2001 YEAR IN Review

ROBERT B. ANNIS WATER RESOURCES INSTITUTE

GRAND VALLEY STATE UNIVERSITY

Dr. Alan Steinman, Director of the Robert B. Annis Water Resources Institute

Dr. Alan Steinman took over the directorship of the Annis Water Resources Institute (AWRI) in August, replacing Dr. Ron Ward, who had served as AWRI's director since its beginning in 1986. With a Ph.D. in Aquatic Ecology from Oregon State University, Dr. Steinman has extensive experience working on numerous water-related issues, including stream ecosystem processes, nonpoint source pollution, and aquatic ecosystem restoration. In his previous position as Director of the Lake Okeechobee Restoration Program in Florida, Al was responsible for a 50-person staff and a $30 million budget. He brings years of administrative as well as scientific expertise to his position at AWRI, helping to bring the Institute to the next level of its development and growth.

With miles of rivers and tributaries, hundreds of lakes, and the largest freshwater inland lake in the United States, Michigan has become known as a water wonderland. How important is freshwater research when it comes to protecting and preserving this natural resource?

I believe that fresh water is going to be the "gold standard" of the future because it is a finite resource. Its distribution is very uneven throughout the world, and as population grows, so will the need for drinkable water sources. Plus, fresh water is the host to finely balanced, intricate, and interdependent ecosystems that we could not live without.

Because Michigan has such richly diverse and abundant water ecosystems, we must do whatever we can now to preserve this vital resource. Our focal point should be on water quality protection. For that, you really need to look at it from a watershed perspective. You can't only look at the health of a particular stream or lake; you need to take into account the entire watershed. That's where we at AWRI will continue to concentrate our efforts.

AWRI's new Lake Michigan Center was dedicated in June.

What are your plans for AWRI in the future?

Before I can even talk about where we are planning to go, I need to acknowledge how far AWRI has come. Dr. Ward was a huge part of our success so far. He was responsible for establish-

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The Annis Water Resources Institute:

- **conducts research and collects data on the impact our lifestyle has on our natural resources**
- **shares information about our environment with the community**
- **collaborates with other organizations to discuss ideas and find solutions to problems**
- **offers hands-on learning experiences aboard research vessels**
- **helps business, industry, and communities implement environmentally-safe practices**
- **confronts issues that will affect our community in the future**
- **provides GVSU students with the opportunity to apply their classroom learning and be part of a research team**
- **assists GVSU professors in their research.**

To preserve, protect and improve our natural resources

The *W.G. Jackson* makes a stop in Chicago on its annual tour of Lake Michigan.

Continued from front

ing a great foundation. We now have a wonderful new facility, a talented staff, and two valuable research vessels that make us unique in our ability to deal with many different issues. We are well positioned to tackle diverse environmental problems by combining our expertise with that from other organizations and agencies. He also established very strong ties with the scientific research, government, and local communities. It makes my job easier to have those relationships already in place.

Ron helped establish the identity and independence of AWRI. Now I'd like to build on that base by developing our credibility on a larger scale. My ultimate goal is for AWRI to become known nationally and internationally for our water resources work. We will continue to provide regional services and to act as an integral resource within this community. On top of that, we need to increase our visibility by going after national grants. That means we need to publish more papers in peer-reviewed scientific journals. In the scientific community, it's really the only way to gain the kind of visibility that we're after.

How will your new location at the Lake Michigan Center enable you to accomplish your overall goal?

We have several strategic advantages by being in this new facility. First, it puts us very close to Lake Michigan and several key watersheds in west Michigan, so we are at the source for first-rate scientific research. It also greatly expands our capabilities in not only scientific research, but in our community outreach, partnerships, and education programs. Our Lake Michigan Center will become a wonderful resource for many different research efforts and collaborations.

It is a great facility with tremendous support from the immediate community. But being so far from the main GVSU campus does pose a few challenges. It is much more difficult, for example, to find a good source of trained, knowledgeable, and available students—something that we were able to take advantage of when we were on campus. To gain more credibility and enhance our status as a serious scientific research institution, we need to have the kind of support that students can provide. Otherwise, we're limited in what we can accomplish and how far we can grow.

What do you think will help you overcome that obstacle?

One of my long-term goals for AWRI is to offer a graduate program that will attract students because they are such a critical element in making a research institute function effectively. Besides being enthusiastic contributors, graduate students have the time, energy, knowledge, and desire to help us carry out the research we need in order to gain national recognition.

