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Annis Water Resources Institute

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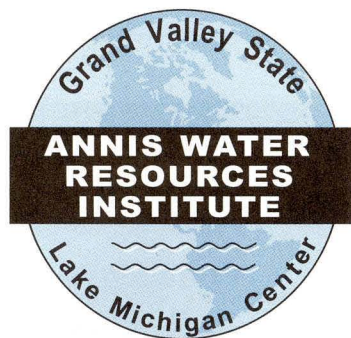


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Review

Grand Valley State University • R. B. Annis Water Resources Institute • Spring 2001 • Volume 14, Number 1

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Be certain to check the back page for information on the upcoming *Lake Michigan: State of the Lake '01* conference!

From The Start, Director's Vision Has Led The Way

The Robert B. Annis Water Resources Institute's founding director, Dr. Ron Ward, is retiring this summer after 35 years with Grand Valley State University. Ward first came to Grand Valley in 1966 as an assistant professor of Biology, becoming a full professor in 1974. He was asked to take on administrative responsibilities for a new water resources research and preservation project spearheaded by the college, and in 1986, Ward became AWRI's first director, a position he has held for the past 15 years.

"What the Institute has done for the environment and for this community is simply remarkable, and we owe a great deal of its ongoing success to Dr. Ward," comments Doug Kindschi, Dean of Science and Mathematics. "Right from the beginning, his vision of what the Institute could be has fueled and channeled its growth. He and his staff have dedicated their careers to bringing AWRI where it is today, and the strong foundation he has built will continue to support the Institute for a long time to come."

Ward grew up in Pennsylvania near the Allegheny River. He had an interest in water early on, yet preservation and water quality weren't on his mind - nor on anyone else's in the 1950s. His

undergraduate work earned him a B.S. in Biology from Indiana University of Pennsylvania in 1960, and he continued his education at Ohio University, receiving a M.S. in Zoology in 1962. He delved into aquatic research more intensely at Ohio, writing his master's thesis on his study of a newly created water reservoir.

Water ecology was taking on more significance as Ward continued his education at The Johns Hopkins Univer-

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Dr. Ronald W. Ward, Director - Annis Water Resources Institute 1986 - 2001



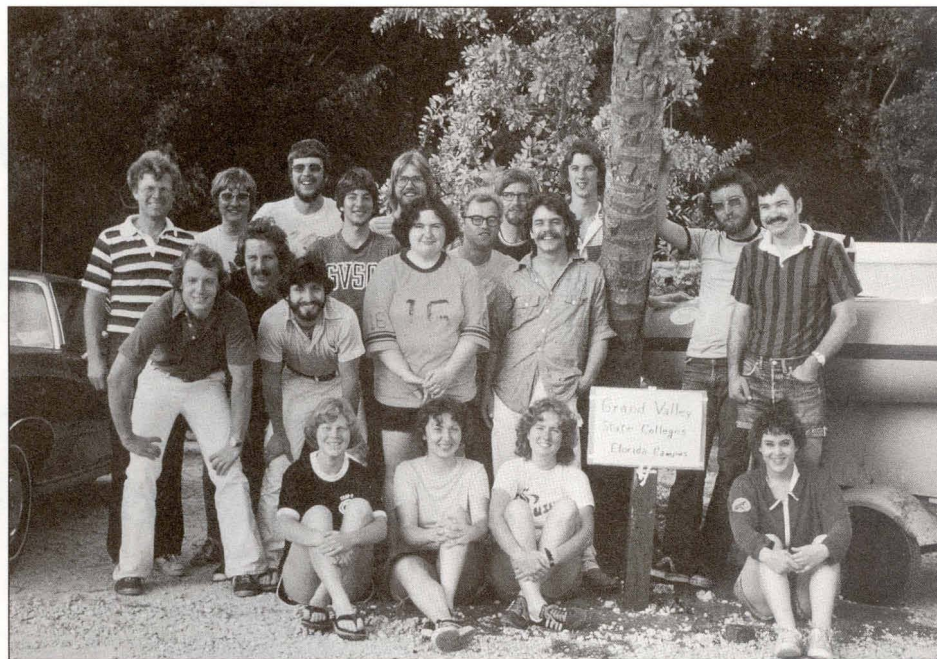
Director's Vision

continued from front

sity. He conducted research on animal, particularly fish, behavior and studied water quality in the Chesapeake Bay for his doctorate degree. He received a Sc.D. in Ecology and Behavior from The Johns Hopkins University in 1966 with a postdoctoral fellow that same year.

About the same time, a new college was establishing roots in western Michigan. Despite its distinctly agricultural setting, Grand Valley State College had a strong interest in water and the Great Lakes, which carried over into the college's new biology department and its curriculum. The school was recruiting teachers knowledgeable in aquatic ecology, one of the reasons why they contacted Ron Ward.

