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WATER RESOURCES Review

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...The **1995 Sciencetech** student internship award and a **Gaines Township Student Internship** are announced.

Air Technical Manual Reaches Completion

After an extensive development and editing process, the Grand Valley State University Water Resources Institute (GVSU-WRI) is pleased to announce the completion of the *Michigan Air Use Permit Technical Manual*. This manual, edited by WRI Research Associate Janet Vail, is the result of a cooperative effort between GVSU-WRI, the Michigan Department of Natural Resources (MDNR), and a Steering Committee. This loose-leaf format publication complements the GVSU-WRI *Michigan Guide to Air Use Permits to Install* booklet published last August.

The *Technical Manual* provides an in-depth review of issues surrounding air use permits and is over 350 pages in length. Topics found in these sections include:

- Federal and Michigan Air Quality Regulations
- Federal Air Quality Standards
- Emission Calculations
- Michigan Air Toxics Regulations
- Major Sources
- Design Considerations and Pollution Prevention Strategies
- Air Quality Dispersion Modeling

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The Air Project Steering Committee (from left to right): Chuck Hadden, Joe Trombka, Dennis Armbruster, Janet Vail (editor), Gary Walker, and Ron Ward celebrate completion of the air project.



GVSU Student Assistants An Important Link To WRI's Success

You will find them in every department at the Water Resources Institute (WRI). From pulling folders out of file drawers to picking bugs out of sediment samples, Grand Valley State University (GVSU) student assistants are an important link to the success of WRI. While these students perform valuable services at the institute, they also receive hands on training and experience that is related to their field of study.

The WRI is composed of several educational disciplines working together to achieve proactive solutions to water quality issues. To accomplish this goal, chemists and biologists integrate with data systems and land use specialists and experts in pollution prevention. Together they provide working solutions to environmental issues. These solutions typically begin with data collection and analysis which creates opportunities for GVSU students to earn valuable work experience and money. Their duties contribute toward their subject knowledge and provide experience of value in obtaining permanent employment. This working relationship is a win/win situation for both students and WRI.

The analytical lab at the WRI analyzes hundreds of water and sediment samples every year to help determine water quality. Much of the preparation and analysis has been accomplished by GVSU students like Julie Thompson and Greg Myers (pictured at right). Greg has also used his fisheries background to assist in stream assessment work in the Grand River Watershed and has plans to attend graduate school. Following

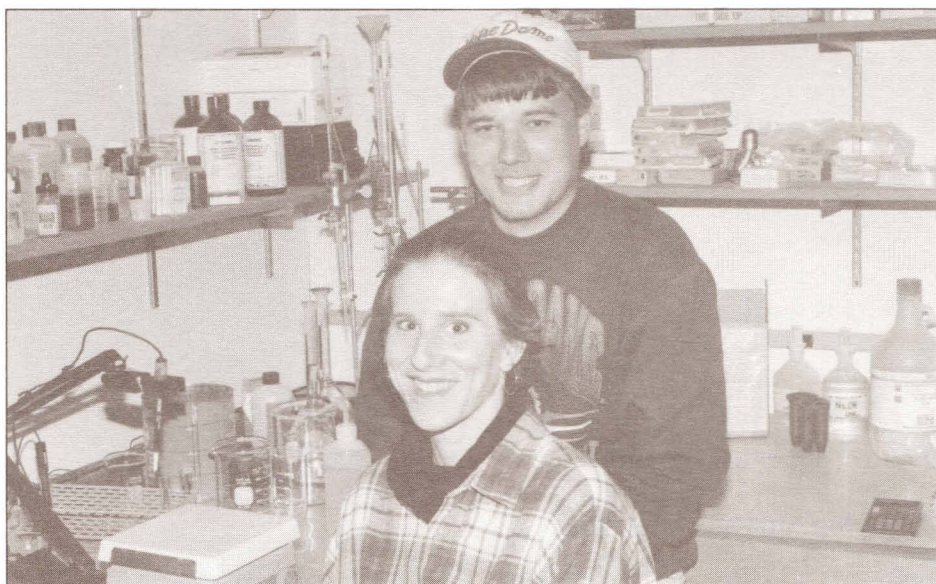


graduation, Julie moved from WRI's lab to Blodgett Memorial Medical Center where she is working as a Molecular Biology Research Assistant.