In addition, a good graduate program will help us recruit renown scientific researchers, who are looking for institutions willing to support their work as well as give them the opportunity to teach others what they know.

Near the shore of Lake Michigan in Muskegon, AWRI's Lake Michigan Center is in a prime location for Great Lakes research and collaborative projects.

Students visit the Lake Michigan Center.

What are your plans for staffing?

Right now, we have four full-time principal investigators, which we plan to increase to seven by summer of 2002. In order to recruit and retain the most talented staff available, we need to offer: greater job security, opportunities to receive training to keep them at the leading edge of technological advances, and improved access to the student population at GVSU. With that kind of support, I believe that they will be able to conduct the kind of research and engage in the kind of projects that will enhance our visibility and reputation.

I would also like to increase joint appointments with GVSU faculty and the number of research projects they conduct at our facility. Currently, we have only two faculty members who are pursuing projects with us on a part time basis.

What attracted you to AWRI?

One of the reasons why my family and I chose AWRI is because we liked the community. West Michigan is a wonderful place to live. People are warm and friendly, and my wife liked the small town feel. Plus, it truly is a wonderland.

Being director of AWRI allows me to work in the scientific research and administrative arenas, honing my skills in both. There are certainly many unique opportunities we have here that can't be matched anywhere else. We have a long way to go, but the things we can accomplish will make a big difference in freshwater preservation worldwide.

AWRI Short-term Goals

• Hold a staff retreat to discuss a shared vision for AWRI and to foster cohesiveness.

• Recruit additional principal investigators, including a fish biologist, a hydrologic modeler, and a research aquatic biologist. Besides filling current needs, these positions will help integrate existing programs so AWRI can function in a more interdisciplinary fashion.

• Build a series of indoor mesocosms so researchers can test hypotheses within a controlled, replicated environment. Possible applications of the mesocosm facility could include examining how invasive species compete with each other, investigating the impacts of nutrients or toxic contaminants on the aquatic food web, or determining what type of plants could be used in phytoremediation efforts.

• Set up a Science Advisory Board to review AWRI's program and to offer suggestions on helping the Institute attain its stated goals. The Science Advisory Board will consist of the following five members—Dr. Claire Schelske, endowed chair at the University of Florida and a world renown limnologist; Dr. Stephen Brandt, director of Great Lakes Environmental Research Laboratory and a renown fisheries biologist; Dr. Carol Johnston, a program officer at the National Science Foundation and a research scientist at the University of Minnesota with expertise in wetlands ecology and Geographic Information Systems; Dr. Gary Lamberti, biology professor at the University of Notre Dame and an expert in stream ecology; and Dr. Peter Meier, professor of environmental health sciences at the University of Michigan specializing in aquatic toxicology and biotic impacts of contaminated sediments.

AWRI Long-term Goals

• Create a graduate program in order to attract the intellectual firepower to help sustain, preserve, and enhance the environmental resources in west Michigan and the entire state.

• Achieve national and international renown for work in freshwater research. Publishing results in peer-reviewed scientific journals will become an important factor in securing that status.

• Continue building key relationships with and collaborations between other research institutions and scientists, government agencies, local decision-makers, the general public, and anyone interested in preserving and protecting Michigan's freshwater resources.

Ecological Research Group

Environmental Chemistry
Environmental Biology

AWRI plays an important role in assessing the condition of our natural environment. Scientists and research technicians gather specimens and conduct sophisticated analyses in our research laboratories. This information is the foundation that helps us make decisions about living responsibly within our environment.

"The data we are able to extract from thorough testing procedures provides vital input in decisions that affect our choices and our quality of life."

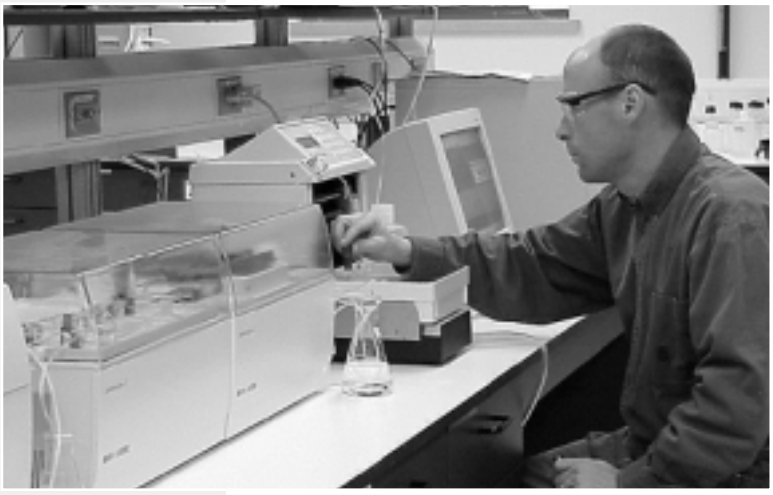
An Interview with Dr. Richard Rediske, Senior Program Manager of Environmental Chemistry

Your group has conducted several sediment contamination studies. What are you particularly looking for?

