

2-1992

Water Resources Review February - 1992 Vol 5 No 1

Annis Water Resources Institute

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Outreach Activities Through WRAMP

The pollution prevention ("P2") concept in Michigan is spreading and there is increasing involvement of diverse sectors of industry as well as governmental entities in putting P2 into practice. The Waste Reduction and Management Program (WRAMP), which is the Water Resources Institute pollution prevention program, has been represented at a number of significant waste minimization conferences in the past few months.

At the 1991 Binational Great Lakes/St. Lawrence River Pollution Prevention Symposium held in conjunction with the International Joint Commission meeting in Traverse City, Janet Vail (WRAMP Coordinator) represented WRAMP with a display and discussed the program with Governor John Engler and his senior policy advisor, Dennis Schornack. A topic of discussion at the conference was the Great Lakes Pollution Prevention Initiative which includes the Lake Superior Initiative (See page 3)

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John Koches (left), WRI's Groundwater Education in Michigan Program Coordinator, and Steve Miller (right), Michigan DNR Environmental Engineer of Water Resources, discuss groundwater research activities at the Third Annual Groundwater Conference.

Groundwater Research Developments

Researchers at Grand Valley State University continue to gather information, conduct investigative studies, and develop important learning tools which together have successfully helped to increase public knowledge and understanding about groundwater resources.

WRI has achieved significant progress in several areas since our last report. First, the Institute continues to develop and enhance its groundwater data base for west Michigan. New, innovative, and unexpected uses for this data base increase almost daily. Secondly, WRI researchers have conducted several experiments to test new analytic techniques used in the analysis of herbicides in both surface and groundwater. These techniques have proven to be both cost effective and reliable while at the same time able to achieve unprece-

dent detection limits. Finally, the Institute offers additional improvements to its already successful interactive computer programs used to describe hydrologic principles and groundwater vulnerability concepts.

The Groundwater Data Base which was developed initially for Kent, Muskegon, and Ottawa Counties, containing approximately 14,000 well-log records and as many well-chemistry records, has been expanded with the addition of 5,000 well-log records from Newaygo County. The Institute plans to complete another 2,000 well-logs for Lake County before next spring.

The work undertaken by the Institute on behalf of Newaygo and Lake Counties is a direct result of a

(See page 4)

From The Director

It gives me great pleasure to announce that as part of the WRI Advancement Program, we have raised the challenge funds needed to receive a scientific equipment grant from The Kresge Foundation.

We met this challenge thanks to community supporters who contributed \$2 million to create an endowment, earnings from which will ensure that the needed research equipment we acquire will be properly maintained and replaced as it becomes obsolete. In response to this support, The Kresge Foundation will provide a grant enabling the purchase of a total of \$1 million of equipment for the Institute's laboratories as well as the GVSU departments of Biology, Chemistry, and Geology.

In meeting the challenge from The Kresge Foundation, we have moved to within \$1 million of the \$5.1 million target for our WRI Advancement Program. This overall success has only been possible with the support of the many friends of the University, as well as gifts from numerous faculty, staff, and alumni of GVSU. I am also pleased to acknowledge a major year-end gift from Mr. Robert B. Annis, a long-time friend of the WRI.

Throughout the campaign, the WRI Council and its chairman, Rich

DeVos, have been invaluable in offering guidance, leadership and support. Their involvement helped bring to Grand Rapids important environmental leaders and scientists, including singer John Denver, NASA's Dr. Charles "Rick" Chappell and National Wildlife Federation President Jay Hair.

While space prohibits my acknowledging all those who have so generously supported our efforts, I would be remiss if I did not single out President Don Lubbers and Dean Doug Kindschi for their tireless effort on behalf of science education and research at Grand Valley. Additionally, all of the staff and Faculty Research Associates of the WRI deserve commendation for their commitment to our campaign and to the University.

Thanks to each and everyone of you for your support in the development of the first research institute at GVSU. As we proceed to acquire equipment funded by the Kresge grant I hope that you will find time to visit our labs and see the fruits of your efforts.