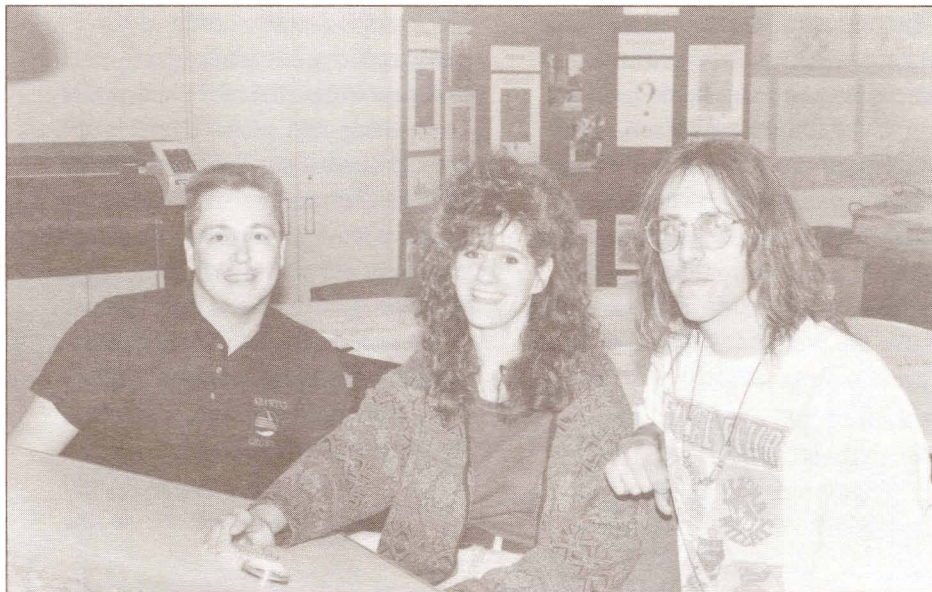
Sara Bierenga (above right) and Jennifer Carson (above left) are currently working with WRI Research Associates Drs. Rick Rediske and Min Qi on a project involving PCB analyses of bottom sediments

and fish tissues in several west Michigan watersheds. Both Sara and Jennifer are Chemistry majors and plan to attend graduate school in related fields of study.

Amy Zuidema and Christy Klinge are GVSU Natural Resource Management (NRM) graduates who began working at WRI's Data and Information Resource lab as students and stayed as full time research



Student Assistants (continued)



Data and Information Research Technician Christy Klinge and Student Assistants Steve Andrews (left), and Kevin Mieras (right).

Technicians. Their work has centered on land use interpretation and analysis. Also working in the data lab are student assistants Steve Andrews, a NRM major, and Geology majors Kevin Mieras and Tom Long. These three students are involved with field data collection as well as converting physical data into a digital format for Geographic Information Systems (GIS) and other applications.

In addition to students directly involved with field collections and data analysis, individuals like Sarah Kassal, Nicolle Nicoles, and Tonya Pavey provide an invaluable service as student clerical assistants in the WRI office. While their duties include data entry and general office secretarial responsibilities, their work impacts every aspect of the WRI. Their's is the friendly face greeting you at the front door of the suite, their voice very pleasantly assists callers to the WRI, and nearly every product of the WRI is handled

by one or more of these three individuals on its way to its final destination.

Former student assistants are using experience gained at the Institute to further their educational and vocational goals. Don Uzarski and Virginia Robertshaw are continuing their work at graduate school, while Brian Keeley is applying skills learned at GVSU and WRI at the University of Georgia as an assistant for a stream research team. Former student Cal Zuidema is now using his programming skills for the Meijer Corporation in Grand Rapids.