We're looking at historic patterns of heavy metal deposition in lakes and trying to predict the future from looking at the past.

What methods do you use to look at historic patterns of heavy metal deposition?

In White Lake and Muskegon Lake, we've primarily used the radiodating technique as a tool to look at sediments in the lakes. By looking at current rates of deposition and the lake's past history, we can determine whether there's a need to remove contaminated sediments. We can also determine whether contaminated sediments are spreading throughout the rest of the lake or if they are contained in a certain area.



Highly advanced computer equipment helps AWRI's scientists analyze samples.

Why is it important to look at historic patterns and the effect of contamination that may have happened years ago?

A lot of people believe that contamination, which occurred 30 or 40 years ago, is not a problem anymore because clean sediments are being deposited over the bad sediments—in effect, "burying" the contamination.

However, in many situations, like the lakes we have in west Michigan, we have a lot of wind action that can stir up the sediments. Also, several of our lakes are classified as drowned river mouths where there is actually a river channel flowing through the lake. When you get wind currents and flow from this river channel through the lake, contaminated areas can become stirred up and then spread throughout the lake.

A historic source of contamination can still affect the entire lake, as we have seen in White Lake and Muskegon Lake. The whole goal of this type of analysis is to find hot spots of contamination within the lake and determine if they are being stirred up and mixed throughout the lake. If they are, that area becomes more of a priority for remediation in the near future.

What is the process of radiodating?

We take a core sample of sediment and segment it at 1 to 2 cm intervals. We then look for radioisotopes that are present within each of those intervals. We also look at the natural decay of the radioisotopes plus the cesium. By determining the concentrations of these isotopes versus their depth, we can tell how much heavy metal contamination is being

deposited per year in a particular area. We are working with Hope College on radiodating sediments.

From the studies you have done in the past few years, what is the general trend?

Instead of a rapidly decreasing trend of heavy metal concentrations, we're seeing the deposition of significant levels in certain areas. There's no new source of this contamination; it's the sediment movement in the lake that is causing the resuspension of historical contamination. The results of our studies provide more impetus to clean up these hot spots. If not addressed, the historical contamination can move into uncontaminated areas.

In 1998 your group completed a sediment contamination study near the tannery in White Lake. You are now working on Phase II of the project. What did your investigation reveal, and what are your plans for the next phase of the project?

We found the sediments near the tannery to be highly contaminated with heavy metals and also toxic to aquatic life. Now in Phase II we want to look at how far the chromium contamination has spread throughout White Lake. We want to find out if there are other areas of toxicity that could be attributed to the heavy metals in the lake.

This past year you completed an extensive three-month, inter-laboratory evaluation of the detection limits of PCBs. What will this evaluation accomplish?

The evaluation will help regulators set the PCB limits and determine what concentrations can actually be detected. Sometimes you can set a limit that's too low. If it's too low, you do not have enough accuracy to demonstrate compliance with environmental regulations. It is the largest study that has been done using a variety of laboratories over an extended period of time. From the data collected we can get a good handle on what these labs can actually achieve.

2001 Environmental Chemistry Group Highlights

• Published the final report of sediment on Manistee Lake on the U.S. Environmental Protection Agency's website. The project was funded by the U.S. EPA.

• Submitted the final report on a two-year sediment contamination and aquatic insect investigation of Muskegon Lake, funded by the U.S. EPA's Great Lakes National Program Office.

• Continued to look at indicators of natural biodegradation at groundwater sites throughout Michigan. Decision-makers are using the results to develop a plan, which would leave some of the areas to degrade naturally while removing areas high in chemical contamination.

• Made presentations on the use of radiodating to look at heavy metal deposition in west Michigan lakes at the Midwest regional meeting of the American Chemical Society and for the Western Michigan Chemical Society.

• Continued to examine how adding chlorine affects the performance of the Lakeview Airport Treatment Lagoons. This project is a collaboration with the Michigan Department of Environmental Quality (MDEQ) and Horizon Environmental.