"It was January when I first came to check out the opportunities at Grand Valley," says Ward. "Not exactly the best time of year to notice how beautiful west Michigan can be. Plus, the campus itself was literally right in the middle of a corn field with no body of water

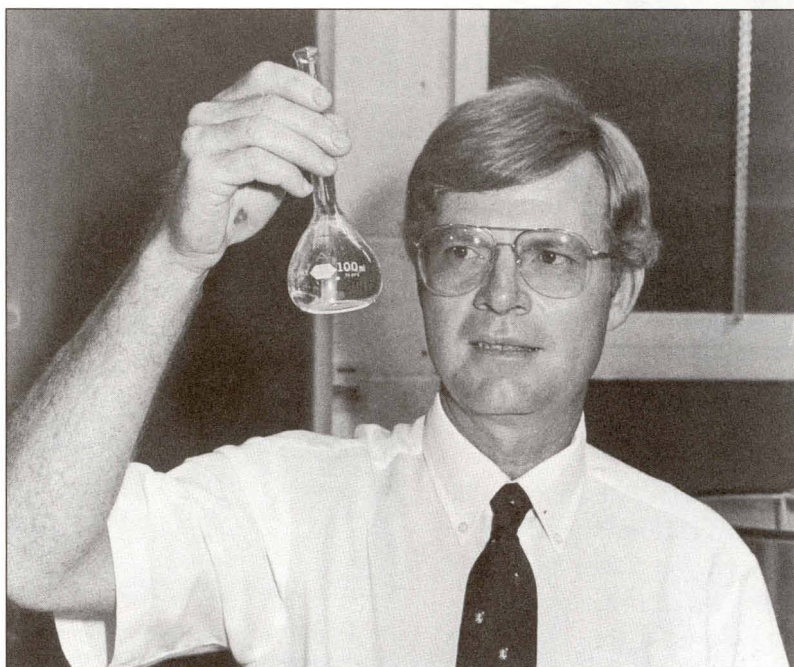


Biology Club Field Trip, Summer 1977

anywhere in sight. Yet I recognized immediately that the college offered some distinct benefits. First, I would be able to teach upper level specialty classes like aquatic ecology right from the start. In a more established school, you typically have to wait a few years before you have that opportunity. Plus, the school wanted to develop an aquatics program using a donated vessel called the *Angus*.

I saw the potential right away." Even then, Ron Ward was able to see way beyond the frozen cornfields. By the time he finished his visit, he had a vision so full of promise that it convinced him to accept the position at Grand Valley, and it is that same vision that has energized him for the past 35 years. What he observed was a young, dynamic, enthusiastic faculty dedicated to more than just scholarly pursuit. He saw growth and opportunity - the new institution encouraged its staff to use their creativity and explore possibilities. With this kind of support, he had a chance to develop a one-of-a-kind program from the ground up. Plus, the quality of life in Michigan was very good - a great place to start a career and raise a family.

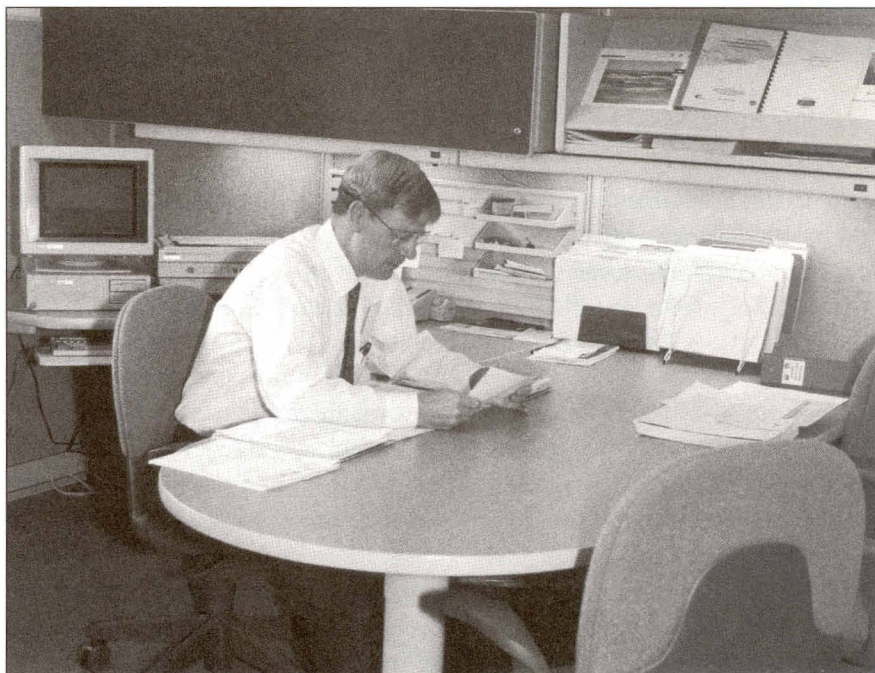
In those first years, Ward focused his energies on teaching classes, conducting research, and developing the aquatic research program. From 1967, the first year Ward launched the program, until the mid 1980s, the *Angus* became a valuable floating laboratory for faculty research projects and offered important hands-on learning experiences for Grand



Valley students. Ward helped the college establish an endowment fund to cover ongoing vessel maintenance - a foresight that has enabled the program to continue despite recurring tight economic times.