The WRI is grateful for the service it has received from GVSU students and pleased to have a part in shaping the future of these dedicated individuals.

D. J. Angus Scientech Educational Foundation Internship Awarded For 1995

Mr. Ryan Hale, a senior at GVSU, has been awarded a *D. J. Angus Scientech Educational Foundation Internship* for summer, 1995.

The internship, sponsored by the D. J. Angus-Scientech Educational Foundation of Indianapolis, Indiana, is intended to provide the recipient with an opportunity to make practical application of what he/she is receiving in the classroom. This experience "broadens the student's perspective on their chosen discipline". The internship is based in part on "...past academic performance..., and an appreciation for the American way of life and our free enterprise system."

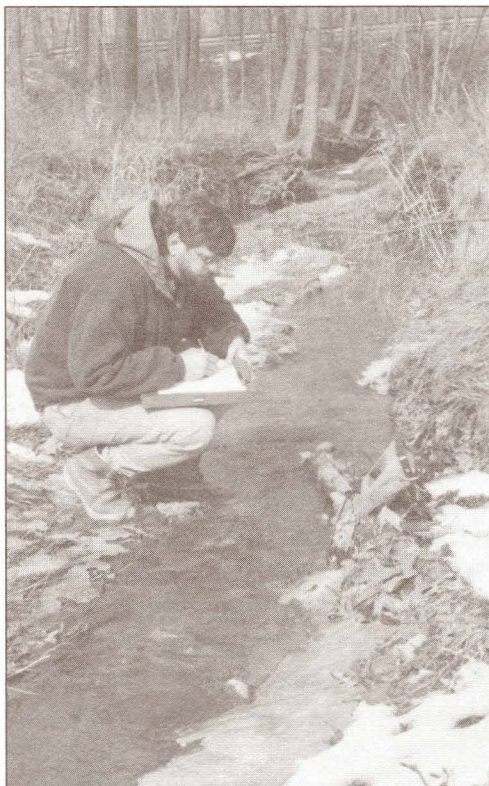
Ryan is a native of Grand Rapids, Michigan and a Chemistry major/Math minor at GVSU. He will be working with Dr. Rick Rediske in WRI's analytical laboratory, combining his math skills with data collection and analysis.

WRI wishes to congratulate Ryan and thank the Foundation for their generosity and continued support of student based activities at the Institute. Thanks also to the excellent field of candidates who chose to apply for this year's award.

The Meadows Golf Club Begins Second Year Of Operation With Steadily Improving Water Quality

While everyone's golf score may not have decreased during the 1994 golfing season, water pollution indicators monitored at *The Meadows Golf Club* demonstrated a steady decline since construction of the new golf facility began nearly four years ago.

The Meadows Golf Club, built to model sound environmental practices, finished its first year of operation in November of 1994. Water quality monitoring by the Water Resources Institute (WRI) indicates a steady decline in the amount of nitrates, phosphates, suspended and dissolved solids, and ammonia exported from the golf course wetlands and into the Grand River over the past three years.