• Started Phase II of a sediment contamination investigation in White Lake. Phase I, completed in 1998, focused on sediment contamination near the tannery, resulting in removal of the most contaminated areas. Phase II will examine the entire lake. The project is funded by Great Lakes National Program Office of the EPA.

• Initiated a two-year project on sediment contamination in Lake Macatawa in collaboration with Hope College. The investigation will look at levels of chemicals, heavy metals, and pesticides; toxicity to aquatic organisms; the benthic macroinvertebrate communities; and radiodating of core samples.

• Completed an extensive inter-laboratory evaluation of detection limits for PCBs. Sponsored by Ford Motor Co. and the American Automobile Manufacturers Association.

• Started a comprehensive habitat assessment of the White River watershed which covers a three county area—Muskegon, Oceana, and Newaygo counties. The project will primarily focus at water quality and benthic macroinvertebrates, but will also include important natural features. Funded by the Community Foundation *for* Muskegon County.

An Interview with Dr. Don Uzarski, Senior Research Scientist with the Environmental Biology Group. He also teaches Limnology in GVSU's Biology Department

You have been working on collecting data on the Great Lakes ecosystems, particularly along the lakes' coastline. What kind of data are you gathering?

The Great Lakes coasts containing emergent vegetation are legally considered wetlands; the miles of shoreline with weeds and vegetation are host to many different ecosystems and should be protected.

We go into those systems to collect chemical, physical, and biological data by taking samples of the water, plants, fish and macroinvertebrates. We observe what is happening around the system that may impact it, such as boat traffic, impervious surfaces, as well as other adjacent land cover and land use, and any possible sources of pollution.

What do you do with this information once its collected?

We go back to the laboratory to determine what we have and to analyze data. We especially look at how the biological community is responding to possible insults to the system. Certain things like sedimentation or sewage effluent or even boat traffic will impact the system differently. The biological community will respond or change in a specific way. You may get a shift of a certain organism when there is an excess of sedimentation, for example. You may get a different shift when an excess of nitrogen or phosphorus is added.

We compare our results to similar systems without these impacts and use the differences to develop our index of biotic integrity.

Why is it important to look at the biological community as well as the chemical components?

A wetland ecosystem is extremely variable. Just the time of day may change what you find chemically. Also, an episodic event like a spill could be flushed from the system and not be detected. But the biology will maintain a scar from the event—something that can be measured. When you can quantify a disturbance, it makes it easier to determine what happened and what further action needs to occur.

How does an index of biotic integrity help preservation and protection efforts?

We can determine what the impact is or was to a particular system by knowing what the community looks like. We use the biology to integrate time and space. Basically an agency like the MDEQ or U.S. EPA can go to a site and in about two hours collect just enough random biological samples needed for an accurate assessment. Then in the lab they can look for specific things in the community that we've already related to certain disturbances. Without this index, they would have to conduct an ongoing, maybe weekly sampling, for a year or several years before they could adequately determine the impacts to a particular system. The index saves these agencies lots of time and money.

How do coastal wetlands affect the health of the Great Lakes in general?

We're finding that these areas are extremely important—much more than what we had thought in the past. They can act as a sink for excess nutrients or pollution that would have otherwise entered the lake directly. They provide an essential food source for fish, birds, and terrestrial wildlife. They also offer suitable nursery habitats for fisheries. When their health is compromised, so is the well-being of the entire lake. Everything is connected. That's why focusing our attention on these coastal wetlands is a very essential part of preserving one of our most valued natural resources.

Researchers collect samples from shoreline wetlands.

An Interview with Dr. Mark Luttenton, Professor of Biology with a half-time appointment in the Environmental Biology Group

Much of the work you do involves setting up and implementing chemical and bio-monitoring programs. What do you keep track of and how does that benefit the environment?

Monitoring programs are very important for helping to maintain the integrity of the natural environment. They track changes in the system over the long-term and can give us indication of how other streams will respond given similar conditions. Many times we can detect patterns that will offer clues as to what's going on and how best to deal with it.

We monitor basically two different entities—chemicals or nutrients, such as nitrogen, phosphorus, and chloride; and the biology, including algae, aquatic insects, fish, and other living organisms present in the stream. By looking at these two things, we can get a good idea of the health of the stream in general.

Based on the general results of your work, how does development affect the health of a river, stream, or lake?

