

2006

Dedicated to Our Aquatic Resources: A History of the Robert B. Annis Water Resources Institute

Gordon L. Olson

Follow this and additional works at: <https://scholarworks.gvsu.edu/reports>

 Part of the [Archival Science Commons](#), [Education Commons](#), and the [History Commons](#)

ScholarWorks Citation

Olson, Gordon L., "Dedicated to Our Aquatic Resources: A History of the Robert B. Annis Water Resources Institute" (2006). *Grand Valley Reports and Histories*. 19.

<https://scholarworks.gvsu.edu/reports/19>

This Report is brought to you for free and open access by the University Archives at ScholarWorks@GVSU. It has been accepted for inclusion in Grand Valley Reports and Histories by an authorized administrator of ScholarWorks@GVSU. For more information, please contact scholarworks@gvsu.edu.

"Dedicated To Our Aquatic Resources"

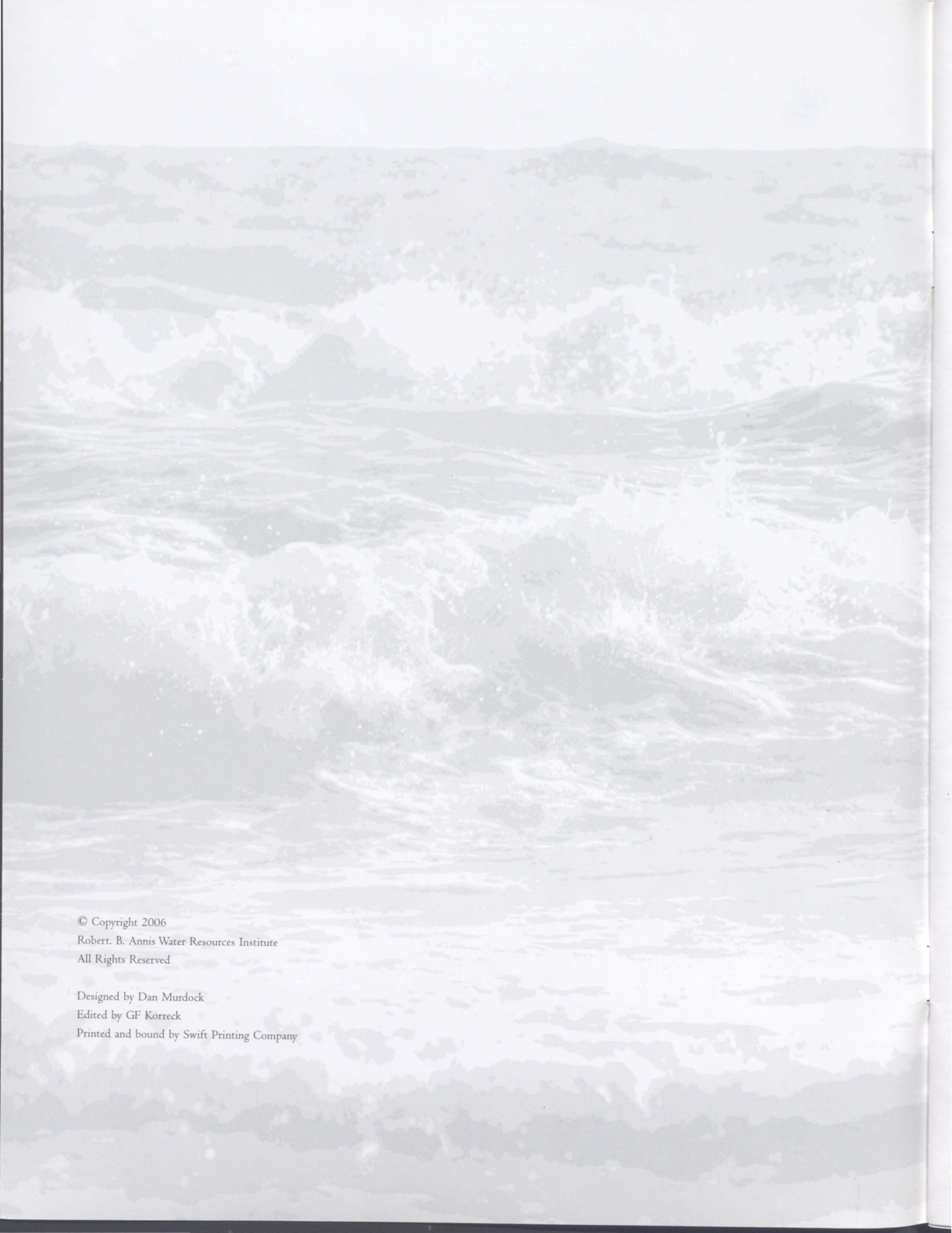
A History of the Robert B. Annis Water Resources Institute