With Great Appreciation,
Ronald W. Ward, Director
Water Resources Institute

Third Annual Groundwater Conference A Major Success

The Water Resources Institute hosted its Third Annual Groundwater Conference at The L.V. Eberhard Center on October 8, 1991. If attendance at such events is an appropriate measure of success, then this conference was very successful. Conference planners had hoped to interest 150 people. There was no problem in attracting this kind of participation and, in fact, we were forced to limit registration due to existing accommodations.

The full day conference offered presentations by researchers from GVSU, Michigan State University, Western Michigan University and many more groups active in groundwater protection. Topics included Groundwater Research, Agriculture's Role in Groundwater Pollution Prevention, Groundwater Education, and Groundwater Pollution Prevention for Local Government.

A special word of thanks is due the Michigan State Cooperative Extension Service in Kent, Muskegon, and Ottawa Counties which cosponsored this event. And of course our appreciation goes to all of those individuals who took the time to make presentations. They deserve much of the credit for the conference's success.

Reaching the Limit: Fertilizer Use and Groundwater and Surface Water Contamination

Do you use fertilizer on your crops, garden or lawn? Chances are you may be throwing your money away and contributing to surface water and groundwater contamination by using more fertilizer than necessary. Unused nutrients from excess fertilizer, in particular nitrogen and phosphorus, eventually find their way into surface water and groundwater, contaminating wells, drinking water and creating health hazards and nuisance plant growth.

How much is too much? The amount of soil nutrients in your garden may differ from the amount your neighbor has in his/her lawn or

corn field so not everyone will need the same amount of fertilizer. If your soil happens to be high in nitrogen a small amount of fertilizer may be all that is necessary to ensure healthy plant growth. Determining your soil characteristics is the first step to managing your land.

Where do I get my soil tested? Your County Cooperative Extension Service will provide testing for a small fee. Most lawn and garden nurseries also provide a similar service or you may purchase a do-it-yourself testing kit. These facilities will also assist you in determining which fertilizer is best for your lawn based on your soil type.



**GROUNDWATER
EDUCATION
IN
MICHIGAN**



Janet Vail (left), Waste Reduction and Management Program Coordinator, and Elizabeth Bols (right), Michigan DNR Environmental Quality Analyst, at the Industrial Waste Minimization Conference held at GVSU's L.V. Eberhard Center.

for zero discharge and pollution prevention projects in the automobile parts manufacturing industry to virtually eliminate toxic substances from wastewater effluents.

Janet Vail was also present at the "Confronting Solid Waste Issues" conference organized by Representatives Fred Upton and Howard Wolpe. The Pollution Prevention Act of 1990, which provides state grants to help companies learn how to reduce waste, was sponsored by Representative Wolpe. A key element of this conference was a presentation on the Regional Action Plan for Solid Waste Management in Southwest Michigan presented by GVSU graduate Jim Frey of Resource Recycling System. The plan promotes the concept of an eight county "waste shed" which is analogous to the watershed concept.

In November, Janet Vail attended the Michigan Office of Waste Reduction Services' third annual Business Roundtable for waste minimization. Jim Cleary, Deputy Director of Environmental Protection at the Michigan Department of Natural Resources, stressed the need for pollution prevention

education. Michael Perry of the Harwood Group presented preliminary information from in-depth interviews with 50 Michigan companies regarding waste minimization with the final report due next spring. Joe Lindsly of Dow Chemical discussed projects of the economics, education, implementation, and technology councils of the American Institute for Pollution Prevention.

Cleveland was the site of the Fall Conference of the National Roundtable of State Pollution Prevention Programs of which WRAMP is a member. This conference allows WRAMP to have access to waste minimization information from programs throughout the nation and to significantly augment WRAMP's information sources.

WRAMP provided computer access to the EPA Pollution Prevention Clearinghouse for researchers working on the waste assessor training manual developed by the Industrial Development Institute of Michigan State University. The manual was used in the two week training session of the Business Waste Assessor Program (EPA Grant No. 816645-10-0). As one of the instructors, Karen Lubbers of

Lubbers Resource Systems, Inc. provided training on the basics of a waste assessment. This series is being developed for dissemination throughout the nation.

