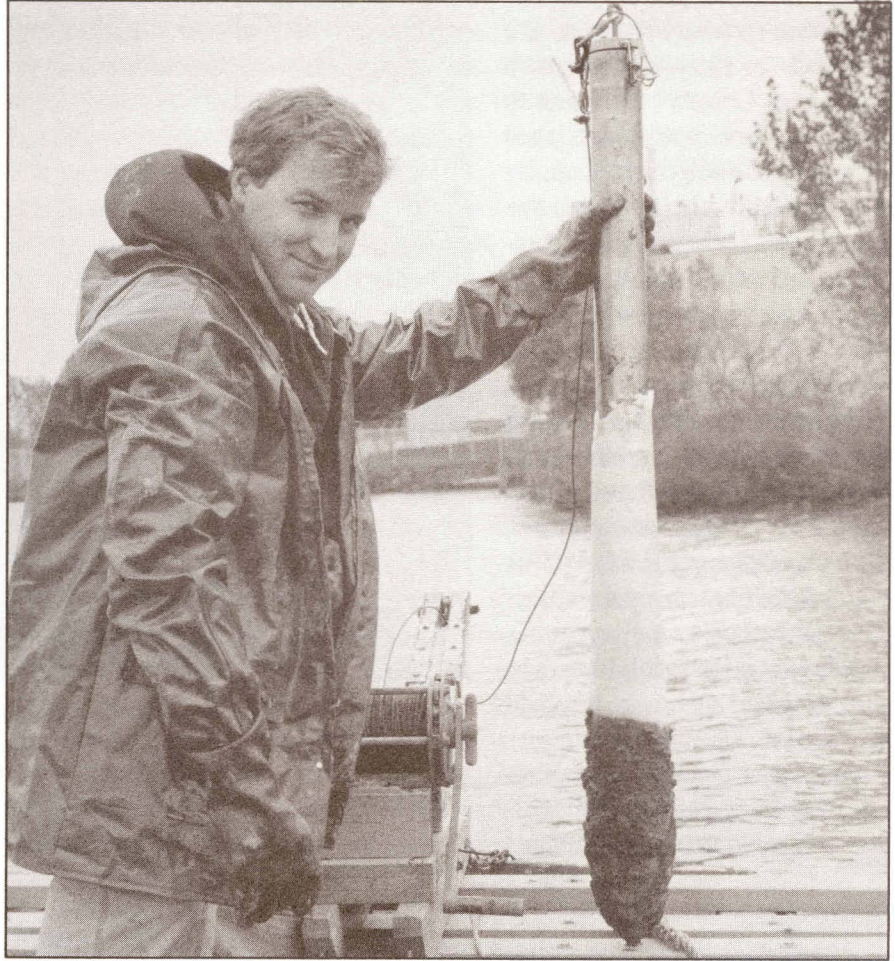
Both Drs. Qi and Miller are looking to isolate and quantify approximately 15 different PCB congeners that are considered to be most threatening to the environment. This study will help identify individual PCB congeners that are highly persistent in aquatic environments. It will also provide baseline data on the levels of PCB congeners in the four lakes sampled, which may be important for future recreational and fisheries management programs.

For more information on WRI's PCB pilot study, contact Dr. Min Qi at (616) 895-3749 or Dr. Blair Miller at (616) 895-3866.

Freeze Coring Device Used In PCB Study

Dr. Blair Miller holds WRI's freeze coring device shortly after removing a sediment sample from Lake Macatawa. The device is essentially a heavy brass tube that is filled with dry ice and alcohol lowering the inside temperature to minus 50° centigrade or lower. Once the dry ice/alcohol mixture has been added, the device is dropped from a boat, embedding itself in the bottom sediments.

The corer quickly cools, enabling water and sediment to freeze to the sides of the device. After allowing a short period of time for the sediments to freeze, the device is raised and heated with warm water, separating the sediment sample from the corer. This method allows the researcher to record sample content as well as the sediment depth where these contents are found.

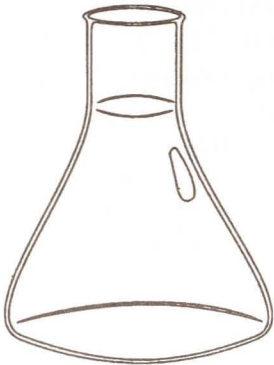


WRI Appoints New Lab Director

The Water Resources Institute is pleased to announce the appointment of Dr. Richard Rediske as director of WRI's analytical laboratory. Dr. Rediske has over 18 years experience in the development of analytical methods and management of environmental laboratories. He is a former vice president at Earth Technology Corp., formerly WW Engineering and Science, where he managed environmental consulting and laboratory operations.