Gordon L. Olson



**GRAND VALLEY
STATE UNIVERSITY**



© Copyright 2006
Robert. B. Annis Water Resources Institute
All Rights Reserved

Designed by Dan Murdock
Edited by GF Korreck
Printed and bound by Swift Printing Company

"Dedicated To Our Aquatic Resources"

A History of the Robert B. Annis Water Resources Institute

Dedication

Foreword

Preface

Chapter One:

Chapter Two:

Chapter Three:

Chapter Four:

Chapter Five:

Chapter Six:

Chapter Seven:

Gordon L. Olson



GRAND VALLEY
STATE UNIVERSITY

This history is dedicated to
D. J. Angus, Robert B. Annis, William G. Jackson,
and all the others who generously gave their time and
financial support to assure the success of the
Robert. B. Annis Water Resources Institute.

Dedication

Foreword

Dr. Alan Steinman. iii

Acknowledgements iv

Preface v

Chapter One:

A New College in West Michigan, 1960-1967. I

Chapter Two:

Founding Grand Valley's Aquatic Program, 1967-1985. 5

Chapter Three:

Creating the Water Resources Institute, 1985-1991. II

Chapter Four:

A Growing Water Resources Institute, 1991-1995. 19

Chapter Five:

A New Home in Muskegon, 1995-2001 23

Chapter Six:

Stepping Up to a New Level, 2001-2006. 29

Chapter Seven:

Into the Future. 39

Almost four centuries ago, John Donne wrote that “no man is an island, entire of itself; every man is a piece of the continent, a part of the main.” This meditation, that all humankind is interconnected, is a wonderful parallel for the genesis and maturation of the Annis Water Resources Institute. There are a hundred reasons why the Institute should have failed, but the vision, persistence, and support of people from within GVSU, such as the Institute’s first director, Ron Ward, and its upper administrators, such as President Lubbers and Dean Kindschi, helped it emerge from the womb and provided a nurturing environment for its growth. But even then its survival and growth were not guaranteed. Without the financial support from people throughout the West Michigan region, the Institute might still be floundering in the basement of a building on GVSU’s main campus. I am indebted to all our supporters, many of whom are identified in the following pages of this historical document. But the final connecting piece that helped ensure the growth and success of the Annis Water Resources Institute was our personnel; the faculty, staff, and students make up the heart and soul of the Institute, and through the good years and bad years (and after reading this history you will appreciate that there were plenty of

both), they have helped create an environment and culture that has consistently 1) been responsive to our clients, region, and the scientific community; 2) delivered scientifically rigorous products; and 3) sought out new challenges and identified solutions to the environmental problems facing this planet. The interactions of all these people: internal boosters, external supporters, Institute personnel, general public, and the scientific community, has created an organization that would be the lesser if any one part was removed.

I am privileged to oversee an organization that integrates research, education, and outreach to make a difference in our society. The story that unfolds in this narrative is compelling and relevant, and it is brought to you via the pen of one of our region’s foremost historians—Gordon Olson. I thank all the people who have been involved in the creation and maturation of the Robert B. Annis Water Resources Institute; I hope that you are as proud of this organization as I am.