At the local level, WRAMP sponsored the successful Industrial Waste Minimization Conference on October 23rd and is working with the Michigan Office of Waste Reduction Services in planning another conference for next spring. Janet Vail made presentations at the "Going Green" seminar sponsored by Seyferth and Associates, an environmental permitting seminar by the Chemical Coaters Association International, a clinic on waste reduction for the furniture industry by the Society of Manufacturing Engineers, a teacher workshop at GVSU, the Spartan Stores "Environmentally Safe Living" business workshop, and a meeting of the state level Advisory Committee on Health and Environment.

WRAMP worked with the Grand Rapids Area Chamber of Commerce and the Business and Industry Team for the Environment (B.I.T.E.) on the seminar "Waste Stream Solutions for Small Business - a forum to discuss corrugated paper and plastics". Some of the highlights of this seminar were insights from Doug Padnos of Louis Padnos Iron & Metal Company and Brian VanderArk of Able Sanitation on the corrugated and paper markets, and a tour of Spartan Stores' recycling programs led by Mary Dechow.

The WRAMP coordinator is the Pollution Prevention subcommittee chairman of the Chamber's Environmental Affairs Committee and an active member of B.I.T.E. The Environmental Affairs Committee is open to all Chamber members and it holds lunch meetings at the Chamber office on the 4th Monday of each month. B.I.T.E. meets every other month.

If you would like more information on any of these WRAMP activities, contact Janet Vail, WRAMP Coordinator, at (616) 895-3048.

cooperative effort developed between the Institute and the District 5 Health Department. Mark Hill, Environmental Specialist with the District 5 Health Department, has helped to coordinate this project for Newaygo and Lake Counties.

According to Hill:

"The Well-Log Data Base Project conceived and implemented by Grand Valley State University and the District 5 Health Department is a model for others interested in the collection and manipulation of well-log information. While the District hopes to develop its own mapping and data management capabilities over time, it is unlikely we will ever be able to devote the resources or develop the expertise currently offered by Grand Valley State."

Hill identifies which well-logs are to be included in the data base, and then provides the University with an accurate location of each well head. The University uses the infrastructure it has developed as a Regional Center for The W.K. Kellogg Foundation Groundwater Education in Michigan Program and enters this information into a data base using standards and protocols developed by the Michigan Department of Natural Resources (MDNR). Once in the data base the information contained is subject to a battery of tests designed to find and eliminate errors. This "cleaned" information is then sent on to the MDNR and archived as part of the State's Groundwater Data Base.

Hill expresses real enthusiasm for the process and states:

"Everybody wins! Taking the time to sort through well-log records and identify well locations before sending this information to the University helps to insure its accuracy and saves WRI considerable time and effort. Once the data base is created, the local Health

Department has access to information and technology that would otherwise be unavailable and take years to develop. The University and the State are able to add data to their systems in a cost effective and efficient manner. I couldn't be more pleased!"

Researchers at WRI have taken the groundwater information compiled for Newaygo County, and the other counties currently in its data base, and have integrated this data as part of a larger Geographic Information System (GIS). Using GIS techniques the Institute has been able to examine and compare aquifer vulnerability with current land use practices, topographic influences, and soils information.

According to John Koches, WRI Research Associate and Program Coordinator for the WRI GEM Program:

"Having this kind of information together with GIS capabilities will lead logically to a better understanding of human health risks. We are already able to accurately model the movement and exposure of contaminants through the groundwater system. We can examine in detail existing contamination problems, and are able to predict potential problems. We are just beginning to explore and appreciate the full potential of our Groundwater Data Base as it relates to GIS capabilities."

Dr. Edward Baum, WRI Research Associate and Professor of Chemistry, has recently completed his latest paper titled, "Contamination of Water Supplies in West Michigan with Herbicides." Baum describes his use of "enzyme immunoassay" techniques for the detection of atrazine and other triazine herbicides. He was able to achieve a method detection limit (MDL) for atrazine of 40 parts per

trillion in groundwater using this new technique.