Yet the vision didn't stop there. The vessel program had the potential to reach into the community, offering unique learning experiences to several more individuals. Ward took advantage of an opportunity to design and build a new vessel complete with a state-of-the-art, onboard research laboratory, and in 1986 Grand Valley launched a new vessel the *D.J. Angus*. Its first year out, more than 800 students boarded the *D.J. Angus* to study water habitat, and within three years, that number grew to 3,000. In fact, the educational outreach program has never stopped growing. Today, with two research vessels - the *D.J. Angus* and the *W.G. Jackson* - more than 8,000 area students, teachers, scientists, and interested community members each year learn about our great lakes region through an onboard experience unavailable anywhere else.

About the same time the *D.J. Angus* was still on the building blocks, preparing for her maiden voyage, Ward was asked to head a taskforce responsible for exploring the possibility of establishing an entity dedicated to water research and preservation of water resources. In the Spring of 1986, the Water Resources Institute became a reality, and Ward assumed part time responsibilities as its director. With the initial backing of a \$580,680 grant from the W.K. Kellogg Foundation, the new organization started developing a program for important water research.



Today, that program has had far-reaching impact on countless regional protection and preservation projects, and from the beginning, thanks to Dr. Ron Ward, it has accomplished its objectives in a truly distinctive way. As a research institution, AWRI has accumulated a mountain of critically important data and research findings - the heart of any quality university research program. Yet it doesn't stop there. According to Ward, even an award-winning scientific discovery does nothing if the report sits on the shelf. Scientific findings are only useful when decisionmakers can understand and use them to influence policies and implement change. If research data is the heart, then proper communication is its life blood.

Ward's belief - to bring "science to the nonscientist in a meaningful way" - has been the driving force of the organization from the very beginning. That perspective has brought the Robert B. Annis Water Resources Institute to where it is today - an organization recognized in the region for its innovative approach, its emphasis on collaboration, and its dedication to bringing critical environmental issues to the attention of those who need to know. With the construc-

tion of the new Lake Michigan Center located in Muskegon, AWRI is poised to bring its mission to the Great Lakes area and beyond.

With an ability to look farther than the here and now, Ron Ward has developed a vision with unlimited possibilities. His work at Grand Valley in the last 35 years has not only built a solid foundation but has also given the Institute a concrete direction.

"Grand Valley has made a commitment to the environment, this institution, and the community at large. They have been very supportive of our programs, and because of that support we have been able to accomplish quite a bit in the last 15 years," says Ward. "Yet when I think of the potential for growth and new initiatives, sometimes I think we haven't come far enough. The opportunities are enormous. The Institute is far larger than any one individual, yet if I can leave anything behind, it would be the idea that progress is limited only by imagination. Challenges will abound, but a strong vision will inspire you to overcome obstacles. Protecting our natural resources is certainly a cause worthy of the very best we have to offer."

AWRI Searches For New Director

The Annis Water Resources Institute is currently conducting a nationwide search for a new director, a position that will be open after AWRI's founding director, Dr. Ron Ward, retires this summer.

"We will be very sorry to see Dr. Ward leave. He has been a driving force for the Institute since it started 15 years ago. It's going to be tough to replace him," comments Doug Kindschi, Dean of Science and Mathematics at Grand Valley State University. "The Institute has evolved into a focal point for partnerships, research, education, and outreach in the Lake Michigan basin. And with the newly constructed Lake Michigan Center on the Muskegon shoreline, we'll be able to create even more opportunities for new initiatives and collaborations across the Great Lakes. The position of director is incredibly important and requires someone with many different skills to help bring the Institute into its next phase of development."

AWRI's new director will work with senior program managers in three major areas - Information Services, Environmental Research, and Educational Outreach. That person will be responsible for developing programmatic agendas and strategic objectives, proposing and administering budgets, managing facilities, and leading a team of 37 full and part-time employees. Other major duties include securing sources of program funding; promoting collaboration among affiliated scientists and organizations; and serving as liaison with federal and state agencies, other university groups, and private and public sectors of the community.

"The Institute has always had a community focus. That's why we're looking for someone who can not only nurture the many collaborations and partnerships AWRI has already developed but also foster new relationships and interactions. We need someone with vision, energy, and leadership. Someone who

recognizes and is ready to seize new opportunities. Someone who can look at AWRI's mission and brainstorm where it can go. The possibilities are endless," says Kindschi.

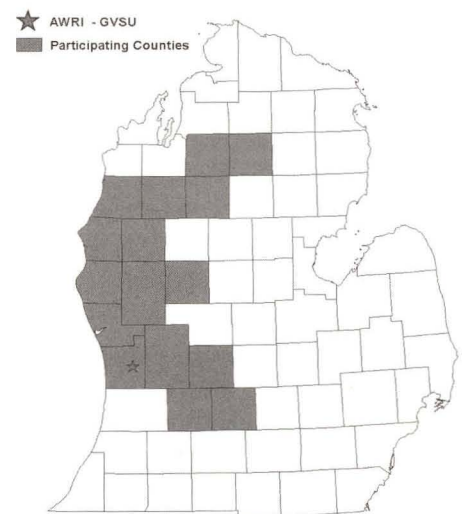
The new Lake Michigan Center is just one example. With direct access to Muskegon Lake, Lake Michigan, and the Muskegon River, the Center is perfectly situated for unique aquatic and environmental research, education, and outreach possibilities. The Muskegon River watershed contains one of the largest freshwater estuaries in the Great Lakes basin and provides several opportunities to study the complex coupling and dynamics of the many different water-based environments.