Dr. Alan Steinman

Director, Robert B. Annis Water Resources Institute

A New College in West Michigan

1969-2000

This book is the work of many people, beginning with D.J. Angus, Robert Annis, William G. Jackson, and many others who gave their time and treasure to make the Robert B. Annis Water Resources Institute a reality. The story of their generosity and of the work of the many professionals who built the Institute's reputation for high standards of research, teaching, and community involvement deserves a broad audience.

Many Robert B. Annis Water Resources Institute staff members and supporters contributed to this research and writing effort, beginning with its current director, Dr. Alan Steinman, and his predecessor, Dr. Ronald Ward. Also granting interviews were Dr. P. Douglas Kindschi, Dr. Janet Vail, John Koches, Tonya Cnossen, and Arnold Boezaart of the Community Foundation for Muskegon County. The interviews were transcribed by Jody Rewa and John McCutcheon. Their prompt, accurate work enabled me to keep the entire project on schedule throughout the past year. Tonya Cnossen, Heidi Feldpausch, and Roxana Taylor helped locate photographs to illustrate the Institute's story, as did Robert Beasecker, GVSU Libraries Director of Special Collections.

Finally, the professionalism of everyone involved with the book's production made the task go smoothly. Once drafted, the manuscript was reviewed by Dr. Steinman, and then carefully copy edited by GF Korreck. The edited and corrected manuscript was then turned over to Dan Murdock, who created its design. Final printing and binding were the work of the Swift Printing Company of Grand Rapids.

Along with all other residents of West Michigan, I am indebted to everyone associated with the Robert B. Annis Water Resources Institute for enhancing our quality of life through their research and education activities. To everyone who participated in this history project I express a hearty "Thank You." Telling your story was truly a pleasure.

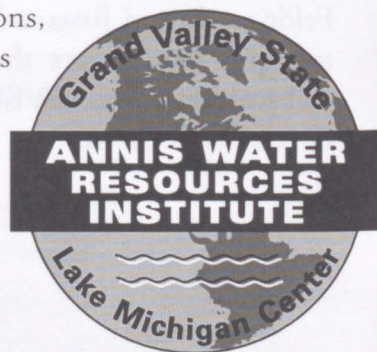
Gordon Olson



With more than 3,000 miles of shoreline, over 40 percent of Michigan's surface is covered with water. Four of the five Great Lakes touch its borders. Along with the Great Lakes, which surround it on three sides, the state features 36,000 miles of streams, over 11,000 inland lakes, and vast underground aquifers. Water is Michigan's dominant, but often least appreciated, natural resource. As Americans look ever closer at their environment, knowledge about water and the organisms that inhabit aquatic systems becomes increasingly important. Since its founding twenty years ago, Grand Valley State University's Robert B. Annis Water Resources Institute has been at the forefront of critical water education and research projects throughout the region and country. In the course of two decades, it has grown from a foundling organization in a basement office operated by a director and part-time assistant to a nationally recognized education and research facility.

Once featuring a 50-year-old yacht for teacher and student trips on Lake Michigan, it now has two educational/research vessels serving more than 5,000 students annually. Its headquarters on Muskegon Lake, with eight full-time principal investigators, is home base for more than twenty concurrent research projects. On a typical day, investigators work on numerous public or privately funded research projects, teach students ranging from elementary to graduate school, conduct tours aboard their Lake Michigan education/research vessels, meet with area business and government leaders to discuss water quality and research-related questions, and respond to queries from around the United States and other parts of the world.

And it all started with an idea for a new college in West Michigan.