Baum is interested in using these methods to trace contamination movement through groundwater into surface streams. He indicates that the ability to detect herbicides at such trace concentrations will prove particularly useful in the study of chronic exposure from such contaminants.

Dr. Melvin Northup, WRI Research Associate and Professor of Natural Resources, is the creator of the "Groundwater Education WIZard (GEWIZ), a computer interactive software system that can teach and motivate junior high school audiences to protect our groundwater resources. It features user friendly menus, an on-line dictionary, page-back for review of previous screens, color graphics, instant feedback, personalized tokens, auto-leveling to adjust for student performance, and color coded screens to allow the instructor to monitor student performance at a glance.

Many of these same features were included in a second program called a "Groundwater Education Encyclopedic WIZard" (GEEWIZ). Two additional programs, "GW Primer" and "Thirsty Wizard" were added which blended computer technology with age-old word games.

The GW Primer program is currently used on an MS-DOS system but is being converted to an Apple/Macintosh format. Northup is also distributing an educational card deck created using groundwater and water cycle concepts.

Meanwhile, as individual research efforts continue, other WRI staff members begin to concentrate more and more of their attention on the evaluation of The W.K. Kellogg Foundation GEM Program. Watch for subsequent issues of the REVIEW for an update on this evaluation process.

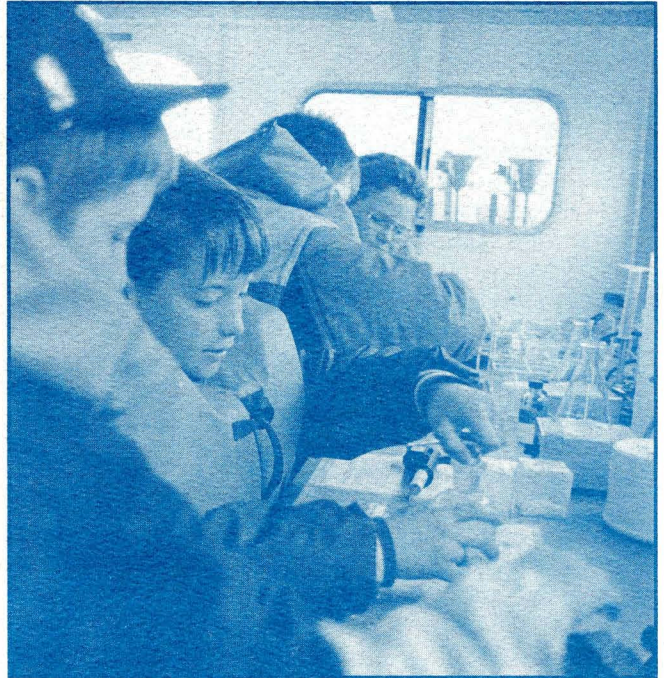
D. J. ANGUS Cruises Through Terrific Season

The 1991 season for the Water Resources Institute's Aquatic Sciences Education Outreach Program aboard Grand Valley State University's research vessel D. J. ANGUS has concluded. The season was a huge success with more cruises, participants, experiments and trips than ever before in the six year history of the program.

The number of persons carried for 1991 totaled 4,393, a new season record. In addition, a grand total of 15,556 persons have participated in the program since its inception in 1986. "The numbers have grown beyond my expectations," said Ron Ward, WRI Director.

Over the past six years, 21 Michigan counties, stretching from Delta County to Wayne County, and nearly 100 school organizations have participated in the program. "We are seeing a lot of repeat users," said Ron Ward.

The primary function of the Aquatic Sciences Education Outreach Program is to provide information and educate the public about water resources. By providing a hands-on approach to learning, the D.J. ANGUS has proven to be an invaluable educational tool for people of all ages. "The teachers and students are very happy, pleased with the program," said Marilyn Park, on-board instructor. Nearly all educational excursions are free of charge but most of the users do contribute to the D. J. ANGUS Aquatic Sciences Endowment Fund.