Any time humans come into contact with the natural world, there are bound to be consequences or changes. One of the major contacts is development,

The shoreline contains miles of wetlands that need protection.

which may alter the land and impact the natural environment. For example, when property owners apply fertilizers to their lawn, those nutrients eventually will make their way into the water system, where they do what they do best—make plants grow. A significant increase in algae production or underwater plant life will definitely change the biological community, altering behavior and even eliminating species. To make matters worse, sometimes the response to an increase in aquatic plant life is to apply herbicides, which further upset the system's delicate balance. Long-term monitoring will help us identify what the consequences will be and how we can keep our natural resources intact.

You have been monitoring the Muskegon River below Croton Dam. What have you discovered so far?

In the last few years, four exotic species have been introduced and are living in the Muskegon River—zebra mussels (which primarily reside in lakes), rusty crayfish, curly pondweed, and the spiny water flea—in addition to the sea lampreys, which have been in the system for a long time. These invasive species do not exist in this combination anywhere else so the situation is unique.

We do not know right now how these species will ultimately alter the Muskegon River habitat, which is renown for its trout and salmon fisheries. We do know, though, that these creatures have already changed the physical structure of the river and are threatening the survival of native species by competing for the same food sources. We will need to watch the situation carefully in the next few years to determine what other impacts will result.

2001 Environmental Biology Group Highlights

• Continued working on a wetland research project along the Great Lakes shoreline to develop indices of biotic integrity. Funded by MDEQ and the U.S. EPA.

• Started developing an index of biotic integrity using plants, fish, and macroinvertebrates for the drowned river mouth wetland ecosystems located along west Michigan. Funded by a grant from the Great Lakes Protection Fund.

• Collaborated with an international team of researchers to test indices of biotic integrity and additional indicators in the wetlands of the Great Lakes. Study suggested by the 1998 State of the Lakes Ecosystem Conference and funded by Great Lakes Wetland Consortium and the U.S. EPA.

• Continued bio-monitoring assessment of the Cedar River, a highly prized trout stream near Mancelona. The monitoring program was requested by the Friends of Cedar River after a berm collapsed, spilling 1,000 pounds of sediment into the river. Cedar River also borders a popular golf resort and residential development community. The program will help keep track of changes in the system as a result of their close proximity.

• Developed monitoring program and conducted analytical lab test for the Coldwater River Watershed Council, which will help determine how the system is functioning from a chemical/physical standpoint.

• Continued assessing fish and insect communities and recording temperature fluctuations in the Rogue River.

• Continued a study on aquatic insects in the Muskegon River.

• Studied sections of the Muskegon River below Croton Dam to assess change in habitat resulting from introduction of invasive species.

• Collaborated on a bio-monitoring program with Murray State University in Kentucky. The program monitors the fish, algae, and aquatic insect communities as well as charts changes in chemical composition within several river systems in western Kentucky.

• Assisted with development of new methodologies, including the use of sonar equipment, for monitoring plant growth in inland lakes. Part of a Department of Natural Resources project.

Information Services Center

The Information Services Center (ISC) collects and analyzes data from environmental research projects, condenses these data into useful information, and then offers the information to those who make critical decisions about managing our natural resources.

"Through several different projects, the ISC has been able to develop tools and methods for capturing information on water quality and land use issues. These tools are valuable in solving not only environmental problems but also help shed light on socio-economic concerns as well."

An Interview with John Koches, Senior Program Manager

You are currently finishing work on the Muskegon River Watershed Plan. What can you say about the results?

The Muskegon River Watershed Plan is like many of our other plans—it first identifies where the current and potential nonpoint source problems are and then determines what needs to be done to correct those situations. Integral to that is an education process that acquaints everyone with what their responsibilities are in the conservation or remediation process.

The Muskegon River Watershed Plan is unusual because it covered such a large geographical area—over ten counties in west Michigan. We've worked with many partners and individual conservation districts in each county, and we've identified a number of subbasins that are in trouble or could be in trouble as a consequence of future development.

Overall, though, we've found that the watershed is a high quality habitat. It has a highly prized fishery—one of the major ones in west Michigan. It's not too late to implement measures to preserve and protect this precious resource.

Last year, a series of collaborated proposals came out of a conference on how to enhance our understanding of the Muskegon River Watershed. Your group began work on two projects this past year —the "Mega Model" project and the "Sustainable Future" project. What is the Mega Model project and what is AWRI's role?