Applications for the position of director will be accepted until the position is filled. For more information, contact the AWRI Search Committee, P. Douglas Kindschi, Dean of Science and Mathematics, or log on to our website at www4.gvsu.edu/wri.

Source Water Assessment Program (SWAP) Update

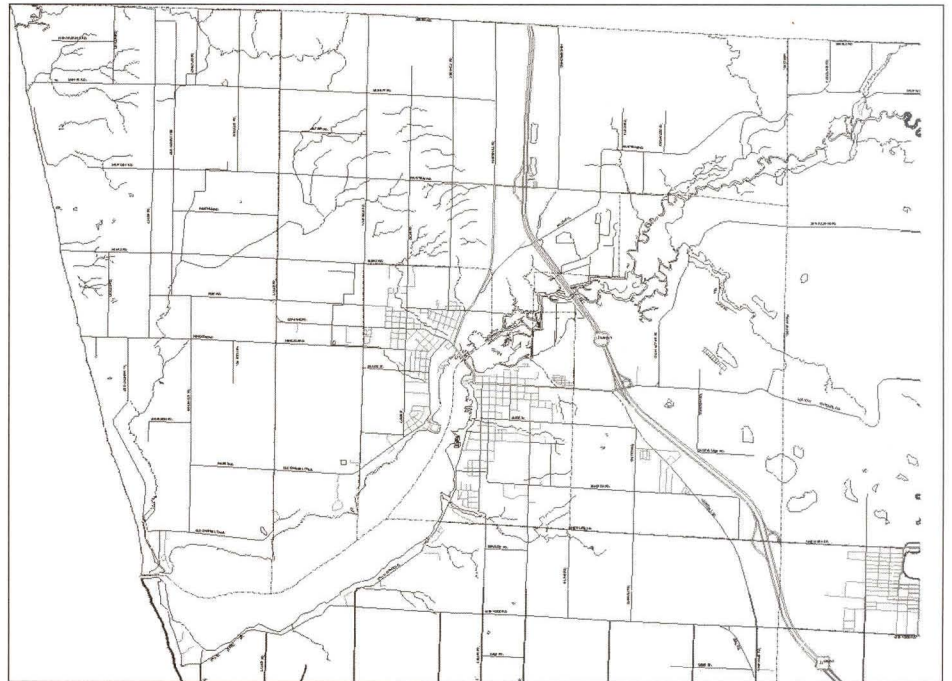
AWRI continues its fourth year as a participant in Michigan's Source Water Assessment Program (SWAP). The Michigan Department of Environmental Quality Drinking Water and Radiological Protection Division (MDEQ-DWRPD) administer the program, with assistance from Michigan State University's Institute of Water Research (MSU-IWR). AWRI continues to provide technical assistance to 6 local health

departments serving 16 counties. In addition to the collection of critical information used in understanding the vulnerability of Type II non-community wells to surface contamination, AWRI researchers will be creating a vulnerability assessment map for each county in its assigned region. For more information about SWAP, contact Kurt Thompson at (616)895-3091, or thompsok@gvsu.edu.



Phase II Investigation Of Sediment Contamination In White Lake Underway

The Environmental Research Group (ERG) of AWRI has received a grant from the Great Lakes National Program Office to conduct a Phase II Assessment Of Sediment Contamination In White Lake. A preliminary investigation of the eastern half of the lake by AWRI/NOAA in 1996 found high levels of chromium, arsenic, and mercury in Tannery Bay and PCBs near Dowies Point. The new grant will support an investigation of the western half of White Lake from Dowies Point to the Lake Michigan Channel. The Phase II investigation will examine the migration of heavy metals and PCBs in this area and focus on depositional zones that are influenced by circulation patterns. Stratigraphy and radiodating will be utilized to examine historical and current contaminant deposition patterns. In addition to an assessment of sediment chemistry, laboratory toxicity studies and a benthic macroinvertebrate survey will be conducted. Even though the direct discharge of tannery and process chemical effluents was discontinued in the mid 1970s, the previous data suggests that the river and lake currents may be sufficient to resuspend and transport contaminated sediments to other areas of the lake. Without more information on sediment stability and accumulation rates, it is difficult to determine the fate of contaminants in the system. Whether historical levels of metals and chlorinated hydrocarbons are being covered by less contaminated material or being resuspended by physical events are critical questions that need to be answered

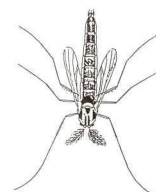
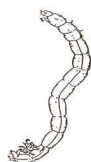


White Lake, Whitehall, Michigan

before evaluating remediation options. We also know very little about the toxicity and the ecological effects of contaminated sediments outside of Tannery Bay. The Phase II Assessment Of Sediment Contamination In White Lake addresses the above issues and provides information that is critical to the development of restoration plans for the U.S. EPA designated Area Of Concern (AOC). Future dredging, marina development, and macrophyte control programs may also affect the mobility of contaminated sediments in the system.