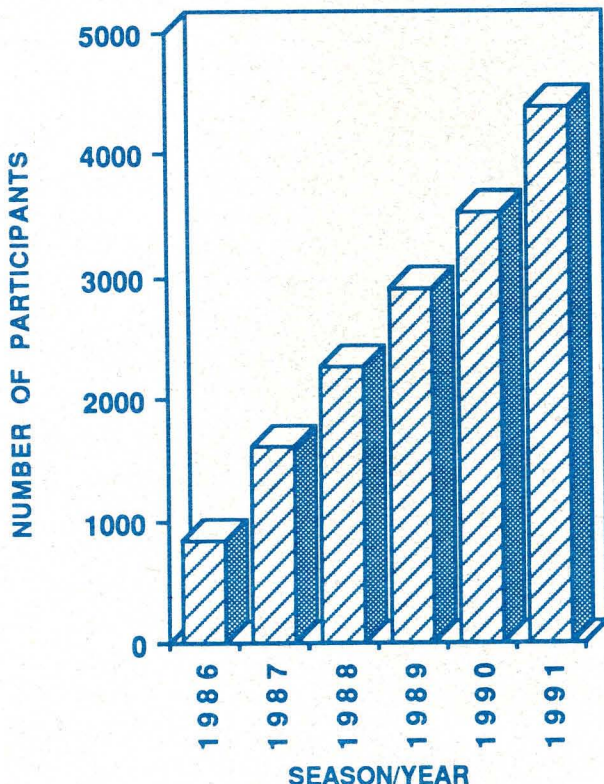


Elementary students perform a dissolved oxygen test during a D. J. ANGUS demonstration cruise

D.J. ANGUS crew members for the 1991 season included two new members, Marilyn Park, Assistant Professor of Biology at GVSU, serving as the on-board science instructor and student lab assistant Charles Klanke, a senior at GVSU. They, along with returning Captains Richard Behm and Leonard Lamb and crew members Joe Rohloff and Joe Galbraith, brought the D.J. ANGUS through another busy season.

The 1992 season begins in late April with a trip to Ludington, MI and will end in October with a trip to Hammond, IN. Please feel free to call Tonya Crossen at (616) 895-3749 with any questions concerning the Aquatic Sciences Education Outreach Program and/or the D.J. ANGUS.

D.J. ANGUS OUTREACH PROGRAM



Grand River Watershed Program Citizens Advisory Groups

Stormwater Committee Making Advances

The Stormwater/Erosion/Sedimentation Committee, a citizen's group concerned with stormwater-related issues, last met on October 3rd at GVSU's Allendale campus to discuss the findings of its four task forces. The task forces include: Upgrading Legislation, Education and Awareness, Development of Watershed Councils, and Regulation of Stormwater Discharge.

Much attention was focused on the Development of Watershed Councils Task Force which presented a three level river basin management organization based on the proposed Michigan River Basin Management Act(draft of July,7 1991). The organization consists of River Basin Councils(Level I), River Basin Districts(Level II), or River Basin Authorities(Level III). Proposed legislation for the development of the tri-level organization includes providing each level with specific powers, responsibility and limitations, and setting a time period for operation with a self evaluation assessment based on the time of operation. Several enthusiastic individuals decided to explore the development of a framework for a Watershed Council.

In addition, several groups were identified by the Task Force for Education and Awareness as targets for sedimentation control information and education. Included were: farmers, excavation contractors, teachers, students, and regulatory officials. Information disseminated to these groups would focus primarily on problems associated with failure to control erosion rather than consequences suffered as a result of violating regulations.

The Committee will meet again in February. Please contact Dr. Ron Ward at (616) 895-3749 with any questions concerning the Stormwater/ Erosion/Sedimentation Committee.



Grand River Watershed Advisory Council Discusses Rural And Urban Watershed Initiatives

The parent group of the Stormwater Committee, the Grand River Watershed Advisory Council, held a meeting on November 21 at GVSU's Allendale campus which included presentations on urban and rural watershed initiatives.