A New College in West Michigan

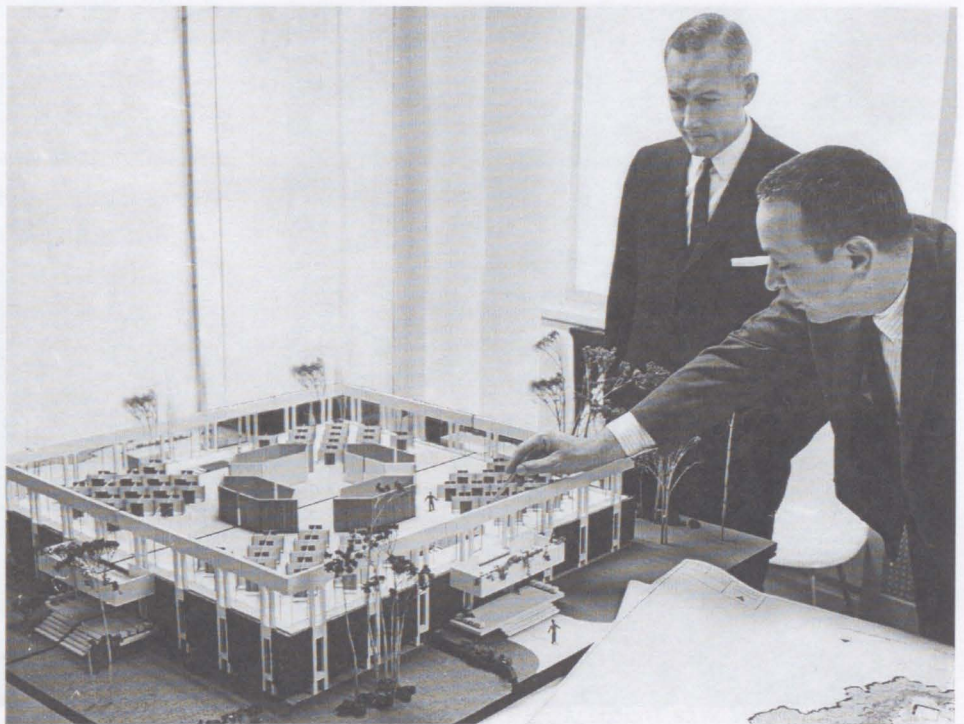
1960 - 1967



Up to just beyond the midpoint of the 20th century, there were no public four-year colleges in lower West Michigan north of Kalamazoo. As the area and population grew, the Michigan legislature took notice and passed an enabling act in 1960 that allowed for the formation of a new college in the West Michigan region. Three years later, Grand Valley State College admitted its initial class of 226 students.

Designed as a new type of public college that provided a classical liberal arts education, Grand Valley's first-year curriculum called for entering students to take a block of nine foundation courses in literature, history, mathematics, science, and foreign languages.

Some challenged this idealistic founding mission. The college's small faculty was divided between those who favored a traditional liberal arts curriculum and pragmatists who argued for courses that would train students for specific employment after graduation.



Dr. James Zumberge, first president of Grand Valley State College, shown here with architect William Kessler (right) looking at a model of one of the school's first buildings, took the initial step toward the formation of the Annis Water Resources Institute when he accepted D.J. Angus' yacht as the fledgling school's floating classroom.

(All photos courtesy Grand Valley State University)

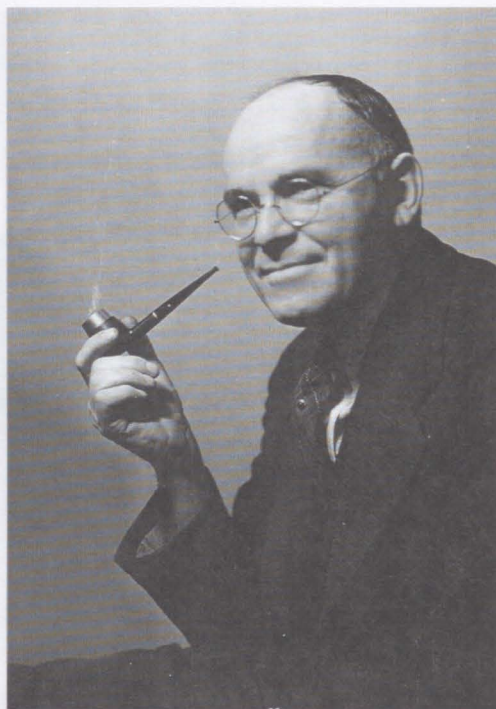
The debate continued for the college's first two decades as it went through several reorganizations before emerging in the 1980s as a regional public university offering a full range of traditional liberal arts as well as professional undergraduate and graduate courses.