It is therefore important that areas of contaminated sediment are identified so that proposed maintenance and development activities do not impact the lake.

AWRI researchers will work with scientists at Hope College and the University of Michigan on the investigation. For more information on the Phase II investigation please contact Dr. Richard R. Rediske, ERG Senior Program Manager and Principal Investigator of this project at (616)895-3047 or redisker@gvsu.edu.



Life cycle of a midgefly.

Lake Michigan Center Campaign Nears Goal

With more than \$5.3 million in pledges and contributions so far, the University is within reach of its \$5.5 million goal set in 1998 when the campaign first kicked off.

“We’ve been very pleased with the response to our requests for funds,” comments Charles Johnson, Campaign Chair. “The generous support, especially from the Muskegon community, demonstrates how committed everyone is to preserving and protecting the natural resources within the Lake Michigan basin.”

The Community Foundation for Muskegon County awarded \$1 million to the project, making it the largest grant award in its history. Other initial major contributors include the State of Michigan, SPX Corporation, William G. and Kathleen Jackson, Muskegon County, Paul C. Johnson Foundation, John and Debi Bultema, Dawn and George Bailey, R.B. Annis Educational Foundation, John and Linda Hilt, Kurdziel Industries, Inc., MichCon Foundation, Tho-

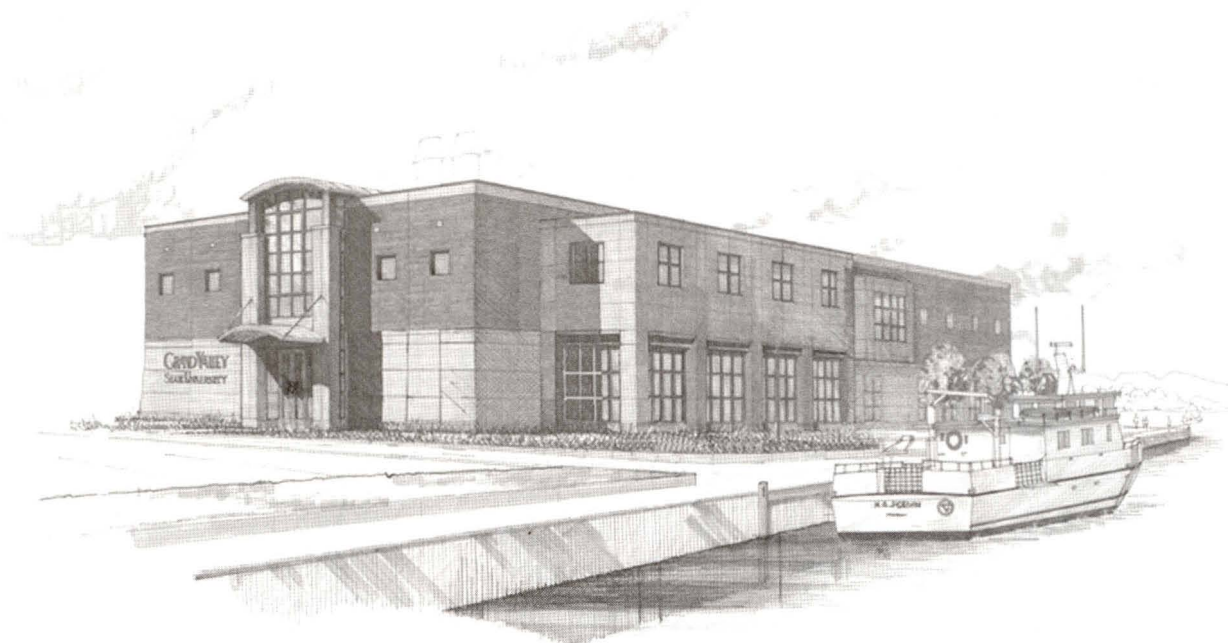
mas and Geraldine Seyferth, and the Youth Advisory Council of Community Foundation for Muskegon County.

One of the things that has made this campaign different from other fundraising campaigns is its scope. Since work accomplished at the new Lake Michigan Center will have an impact on more than just the west Michigan community, the campaign committee thought it appropriate to solicit funds from companies and businesses surrounding Lake Michigan as well. They targeted 1,000 companies in 29 counties surrounding Lake Michigan, including those in Illinois and Wisconsin.

Karen Loth, GVSU Director of Special and Campaign Giving, believes the request will pay off in ways other than financial support. “Creating the Lake Michigan Center is the first step toward connecting communities that have been separated by a large body of water,” she says. “We share this vast

natural resource, yet each community has primarily focused on localized preservation projects. The Lake Michigan Center has the potential to change that. So now is the time to initiate relationships with other communities that will benefit from a combined effort, and begin to establish the Center as a regional resource.”