Randy Lehmoine from the City of Grand Rapids discussed stormwater initiatives confronting Grand Rapids, especially watersheds of Plaster, Silver, Coldbrook, Indian Mill, and Palmer Creeks. One issue raised by Lehmoine was the inadequate stormwater drains and river walls currently in place. Costs presented for improving the structures in these watersheds totaled \$35 million with much of that cost resulting from undersized stormwater sewers installed in the 1920's.

The Brooks Creek Watershed Project was presented by Wayne Whitman of Newaygo Soil and Water Conservation District. Planning efforts of the Project include identifying sources, documenting causes, prioritizing sites, and offer-

ing site specific BMPs(Best Management Practices) for non-point source pollution in the largely agricultural Brooks Creek watershed in Newaygo County. The Project has an Advisory Committee and funds to share costs on implementation of some BMPs. Because Brooks Creek watershed is 65% agricultural land, much of the Project work involves area farmers with a quarterly newsletter being the primary tool for outreach education. Other efforts by the Project include a grant obtained for the reclamation of wetlands located in the watershed (about 3% of the Brooks Creek watershed area).

The Grand River Watershed Advisory Council will hold its next meeting on April 14 from 7 to 9 pm in the Portside room at GVSU's Kirkhof Center (Allendale). All interested individuals are encouraged to attend. Please contact Stacey Tabor at (616) 895-3749 with any questions concerning the meeting or the Advisory Council.

Grand River Watershed Program: Plaster Creek Report

Visiting professor and researcher Kathleen Lacey recently returned to WRI from Kingston, England to complete a comprehensive report of her 15 month research on urban non-point source pollution in Plaster Creek. More specifically, the study focused on the relationship between water quality and storm flow discharges in Plaster Creek.

Plaster Creek is a tributary to the Grand River and drains an area of 58 square miles in southern Kent County. The watershed is 75% urbanized with the remaining percent rapidly headed toward that direction.

The results include data collected on biological and chemical oxygen demand, suspended sediment, heavy metals, and total phosphorus. Also included in the report are analyses of storm hydrographs and comparisons of Plaster Creek storm water quality with dry weather flow water quality.

The Plaster Creek report will be available through the Water Resources Institute in March, 1992. Please contact Stacey Tabor at (616) 895-3749 with questions regarding Kathleen Lacey's Plaster Creek report.

Waste Exchange Expo

Does your business and industry need a home for waste that is "too good" for a landfill? Do you have scrap materials that another business could use or can you use these materials from another company? The Second Annual West Michigan Waste Exchange Expo, to be held at the Holland Civic Center on March 11, 1992 from 1:30 to 9:00 PM, is a chance to meet with other businesses to solve common waste issues. Admission to this event is free.

Brenda Kling, Ottawa County Resource Recovery Coordinator, is spearheading the Expo with the assistance of a committee from business, industry, institutions, and county government. The Waste Reduction and Management Program of Water Resources Institute has been hosting the Expo planning meetings.

There are four elements to the Expo: the waste exchange, displays, workshops, and a luncheon. A waste exchange is a proactive way of approaching waste disposal. What may be one company's waste ends up as another company's raw material. Companies are encouraged to bring samples of their non-hazardous waste and interact with one another to find uses for the waste.

Throughout the duration of the Waste Exchange Expo, there will be a number of workshops on recycling special materials, cooperative recycling efforts in a shopping mall and in a downtown area, and procurement policies. Additionally, success stories from large and small manufacturing firms, small businesses, hospitals, and institutions will be showcased.

For a brochure and more information on this event contact either Brenda Kling or the GVSU WRI Waste Reduction and Management Program at (616) 895-3048.

Groundwater Hotline

Do you use groundwater from a well? If you live in Michigan you just might because Michigan contains more wells than any other state. The American Groundwater Trust now offers a toll free number (800-423-7748) to answer questions from residents seeking more information concerning their water supply. Groundwater quality, groundwater protection and water wells are the subject areas covered by the service. Upon leaving a message at the end of the call, the Trust will mail you additional requested information, including lists of certified contractors and scientists.

Evolution of Response to Pollution Problems



POLLUTION CONTROL



WASTE MANAGEMENT



WASTE REDUCTION



POLLUTION PREVENTION

Source:

Minnesota Technical Assistance Program