The Mega Model project is a nickname given to a project recently funded by the Great Lakes Fishery Trust. The project is formally titled, "A Collaborative Approach to Understanding the Dynamics of the Muskegon Watershed: A Comprehensive Model, Risk Assessment and Tools for Use in Management." The project involves researchers from the University of Michigan and Michigan State University in the compilation of various computer models that are able to simulate land use change, hydrology, and complex natural communities. The idea is to package these models in a way that is useful in local decision-making. We intend to provide people with information tools that they can use to assess the environment and economic risks associated with land-use decisions. The Institute will serve as the archive for much of the data used in performing this analysis. We are also responsible for making sure the information is

Staff in the Information Services Group review charts and graphs.

accessible to researchers, decision-makers, and anyone interested in the health of the Muskegon River Watershed.

What is the other project and how is AWRI involved?

The Sustainable Future project refers to a project funded by the Wege Foundation with assistance from the Fremont Area Community Foundation and titled, "Building a Sustainable Future for the Muskegon River Watershed: A Decentralized Approach." This particular project involves updating a land use and cover inventory for the entire Muskegon River Watershed. Researchers from Michigan State University will identify land use changes by interpreting recent aerial photographs. AWRI will be verifying certain areas and developing maps and atlases to demonstrate changes.

Understanding what has changed over the last few years will help us predict what will change in the future. From this information, we will be able to create tools useful to local decision-makers.

How has your work changed, and what will be your future direction?

Early on, we focused most of our attention on developing the tools necessary to collect, assess, and document land use issues. Much of this information went into creating a comprehensive Geographic Information System (GIS). Now that we have reliable tools established, we can get into the work of protecting and preserving our natural resources.

We also started out working with small watersheds, learning what it is we had to do and how we needed to do it. We are now taking those principles and applying them to larger watersheds.

Our move to the lakeshore is another step toward making our goal of Great Lakes research a reality. In the future, we can become even more proficient at collecting and then disseminating comprehensive, scientific information to the people who need it the most.

2001 Group Highlights

• Received two grants allowing us to implement the Rogue River Watershed Management Plan, which consists of a public education program (funded by U.S. EPA) and physical improvement projects (funded through the Clean Michigan Initiative). The Michigan Department of Environmental Quality (MDEQ) administers both grants.

• Began the Kent County Septage Management Project in partnership with the Metropolitan Water and Sewer Planning Agency. A final detailed plan will recommend alternative treatment and disposal technologies, suggest ways to coordinate maintenance and disposal programs regionally and county-wide, and create a public information program. Funded by the U.S. EPA as part of the Clean Water Act.

• Began a Road/Stream Crossing Inventory of Newaygo County. Funding provided by the Michigan Department of Transportation and the U.S. Forest Service as part of TEA21 (Transportation Enhancement Act for the 21st Century).

• Completed the fourth year of the Source Water Assessment Program for a 16-county region in west Michigan with funding provided by the MDEQ.

• Continued the Stormwater Management project, which outlined a coordinated, comprehensive program to manage stormwater runoff in Kent County. Several communities have already adopted a model ordinance resulting from this project.

• Started work on the "Sustainable Future" project to update land use and land cover for the entire Muskegon River Watershed. AWRI is partnering with Michigan State University (MSU), and the project is funded by a grant from the Wege Foundation with assistance from the Fremont Area Community Foundation.

• Started work on the "Mega Model" project, which will result in a system-wide model used to perform risk assessments in the Muskegon River Watershed. Project partners include University of Michigan and MSU. Funded by a $1.2 million grant from the Great Lakes Fishery Trust.

• Continued work on the Muskegon Watershed Management Plan, available for distribution in the spring of 2002. The project was funded by U.S. EPA.

• Completed land use update for northern Lake Michigan shoreline communities of Antrim, Emmet, and Charlevoix counties for the U.S. Army Corps of Engineers.

Outreach Initiatives

AWRI outreach initiatives keep the community informed about environmental concerns and offer unique learning opportunities that create awareness of, and appreciation for, our natural resources.

"One of the most important things we do is to create connections between individuals and groups. "

An Interview with Dr. Janet Vail, Senior Program Manager

How has the new Lake Michigan Center affected AWRI's outreach to the community?

The opening of the Center has definitely enhanced our ability to reach out to the community. We now have two classrooms—one is a laboratory suitable for biology, chemistry, and earth science demonstrations. The other is an audio-visual room equipped with eight computers that have high-speed Internet connections. With help from a grant awarded by the Community Foundation *for* Muskegon County, we are able to offer opportunities for K-12 students to have hands-on science experiences right at the Center. We'll also be in a better position to serve the 100 plus GLOBE and Project WET teachers who have been trained through our workshops. The Center opens up many new possibilities for outreach and education we didn't have before.