Although the campaign ends with the official dedication of the Lake Michigan Center June 21, giving opportunities will still exist. Gifts of any size to the Lake Michigan Center are appreciated, and donors may choose between a one-time commitment or a pledge to be fulfilled over as many as three years. Those contemplating a major gift may consider naming a special designated area within the new Center building. For more information on contributing to the Lake Michigan Center and its ongoing programs through the Annis Water Resources Institute, contact Karen Loth at (616)771-6530 or lothk@gvsu.edu.

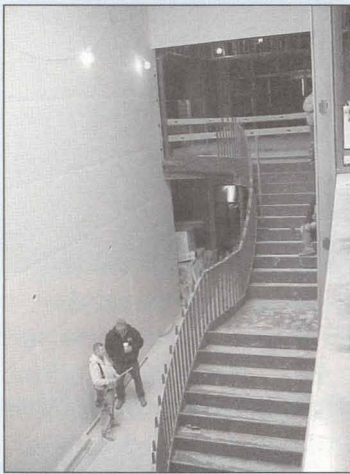




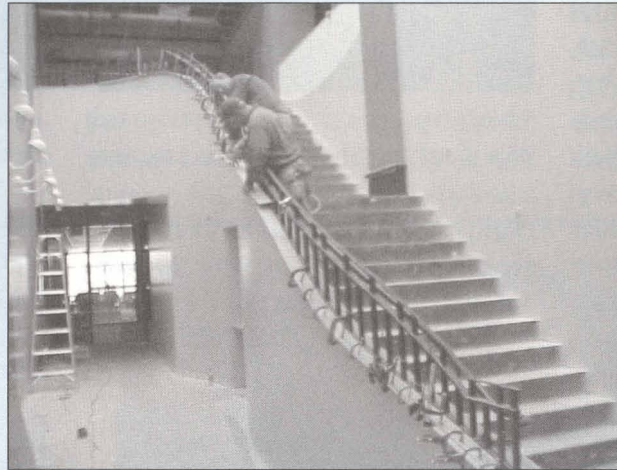
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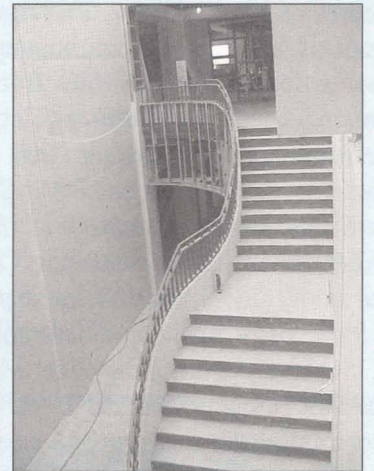
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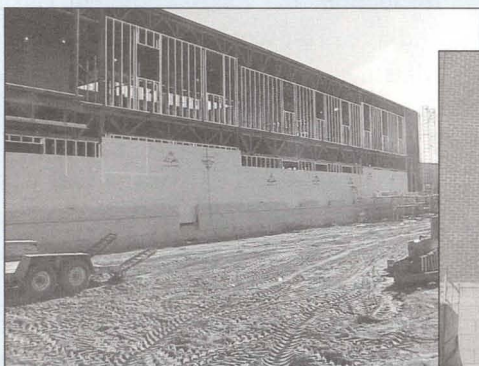
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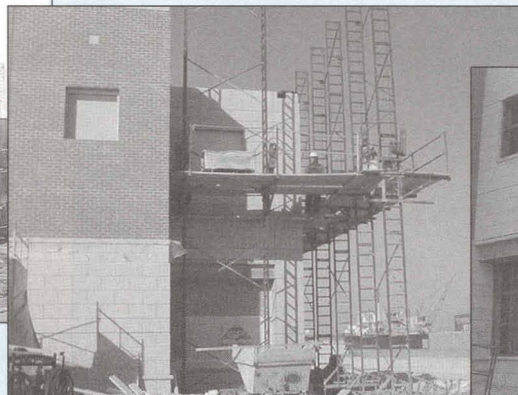
May 23, 2001



March 21, 2001



October 30, 2000



January 10, 2001



March 28, 2001

Research And Education Vessel Highlights

Educational opportunities continue to expand at AWRI with increased use of the research and education vessels *D. J. Angus* and *W. G. Jackson*. The 2000 season emphasized the diversity of groups utilizing the vessels and strengthened ties to education through workshops, program offerings, and continued distribution of resource materials.

The *D. J. Angus* continues to serve numerous classes from GVSU, K-12 students, and adult groups, hosting 163 events during 2000. Tallies from the log indicated that 3,660 participants boarded the *Angus* during 2000 compared to about 2,900 in 1999. Cruise participants included high school (18%), middle school (26%), elementary (16%), university (14%), and the general public (15%). Most of the dockside visitors (11%) toured during the West Marine Trawler Fest July 21 & 22. Local coordinators for the Trawler Fest assigned the *Angus* as a beneficiary of the auction that was held as part of the event.