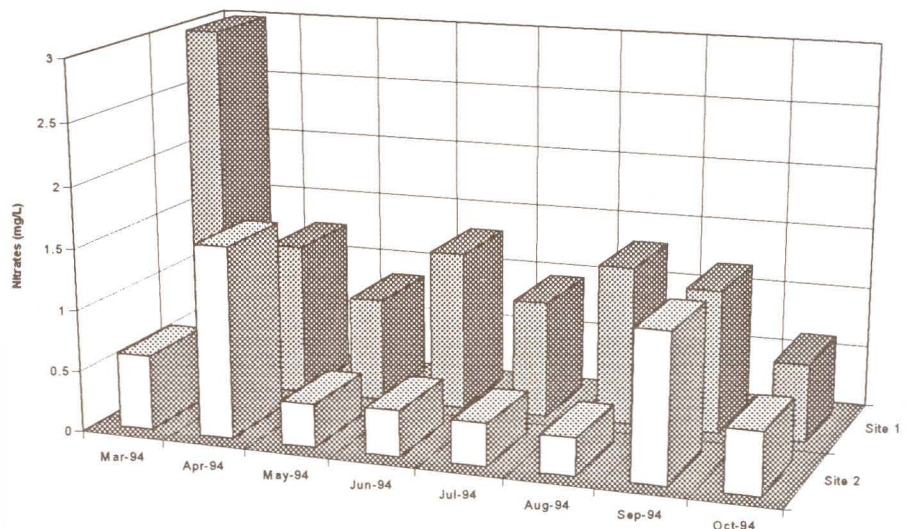


WRI Research Assistant Jeff Cooper monitors water quality at one of the sampling stations at *The Meadows Golf Club*. Jeff serves as project manager for the water quality study.

A large part of the success in preserving water quality at *The Meadows* has come from land stabilization. Vegetation buffer zones, established along sensitive wetland areas, have served in reducing nutrient runoff into the waterways.

The Meadows has the unique ability to use the wetlands located throughout the course as biological filters.

the identification of individual geographic areas where fertilizers and pesticides are more susceptible to leaching and where these materials are retained for greater utilization. "Fertilizers and pesticides that quickly leave the system threaten the environment and waste money", says WRI project manager Jeff Cooper. "The goal is to reduce chemical usage while maintaining a high



Nitrate levels entering (Site 1) and leaving (Site 2) *The Meadows Golf Club* located at Grand Valley State University during 1994. The reduction appears to occur within the wetlands located throughout the golf course.

These wetlands trap and remove nutrients that are often responsible for water quality degradation. As an example, nitrates entering the golf course through groundwater sources are reduced by one half before they exit into Ottawa Creek and subsequently the Grand River.

In 1995, WRI will be working to assist the golf course in developing a management program which will increase fertilizer and pesticide efficiency within localized areas of the course. This approach requires

quality golf course and good water quality at *The Meadows*."

For more information about the ongoing water quality study at *The Meadows Golf Club*, contact project manager Jeff Cooper at (616) 895-3271 or Meadows Golf Club superintendent Kathy Antaya at (616) 895-1005.

First Phase Of Grand River Watershed Program Nears Completion

Project Produces Recommendations For Watershed Protection

Five years after its conception, the first phase of the Water Resources Institute's Grand River Watershed Program (GRWP), funded by The Grand Rapids Foundation, is nearing completion. The program has focused on activities within the watershed that affect the quality of the Grand River and its tributaries. Studies on land use and water quality, in collaboration with governmental and environmental organizations, have been aimed at developing proactive solutions for current and future watershed needs.

The factors that determine water quality are often far removed from the river or stream itself. Activities within the watershed, such as agriculture, land development, and impacts resulting from increases in population, alter natural hydrologic cycles that have evolved over time to maintain high water quality. GRWP is looking at a number of these activities to develop proactive approaches to land and water management that will protect our limited water resources.

GRWP associated projects have detailed different components of water quality in the Grand River Watershed including:

- water quality assessments of the Grand River itself including heavy metal identification in the bayous of the lower river basin;
- activities including pesticide usage and potential environmental threats that may negatively impact the watershed;
- trends in land use change that affect water quality and habitat; and
- waste reduction and pollution prevention programs for business and industry.

The real value to residents in the Grand River Watershed is that each collaborative effort has

worked to provide proactive recommendations aimed at watershed protection or enhancement.

These recommendations have included land use changes that help insulate smaller tributaries in the watershed from the effects of agricultural runoff and urban development while increasing wetland protection.

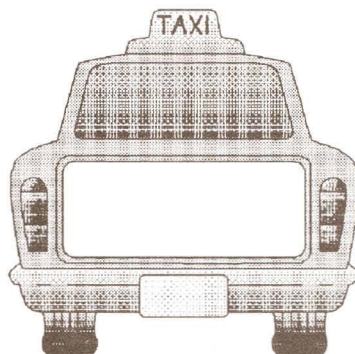
Findings during the first phase of GRWP have led to new research initiatives. For instance, toxicity studies of the Grand River bayous have resulted in PCB and pesticide investigations of fish and sediment from the lower Grand River and several nearby watersheds.