Dr. Rediske holds M.S. and Ph.D. degrees from the University of Michigan in environmental chemistry. While at the University of Michigan, he was involved in a variety of research activities related to the Great Lakes and the environmental dynamics of toxic metals and organics.

Along with supervision of laboratory operations at WRI, Dr. Rediske will be developing research opportunities in the areas of water quality and the fate and transport of chemicals in the environment.



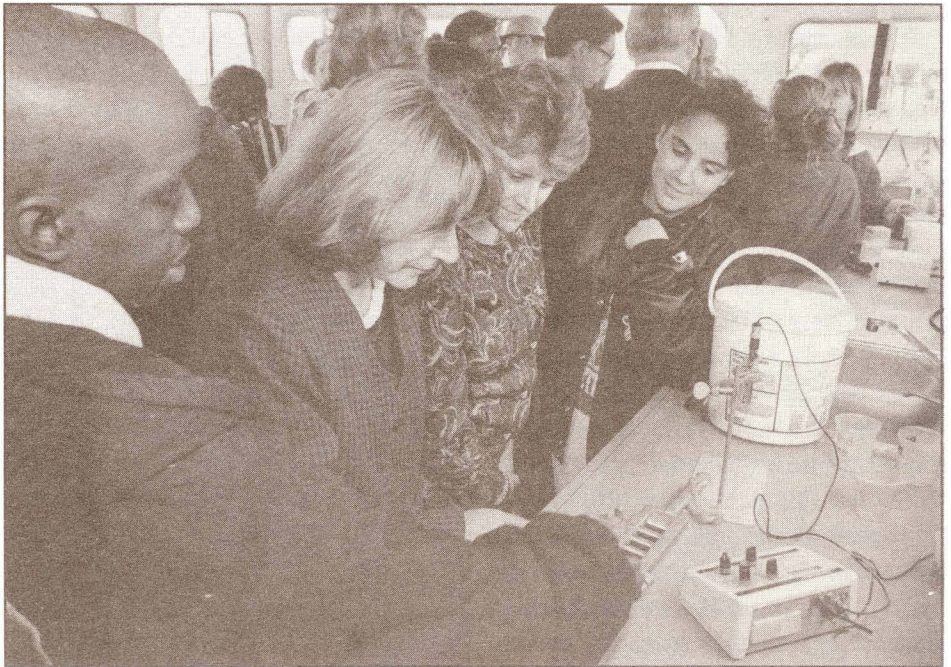
Brunswick Gift

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GVSU's current research vessel, the *D. J. ANGUS*. In 1994, together with the Muskegon County Community Foundation, the University established a committee of Muskegon community leaders and educators to organize the "Making Waves in Muskegon" campaign to raise the \$1.6 million ultimately needed to purchase, equip, and endow the new vessel.

The new boat will be built to accommodate new and specific equipment for research and education and will be capable of extended research trips on Lake Michigan, as well as allowing WRI to increase the number of students participating in the Aquatic Science Education Outreach Program. The new vessel's research lab will carry the Brunswick name in recognition of the company's significant contribution. The lab will provide on-site analyses of aquatic environments and will be complemented by extensive research equipment at the Institute.

"Throughout its history, Brunswick has had a rich tradition of supporting projects that contribute to the quality of life in western Michigan," said Arend Lubbers, President of GVSU. "We hope that Brunswick's leadership will act as a catalyst for other local support that is critical to the success of our program."



After their cruise aboard the D. J. ANGUS, GVSU's water research vessel, students from Horizons School in Wyoming show members of the Brunswick Foundation Committee what they've learned. The committee members visited the D. J. ANGUS this past fall.

New Research Vessel Receives Significant Contributions

Significant support for the *Making Waves in Muskegon* campaign has come from corporations, foundations, and individuals in and outside Muskegon. Major donors to date include:

*Brunswick Foundation, Inc.
Bill and Kay Jackson
Paul C. Johnson Foundation
Carol J. Munroe
Muskegon County
Muskegon County
Community Foundation*

*Quality Stores, Inc.
SPX Foundation
Thomas and Geraldine Seyferth
Advised Fund of the Muskegon
County Community Founda-
tion
State of Michigan*

The support of all donors to this project is gratefully appreciated. Plans are underway to complete the fund-raising drive, and early planning for the vessel itself is in development.