The *W. G. Jackson* completed another successful season with 204 events. During the 2000 season, over 5,175 people participated in *W.G. Jackson* activities. The cruise participants included high school (7%), middle school

(29%), elementary (21%), and university (1.5%). Vessel-based programs, including *Making Lake Michigan Great 2000 Tour*, provided educational activities for the general public through cruises (21%) and dockside open house visitations (20.5%).



The continuation of the *Making Lake Michigan Great 2000 Tour* allowed the *Jackson* to visit additional ports of call throughout the Lake Michigan Basin and spread the word about the Lakewide Management Plan for Lake Michigan. The U. S. Environmental Protection Agency Lake Michigan Forum and AWRI sponsored this year's tour with assistance from Illinois-Indiana Sea Grant and the Waukegan Citizen Advisory Group. Now in its third year, the *Making Lake Michigan Great Tour* has reached hundreds of people in the four states that border Lake Michigan. The ports of Pentwater, Ludington, Manistee, Chicago, Milwaukee, Sheboygan, Waukegan, and Saugatuck were visited during the *2000 Tour*.

Implementation Of The GLOBE Surface Ozone Protocol

The Grand Valley State University R.B. Annis Water Resources Institute (AWRI) was recently awarded a \$5,000 grant from Michigan Space Grant to support **Implementation of the GLOBE Surface Ozone Protocol**. The West Michigan Chapter of the Air & Waste Management Association and GVSU's Regional Math & Science Center will partner with AWRI on this project.

AWRI became a GLOBE franchise in 1999. The Global Learning and Observations to Benefit the Environment (GLOBE) Program brings together K-12 students, teachers, and scientists from around the world who work together to learn more about the environment. By participating in GLOBE, teachers guide their students through daily, weekly, and seasonal environmental observa-

tions, such as air temperature and precipitation. Using the Internet, students send their data to be archived. Scientists and other students use this data for their research.

A new protocol measuring surface ozone is being added to the cadre of GLOBE atmospheric measurements. This project will allow AWRI to be one of the first franchises in the world to assist students to fully implement this protocol. The ozone measurement is of particular importance to the geographic area in west Michigan that draws the majority of our trained teachers. Kent, Ottawa, and more recently, Muskegon Counties have been re-classified as in attainment for ozone. This does not, however, mean that ozone is no longer an issue. On the contrary, an awareness of ozone is vital

to the area-wide Ozone Action prevention program. Additionally, the contribution of ozone coming across Lake Michigan from Milwaukee and Chicago needs to be monitored.

The project will provide for a series of teacher training workshops in ozone monitoring protocols and the latest information about air quality issues. Air quality materials such as the Air & Waste Management Association [Air Quality Environmental Resources Guides](#), Michigan Department of Environmental Quality ozone site and SPOTS computer program, and the Ozone Action Program teacher materials will be included in workshops planned for this project. For more details, contact Dr. Janet Vail at (616)895-3048 or vailj@gvsu.edu.

Vessel Highlights

continued from page 8

AWRI sponsored its first K-12 summer camps at the Muskegon Field Station and hosted GLOBE and Project WET workshops on the vessels during the summer of 2000. Rounding out the season of environmental education activities, AWRI hosted hundreds of students from the National Consortium for Specialized Secondary Schools of Mathematics, Science, and Technology (NCSSSMST) on educational cruises on the *Angus* and *Jackson* early in October.

The *Water Resources Outreach And Education Program* offered on the *D. J. Angus* and *W. G. Jackson* includes such resources as an instructional video, assessments, teacher workshops, and

instructor's guide. An activities guide for middle and elementary school levels was added during the 2000 season. The AWRI web site at www4.gvsu.edu/wri/ continues to provide access to data from

the vessels, a downloadable version of the Instructor's Manual, and a means to stay up-to-date on program developments.



Investigating Lake Michigan Zooplankton

AWRI scientists Dr. Richard R. Rediske and James O'Keefe will be part of a research group investigating tumor-like abnormalities in Lake Michigan zooplankton. The project is funded by a grant from the Michigan Great Lakes Protection Fund and involves researchers from the University of Michigan, George Washington University, Grand Valley State University, and Hope College. Dr. David J. Jude from the Center for Great Lakes and Aquatic Sciences at the University of Michigan serves as the project manager.

Tumor-like abnormalities were first reported in Lake Michigan zooplankton in 1998. Since then, scientists have reported these lesions in other areas of the Great Lakes and its watershed. The physiological affect of these abnormalities on the zooplankton and their ecological significance to the food web are unknown. Since zooplankton are an essential part of the food web, it is important to investigate the distribution and ecological significance of these abnormalities. The purpose of this project is threefold:

- Quantify the species and prevalence of zooplankton with tumor-like abnormalities from selected samples archived

from 1970–2000. These data will provide historical information as to the occurrence and distribution of the lesions in Lake Michigan.

- Analyze new samples of zooplankton and conduct pathological studies to determine the range of zooplankton species and stages that do have lesions.

- Determine if the tumor-like abnormalities can be in healthy zooplankters using a variety of laboratory techniques and experiments.