In November, AWRI brought back Lake Michigan: State of the Lake 2001, which held its debut in 1999. What did this conference accomplish?

We were very happy to see that many people who attended our first Lake Michigan: State of the Lake conference came back in 2001 for more news and updates on current issues affecting Lake Michigan. It's the start of a good tradition.

Speakers from throughout the Lake Michigan basin and beyond presented their research results and workshops on topics such as the state of our fisheries, the fate of contaminants in Lake Michigan, restoration of coastal watersheds, and more. One session at the conference, "Recreational Water Quality Workshop," even led to formation of a new organization that will address bacterial contamination on beaches. The Association's Internet listserv is called "Beachnet."

This past conference was the first time we advertised and communicated news about the conference electronically, which worked very well. We plan to bring back another version of the conference in 2003.

A group from Scientech takes a cruise aboard the *D.J. Angus.*

Last year you completed your fourth year on tour with the W.G. Jackson as part of Making Lake Michigan Great. What was new or different about the tour?

This year we partnered with the Shedd Aquarium in Chicago, the Indiana Dunes National Lakeshore, and the Indiana Dunes Environmental Learning Center to create some interesting learning experiences for participants.

Dr. William G. Jackson accompanied part of our tour. Students from schools in his home town of Iron Mountain joined us for day trips at Escanaba, one of our ports of call.

In our four years of the tour, we have visited 26 ports of call. This past year, our ports of call included White Lake, Port of Indiana, Chicago, Sturgeon Bay, Menominee, Escanaba, and Muskegon.

With each stop, we poll guests regarding their greatest concerns about Lake Michigan. This year the top concern was water quality and pollution followed by preservation, invasive species (particularly zebra mussels), and fisheries.

Anything new this past year with the GLOBE program?

GLOBE is a unique collaboration between scientists and the education community worldwide. K-12 students, guided by specially trained teachers, conduct daily, weekly, and seasonal environmental observations and archive their findings using the Internet. Scientists and students use these data for their research.

This year we were awarded a $5,000 grant from Michigan Space Grant Consortium to help implement a new GLOBE protocol on monitoring surface ozone levels. We are one of the first GLOBE partners in the world to help implement the new protocol. Ozone has been a topic of increasing concern, and awareness of ozone levels is vital to area-wide ozone action prevention programs.

2001 Group Highlights

• Hosted the Lake Michigan: State of the Lake 2001 conference in November, which was attended by more than 240 government agency representatives, scientists, researchers, policy makers, and those interested in learning about current Lake Michigan issues. The keynote speaker was Dr. Elena Kuzenvanova from Russia, who talked about the Lake Baikal-Lake Michigan Partnership. The conference was funded by the U.S. EPA and GVSU.

• Completed a fourth successful year of the *Making Lake Michigan Great* tour during which the *W.G. Jackson* traveled to 7 ports of call on Lake Michigan. More than 1,300 people turned out for the events. Funded by the U.S. EPA.

• Concluded another successful year during which more than 8,000 people participated in activities aboard the research vessels, the *D.J. Angus* and the *W.G. Jackson*.

• Held the first facilitator training session for Project WET (Water Education for Teachers) since 1995. The facilitator network for Project WET continues to grow. Project WET is a national, interdisciplinary water education program originally developed in 1984. AWRI serves as the Michigan Project WET host organization.

• Organized water festivals as part of Project WET at three sites in Michigan. More than 50,000 children nationwide attend "Make a Splash With Project WET" events and participate in fun, hands-on learning activities that teach them the importance of water in our daily lives. This year the festival was held on September 21. AWRI also hosted a variety of events, summer camps, and workshops at AWRI's new Lake Michigan Center.

• Co-sponsored another Global Learning and Observations to Benefit the Environment (GLOBE) training workshop—the first time at the new Lake Michigan Center. Training was also held at the Kettunen Center near Cadillac, Michigan. AWRI was one of the first GLOBE partners in the world to assist students in implementing a new protocol for measuring surface ozone atmosphere. Funding provided by the Dart Foundation, Frey Foundation, Michigan Space Grant Consortium, and the Wege Foundation.