D. J. ANGUS Completes Another Record Season

The 1994 season was another busy one for the Water Resources Institute's (WRI) Aquatic Science Education Outreach Program aboard GVSU's research vessel *D. J. ANGUS*. A record of 169 events were scheduled during 1994. The increased level of activity was achieved primarily through the scheduling of more evening, Saturday, and September activities.

A total of 3,589 participants were served in the 1994 Aquatic Science Education Outreach Program. This brings the total number of participants served by the *D. J. ANGUS* since her 1986 launch to 26,232. Clearly, our Outreach Program has grown steadily in scope and popularity. It has become a significant resource for environmental education in the Great Lakes.

One highlight of the season was a June Open House hosted by SPX at their Corporate offices on Muskegon lake. That event kicked off our *Mak-*

ing Waves In Muskegon Campaign. This campaign will expand WRI's Aquatic Science Education Outreach Program by adding a second vessel, the *W. G. JACKSON*, which will be home ported in Muskegon.

Another bright spot of the 1994 season was a new course for K-12 teachers entitled *Our Waters and Their Uses*. This course was developed to provide a comprehensive introduction to Michigan's water resources, including their uses by industry, agriculture, and the public. It provided socioeconomic as well as science information and demonstrated how teachers might utilize water resources as a theme in the classroom. The course will be offered again in August, 1995.

Scheduling for the 1995 season has begun, and trip confirmations will be sent out early in the new year.

For more information please contact Tonya Cnossen at (616) 895-3749.

Upcoming Event

A Hazardous Waste Management for Generators Workshop will take place at:

GVSU Eberhard Center
Wednesday, February 8, 1995
1:00 - 4:30 P.M..

This workshop focuses on new developments in hazardous waste regulations, a review of requirements for generators, and common problems found in compliance inspections. GVSU alumnus Dale DeKraker of the Michigan Department of Natural Resources (MDNR) will be conducting the workshop, with MDNR staff available throughout the afternoon to answer specific hazardous waste questions. Cosponsors for the workshop include the Air and Waste Management Association, the MDNR, and the Water Resources Institute. A \$25.00 registration fee is required.

Contact Janet Vail for more information at (616) 895-3048.

New Publications Available

The following WRI publications are now available.

- * *A Kent County 2020 Project Report, A Study Of Land Use Change, Kent County, Michigan.* #MR-94-9.
- * *A Study Of Water Quality And Aquatic Habitat. Cedar Creek Watershed, Kent County, Michigan.* #MR-94-12.
- * *A Survey Of Lead Concentrations In Drinking Water Supplies Of The Grand Valley State University Community.* #MR-94-11.
- * *Research Vessel D. J. ANGUS 1994 Use Report.* #CR-94-7.
- * *Water Quality Assessment Of The Meadows Golf Club, Grand Valley State University, Allendale, Michigan. 1994 Interim Report.* #MR-94-10.
- * *York Creek Watershed Project, Watershed Management Plan.* #MR-94-7.
- * *York Creek Watershed Project, Technical Supplement To York Creek Watershed Project, Watershed Management Plan.* #MR-94-8.

Please contact the WRI at (616) 895-3749 for information on how you might obtain a copy of these reports.

1995 D. J. Angus-Sciencetech Educational Foundation Internship Awarded

Ms. Sara Bierenga, a junior in Grand Valley State University's Honors Program, has been awarded the D. J. Angus-Sciencetech Educational Foundation Internship for 1995.

The purpose of the internship, which is sponsored by the D. J. Angus-Sciencetech Educational Foundation of Indianapolis, Indiana, is to give students the opportunity to apply information learned in the classroom to his/her chosen discipline. The internship is an award based in part on "...past academic performance..., and an appreciation for the American way of life and our free enterprise system."

Ms. Bierenga is a resident of Wyoming, Michigan and is majoring in chemistry with a minor in biology. She will be working with WRI Research Associate Dr. Min Qi on the identification of PCB's found in aquatic sediments and hopes to continue in analytical chemistry following her graduation.

The WRI would like to express their appreciation to the D. J. Angus-Sciencetech Educational Foundation for making such opportunities available to students and to the other gifted students who chose to apply.

WATER RESOURCES Review

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