The first five years of GRWP integrated a wealth of historic data with contemporary investigations of watershed problems and issues. With many of the information gaps filled, new research efforts will continue to focus on proactive approaches to water quality needs in western Michigan watersheds. These approaches will include applied research and as educational outreach programs aimed at local schools, government, and community officials.

For information about the Grand River Watershed Program, contact the Water Resources Institute at (616) 895-3749.

We've Moved

The Water Resources Institute has moved to new facilities in the recently completed science complex at Grand Valley State University. The move provides WRI with enhanced analytical labs and a larger Data and Information Services Center. The WRI office will be located on the first floor of the new science center. A WRI open house with tours of the facilities will be announced in the fall of 1995.



Computers To Link GVSU Research Vessels With Area Classrooms

A computer link between great lakes research vessels and various educational facilities may soon provide teachers and their students an opportunity to study water quality in Lake Michigan and several large rivers in west Michigan from their classrooms. Plans are underway to install computers on board Grand Valley State University's research vessel *D. J. ANGUS*, and the coming *W. G. JACKSON*. The computers and their modem links will be able to share collected data from each vessel to classroom computers for student use.

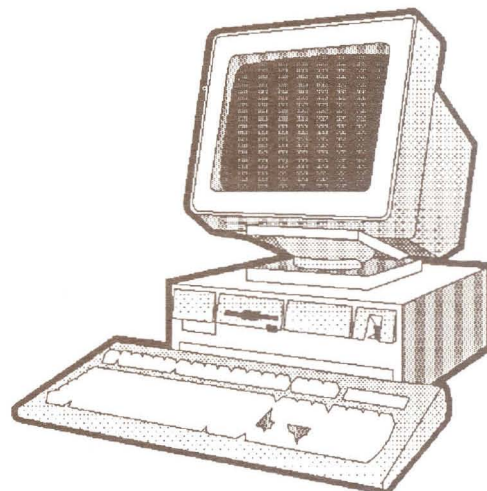
The Water Resources Institute has been providing students and community groups first hand experience in water quality testing aboard the *D. J. ANGUS* since 1986. This educational outreach program has touched thousands of students in K-12 school systems throughout west Michigan. However, the students are generally

limited to one trip per year. The data they generate is only a momentary snapshot in an environment that changes throughout the day and season. The use of data collected two to three times a day from May through September offers a comprehensive approach to understanding the Great Lakes and its associated watersheds.

In addition to water quality data, weather information will be collected off shore in Lake Michigan and from inland areas such as the Grand River and Muskegon Lake. This meteorological data will also be used to show how Lake Michigan influences inland weather patterns.

A Research Vessel Advisory Task Force, comprised of science educators and computer techni-

cians, has been formed to discuss methods and technology that will allow easy access to data collected by the research vessels. Progress reports on this initiative will be reported in future issues of the *REVIEW*.



D. J. ANGUS Instructor's Workshop

The Water Resources Institute (WRI) and the Grand Valley State University (GVSU) Regional Science and Math Center are co-sponsoring a *D. J. ANGUS* Instructors Workshop. Teachers will be introduced to the instruments and procedures on the GVSU research vessel *D. J. ANGUS* and will receive classroom activities and reference materials for elementary, middle, and high school. The experience will help teachers to prepare their classes for a cruise or to do their own instruction aboard the vessel.

Participants: K-12 teachers
Date/Time: June 26 & 27, from 9:00 a.m. - 3:00 p.m.
Location: Government Basin, Grand Haven
Instructors: Ron Ward/Others
Cost: \$25
Contact: Mary Ann Sheline, (616) 895-2267

W. G. JACKSON Campaign Update

The \$1.6 million dollar campaign to fund a Muskegon based research vessel is nearing its goal. To date, \$1.5 million has been raised to support the construction and endowment of GVSU's new research vessel, the *W. G. JACKSON*. Naval architects have begun the process of designing the new vessel, and a bid package should be in the hands of shipbuilders by June. Construction is expected to begin in September of 1995 with a projected launch date of May 1, 1996.