The college's first president, Dr. James Zumberge, leaned toward pragmatism, and

attempted to address the practical education needs of West Michigan students while remaining supportive of the classics curriculum. He recognized the state's need for elementary and secondary teachers, for example, and proposed the addition of an education program. Zumberge stated early on that part of Grand Valley's mission would be defined by its location along the Grand River, and the nearby presence of Lake Michigan.

Originally from Sheboygan, Wisconsin, but with a summer home in Spring Lake, Michigan, "D.J.", as he was known to just about everyone, had first offered the *Angus* to the University of Michigan. The U of M declined because it already had a vessel for Great Lakes research. His next choice was the state's newest school. Zumberge accepted the gift on behalf of the school's foundation, which had been set up to accept such gifts.

D.J. Angus was a self-taught pioneer in the electrical industry, working for companies in Wis-



A Wisconsin native with family ties to West Michigan, D.J. Angus donated his 45-foot diesel-powered yacht to Grand Valley State College in 1965.



After 25 years as its namesake's personal yacht, the *Angus* began a second career on Lake Michigan as an education and research vessel.

D.J. Angus' Gift To Grand Valley, 1965 -1967

Not long after Grand Valley saluted its first graduating classes, Zumberge's emphasis on water and his willingness to entertain deviations from the classical curriculum received a boost when Donald J. Angus, an Indianapolis businessman, offered his diesel-powered launch, the *Angus*, to the college.

consin and Michigan as a young man at the beginning of the 20th century. He also spent time as a technician at Michigan Agricultural College's (later Michigan State University) electricity laboratory before moving to Indianapolis and forming an electrical engineering and consulting firm with J.W. Esterline in 1914. The consulting business grew into the Esterline-Angus Company, maker of a variety of measuring and graphic recording

instruments. Among their many applications, Esterline-Angus instruments were used to accurately monitor the production and output of electrical power plants. Their instruments also were involved in scientific experiments; one of Angus' proudest moments came on December 2, 1942, when an Esterline-Angus graphic recorder was used by Enrico Fermi's research team at the University of Chicago to measure "neutron flux in the world's first atomic pile"—the first controlled atomic reaction.

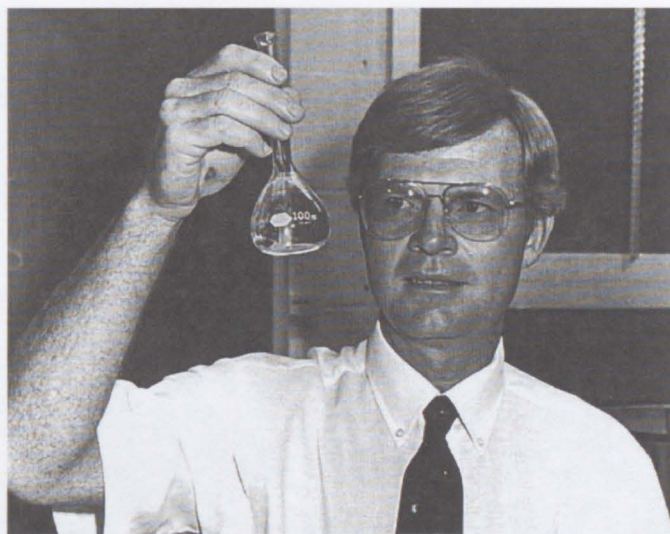
Angus spent his summers near Lake Michigan where his family kept a small launch at their Spring Lake home. During these visits he often talked about having his own vessel. When he learned that a Wisconsin boat maker was willing to build a substantial boat for him at little more than cost in order to keep its work force together during the Great Depression, he placed an order for the 50 foot, diesel-powered, steel-hulled vessel he named the *Angus*. For the next 25 years, the *Angus* was the center of D.J. Angus' non-working life, with the time he spent on the boat increasing after he sold the Esterline-Angus Company in 1960. Unfortunately, his dream of summers aboard the *Angus* was cut short in 1964 when a serious fall aboard the vessel during a storm robbed him of the energy and robust health that had been his hallmark. No longer able to enjoy his boat, *Angus* set out on the quest to find it a new home that led to Grand Valley.¹