The Environmental Research Group at AWRI will conduct a series of bioassays to determine if these lesions can be

induced in the laboratory by experiments that involve the exposure to different water sources and to the presence of zebra mussels. It is possible that zebra mussels may harbor a pathogen or secrete a chemical substance that may cause these abnormalities. This project will provide important information related to the significance of these lesions, their distribution, and factors that cause their production.

For more information about the Lake Michigan Zooplankton project please contact Dr. Richard R. Rediske at (616)895-3047 or redisker@gvsu.edu.

D. J. Angus-Sciotech Educational Foundation Internships Awarded

The D. J. Angus Sciotech Educational Foundation has been supporting internships at AWRI since 1994. These internships provide GVSU students a unique opportunity to apply what they have learned in the classroom to “real-world” situations while contributing some of the additional staff necessary to complete many of AWRI’s projects.

Joining the staff of the Information Services Center for the summer and fall semester is Kimberly Barnes, a Biology major. A member of the American Fisheries Society and Mote Marine Aquarium, and a certified Rescue Diver through PADI, Kimberly will be assisting with field sampling in the Muskegon River Watershed.

Eric Andrews has been awarded a summer internship and will be assisting Dr. Rick Rediske with projects managed by the Environmental Research Group. Eric is currently a junior with dual Chemistry and Math majors and maintains a 4.0 GPA. Eric was also the recipient of GVSU’s Analytical Chemistry Student of the Year Award and has been on the Dean’s list for the past 5 semesters.

Incoming transfer student Brett Shelagowski has joined the staff of the Outreach and Education Program, thanks to an internship. Brett is transferring to GVSU in the Fall of 2001 from Muskegon Community College as a Biology major. Brett’s interests lie in the field of environmental biology.

Applications for the annually awarded Vandermeij Internship will be available early in August 2001.



Look for information about the State of the Lake 2001 conference on the back cover

We Call It The 'Mega Model'

Last August 25 researchers from six Michigan universities joined 25 stakeholders in a four-day conference sponsored by the Wege Foundation and hosted by the Community Foundation for Muskegon County. The purpose of the event was:

“To educate as many people as possible, as soon as possible, on the intrinsic value of the natural Great Lakes system being left intact for the coming generations.”

While the mission was comprehensive and included the entire Great Lakes system, it was decided to focus initial efforts on the Muskegon River Watershed. The conference became known as the ‘Muskegon River Watershed Partnership Conference’.

The conference resulted in the formulation of nine research proposals. A panel of experts reviewed each proposal to verify that the intended outcome was worthwhile, the budget was appropriate, and the science sound. Surviving this process was the proposal titled, ‘A Collaborative Approach to Understanding the Dynamics of the Muskegon Watershed: A Comprehensive Model, Risk Assessment and Tools for Use in Management’. Principal Investigators for this project include Mike Wiley, University of Michigan; Bryan C. Pijanowski, Michigan State University; John K. Koches, Grand Valley State University; and Paul W. Seelbach, Michigan Department of Natural Resources, Fisheries Division. The Great Lakes Fishery Trust recently announced that it would fund the three-year \$1.2 million project, which has become affectionately known as the ‘Mega Model’.

The project has been nicknamed the Mega Model because it has at its core the collection of existing information and the consolidation of previously developed nonpoint source pollution models, hydrologic models, economic models, land use models, and others to produce a system-wide model that will be used to perform risk assessment in the Muskegon River Watershed. The question to be addressed is, “how does the Muskegon River system work?” Issues to be examined by a basin wide model include the impact of urban development, bank erosion and channel sedimentation, and modification of the river hydrologic regime and habitat fragmentation by impoundments.

Responsibilities for various components of the Mega Model are divided between the three universities, with Grand Valley State University being identified as the entity that will shepherd the database to be created. GVSU will also spearhead outreach activities that will assure that the information compiled is made available to stakeholders and other researchers. The need to acquaint local officials and decision-makers with the model so that the analysis afforded might result in sustainable land use choices is considered critical. Stakeholders like MDEQ, MDNR, the Lake Michigan Federation, and others will assist GVSU and the other project partners in sharing our process and the results of our analyses with those individuals and organizations interested in the Lake Michigan basin as a whole.

For more information on the Mega Model, contact John K. Koches at (616)895-3792 or kochesj@gvsu.edu.

AWRI To Assist US Army Corps Of Engineers

The Annis Water Resources Institute has begun work on a collaborative study with U.S. Army Corps of Engineers. AWRI will be updating land use and cover information for the northern Lake Michigan shoreline communities of Antrim, Emmet, and Charlevoix counties. The update is part of the Army Corps Lake Michigan Potential Damages Study that was started in 1996. The project will evaluate economic impacts of the lake level fluctuations along lakes Michigan, Erie, and Ontario.

Over the next six months, AWRI will be using digital ortho-photography provided by the Corps to create the new land use and cover geographic information system (GIS) data layer. Upon completion of the update, researchers will compare the new land use and cover statistics with older information to get an idea how development has impacted these northern Michigan communities. At the end of the project, AWRI will create a color map atlas as a way to display and summarize this new information.

More information about this particular investigation can be obtained by contacting AWRI Research Associate, Rod Denning at (616)895-3793 or denningr@gvsu.edu.