Community Leaders Join To Discuss WRI Information Service Center

An Information Service Center (ISC), making natural resource information and socio-economic data available to local governments and consultants, is under development at the Water Resources Institute (WRI). Methods of data compilation, analysis, and exchange are now being investigated by a joint partnership between the eight county Timberland Resource Conservation and Development Council (RC&D) and WRI. These discussions have led to the creation of the WRI-ISC.

The ISC actually evolved as a result of several grants beginning with support from the W. K. Kellogg Foundation in 1988. The data base, now managed by the WRI, started with the compilation and analysis of groundwater data. The Institute has since combined soils, topography,

land use, and other physiographic features with demographic and economic factors to create a comprehensive Geographic Information System (GIS). While this system has proven useful to local governments and area consultants, it is WRI's hope to make this information more readily available to all interested parties, including, and most importantly, area decision makers.

WRI and the Timberland RC&D are presently identifying other information stakeholders and forming partnerships with all interested persons and organizations. The partners are re-evaluating information needs, looking to identify the kind of data that is needed most. Stakeholders are expected to help in prioritizing these needs. WRI, the Timberland RC&D, and area partici-

pants will develop a plan to secure the data needed most. Once the data is obtained, a plan must then be created to efficiently and effectively share the information with area users. The process of data collection and dissemination will require some regional choices with regard to computer equipment, facilities, and training.

Coordinating information services on a regional scale is a major challenge. However, those involved with the project have thus far welcomed the opportunity. Momentum for the ISC continues to build as others in the community hear of the plans and are given a chance to participate. If you are interested in learning more about the ISC call John K. Koches (WRI) at (616) 895-3749 or Phil Dakin (Timberland RC&D) at (616) 887-5760.

Air Technical Manual

Continued from Page 1

- Complying with Permits and Reporting Requirements
- Continuous Emission Monitoring
- Stack Sampling
- Access to Public Records
- Tax Exemptions for Air Pollution Control
- Sources of Air Permit Information
- MDNR Guidance (Source Specific Guidelines, Operational Memos)

A section on renewable operating permits will be developed as the

implementation of the program in Michigan becomes solidified.

The Steering Committee for the manual consisted of Dennis Armbruster of the MDNR Air Quality Division, Gary Walker of Lacks Enterprises, Joe Trombka of Dow Chemical Company, Chuck Hadden of the Michigan Manufacturers Association, and Ron Ward of GVSU-WRI. These individuals contributed many hours providing review and comments on the text of the manual. The manual has also been peer reviewed by consultants,

MDNR, industries, and trade organizations.

The *Michigan Air Use Permit Technical Manual* is available for \$125.00 from the Grand Valley State University Water Resources Institute. The cost includes two years of updates. It is anticipated that the Michigan Clean Air Small Business Assistance Program will be continuing the updates after 1997. Contact Janet Vail at (616) 895-3048 for further details on the manual and the project.

Gaines Township Funds Student Internship

Kent County's Gaines Township has provided funding to Diane Guillard, a Natural Resource Management major at GVSU, for a summer internship at the Water Resources Institute (WRI). Diane will be working with Mr. Andy Bowman of Gaines Township and staff from WRI's Data and Information Resource lab to develop a Geographic Information System (GIS) for local planning use. The information system being developed will be used by the township to integrate ground-water protection and environmental constraints as elements of a new Gaines Township Master Plan.

Diane is one of several GVSU students making a practical application to their chosen field of study at the WRI. A former native of Sault Ste. Marie, and currently of Cascade, Michigan, Diane will be using state-of-the-art data capture and spatial display techniques to accomplish the township's goals. "I appreciate the opportunity to work with WRI staff and township officials. I think that practical experience like this makes all the difference after graduation."

WATER RESOURCES

Review

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