The R. B. Annis Water Resources Institute works closely with GVSU professors researching our environment. The following professors received AWRI Faculty Research Awards:

Carol Griffin
Assistant Professor of Biology
Project title: Knowledge, Concerns, and Behavior of Residents and Nonresidents about the Rogue River Watershed

AWRI research vessel support was provided to:

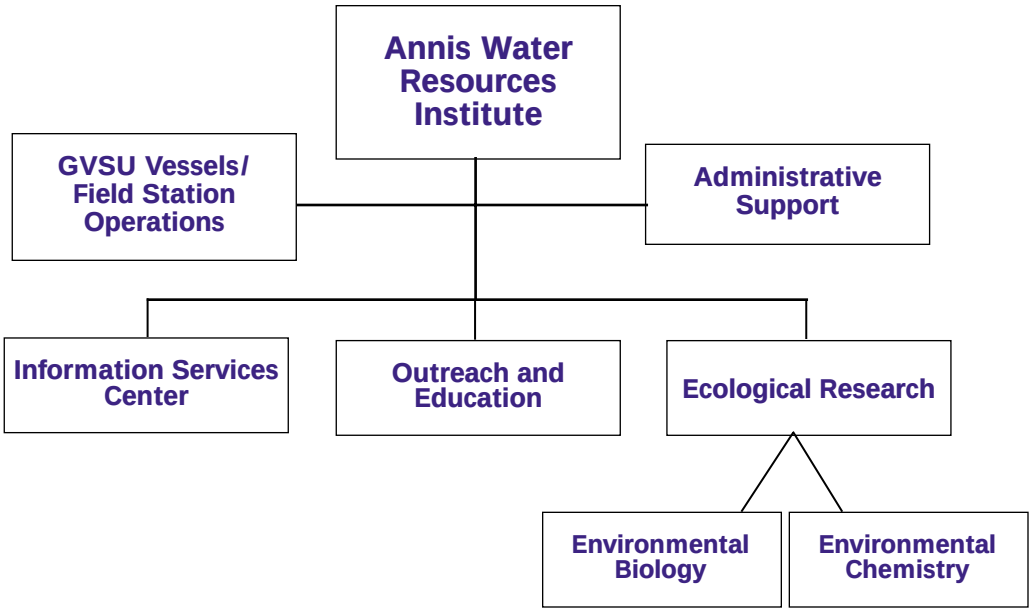
Peter Riemersma
Assistant Professor of Geology
Project title: Grand River Plume Study

Faculty Collaborators:
John Gabrosek, Assistant Professor of Math and Statistics
Carol Griffin, Assistant Professor of Biology
Mark Luttenton, Associate Professor of Biology
Shaily Menon, Assistant Professor of Biology
Paul Thorsnes, Assistant Professor of Economics

AWRI provides opportunities for students to pursue their interests in our environment. The following students received AWRI internships during 2001:

D. J. Angus-Scientech Educational Foundation Interns:
Eric Andrews
Kimberly Barnes
Brett Shelagowski

Ford Motor Company Interns:
Ann Hammond
Michael Russ
Pete Stevens



2001 AWRI Staff

Director:
Alan Steinman
Ron Ward (Retired June 2001)

Administrative Support:
Tonya Cnossen
Renee Kemp
Roxana Taylor

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John Koches, Sr. Program Manager
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Rod Denning
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Katherine Rieger
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GVSU Vessels/Field Station Operations:
Anthony Fiore, Jr., Fleet Captain
Richard Behm
Ronald Brown
Robert Burns
John Gort
Roger Hillstead
Thomas Kamp
Trent Knop
Douglas Maas
Daniel McCormick
Robert Pennell

Ecological Research, Environmental Chemistry:
Richard Rediske, Sr. Program Manager
Betty Doyle
Jeff Harmon
Augie Kotlewski
David Nash
Jim O'Keefe
Cynthia Thompson

Ecological Research, Environmental Biology
Don Uzarski
Mark Luttenton

Student Assistants:
Eric Andrews
Kimberly Barnes
Adam Bosch
Beau Braymer
Michael Buth
Jonathan Ginka
Betsy Grannis
Ann Hammond
Rochelle Heyboer
Robin Johnson
Yashica Lockett
Nikki MacDonald
Michael Russ
Brett Shelagowski
Malini Sridharan
Donna Stevens
Pete Stevens
Sue Swiger
Brenda Tinsley
Jessica Weerstra
Shawn Wessell
Nikki Whitaker

If you would like more information about AWRI's programs, please call us at (616) 895-3749 or (231) 728-3601, fax us at (616) 895-3864, contact us through the internet at www.gvsu.edu/wri/, or write us at Annis Water Resources Institute, Lake Michigan Center, 740 W. Shoreline Dr., Muskegon MI 49441.