Finding A Captain

At about the time Zumberge accepted the *Angus*, a set of unplanned circumstances brought the boat together with the man who would manage its use as a teaching vessel for the next 35 years.

In 1966, Grand Valley's Biology Department announced an opening for someone to teach animal behavior and an aquatic ecology class. Among the applicants was Dr. Ron Ward, a recent graduate of The Johns Hopkins University with significant experience in aquatic research. A native of Pennsylvania, Ward held a bachelor's degree from Indiana University of Pennsylvania and a master's

degree from Ohio University. He had recently completed doctoral studies at Johns Hopkins. His field research focused on two small Chesapeake Bay estuaries known as Back River, where water quality was impacted by the releases of Baltimore sewer and storm water, and Middle River, which received no such releases. In what may have been a portent of things to come, Ward and his colleagues conducted their research in a small, salvaged cabin cruiser once used by the United States Fish and Wildlife Service.



Dr. Ronald Ward undertook one of Grand Valley's first community research projects in the late 1960s, studying the effect of chlorine in discharges from the city of Wyoming's wastewater treatment plant.

The Biology Department saw Ward's experience and credentials as a good fit and, in turn, Ward was impressed by President Zumberge's vision and the Biology Department's enthusiasm. When he was taken for a visit to the newly acquired *Angus*, which lay buried under a foot of snow at nearby Spring Lake, Ward saw not problems, but opportunities—the *Angus* could be a vehicle for workshops and field trips on Lake Michigan that would fit well with Grand Valley's mission. He accepted the job.

Launching the *Angus*

The *Angus* had been inactive since being turned over to Grand Valley in 1965 and Ward's first

assignment, aside from preparing for the classes he was set to teach, was to learn whether the boat was seaworthy. As Ward and his colleagues prepared to work on the *Angus*, he found an ally in the person of Don Lautenbach. Head of the Grand Valley physical plant and an old Navy hand, Lautenbach assured Ward, "I can fix that old boat."²

The *Angus* was hauled via flat bed trailer to a quickly built lean-to on the college's campus near Allendale, Michigan. There, Lautenbach and his employees sandblasted its hull and performed inte-



Leonard Lamb became the *Angus'* captain in 1968 and remained active in Grand Valley's aquatic education program for nearly three decades.

rior carpentry and other repairs, getting it ready for its new career. Thanks to a modest National Science Foundation (NSF) grant secured by Zumberge soon after the *Angus* became its property, the college was able to add radar and sonar, a new electrical power unit, a hydraulic winch, and scientific equipment needed for teaching and research.³

In the spring of 1967, the rejuvenated *Angus* was launched from Grand Haven. Serving a college with a student body that still numbered less than 1,000, it made only a few trips on Lake Michigan but in doing so established a template for a floating classroom program and laboratory. Grand Valley students preparing to be teachers and, later, returning teachers taking graduate classes and specialized workshops, were the first to use the *Angus*. These small groups used the boat's modest technology to analyze lake bottom sediments and water chemistry, and to observe aquatic life.

Don Lautenbach captained the *Angus* its first year before being replaced by Captain Earl Seitz for a year. In 1968, Captain Leonard Lamb took over the vessel. He remained a participant in the school's aquatic education program until his death in 1997.

ENDNOTES

1. Gordon Olson, *D.J. Angus: Practical Entrepreneur* (Allendale, Grand Valley State University, 1990), pp. 4-14, 18-22.
2. Interview with Dr. Ronald Ward, November 28, 2005, pp. 4-8.
3. James Zumberge, *Grand Valley State College: Its Developmental Years, 1964-1968* (Allendale, Grand Valley State College, 1968), p. 89.

Founding Grand Valley's Aquatic Program

1967 - 1985



While the *Angus* was drawing attention, Grand Valley's Biology program was growing in scope. In the summer of 1967, the department offered courses in terrestrial ecology, aquatic ecology, and animal behavior—all using the *Angus*. The terrestrial ecology class, taught by Prof. Fred Bevis, normally took two or three trips on the boat, while the fisheries biology class used the boat to collect samples. Later, a human ecology class taught by Ward incorporated trips on board the *Angus*. The college also teamed with The University of Michigan in a joint program that offered prospective teachers undergraduate credit from Grand Valley. In addition, working teachers, by meeting additional requirements, could earn graduate credit from The University of Michigan.¹

Among the first teachers to attend a joint workshop was Gus Unseld III, who later became a long-time instructor in the program. Unseld asked if it were possible to bring high school students to Lake Michigan for a workshop aboard the *Angus*. The request fell within the college's mission of being a teaching institution, and it offered an opportunity to boost the image of the fledgling school. Before long a select number of young students were enjoying the *Angus* experience.

Teacher and student interest in the *Angus* took a significant step forward after April 22, 1970, the first national Earth Day organized by U.S. Senator Gaylord Nelson of Wisconsin. Two thousand colleges and universities, ten thousand high schools

and grade schools, and more than twenty million citizens participated in a grassroots effort to demonstrate that Americans were concerned about the deterioration of the environment and determined to do something about it. Ecology and environmental science classes, which had been gaining in popularity on college and university campuses before Earth Day, became all but mandatory after the event. For Ward and the Grand Valley Biology Department, this meant a tremendous increase in the numbers of students and teachers who wanted to add a trip on the *Angus* to their classroom activities.

The First Research Venture

As concern for the environment grabbed headlines, funding for new education and research programs became available. Among the earliest areas of interest were community water supplies—particularly the impact caused by large amounts of untreated or improperly treated sewage being released into the country's rivers and streams. Among those concerned was Paul T. Spelman, head of the Wyoming (MI), City Engineering Department. Spelman hoped to secure U.S. Environmental Protection Agency (EPA) funding to evaluate the impact of residual chlorine in treated wastewater released from the Wyoming treatment plant. Chlorine was often used to disinfect wastewater and there was growing evidence that residual chlorine was affecting plant and fish life in rivers, streams, and lakes. Encouraged by EPA officials, Spelman

sought Grand Valley's assistance to design and implement a study.

Although Grand Valley's stated mission did not involve research, the school's commitment to practical education led Ward and others in the Biology Department to see the Wyoming project as an opportunity to combine teaching with applied research for local benefit. For several years Ward and student assistants monitored residual chlorine in Wyoming's wastewater. The study led to a series of workshops, conferences, papers, and reports

larger retention basins, which allowed the chlorine to dissipate to acceptable levels before the water was released into the environment.²

While the Wyoming research project proved practical and useful, the *Angus's* teaching function remained the school's focus. By the early 1970s there was an established schedule for the boat whenever weather permitted. Grand Valley science professors and their students, together with area high school and junior high students, used the boat in the fall and spring, while an increasing number of



For over 30 summers, Robert Annis (far left) spearheaded Indianapolis's Sciencetech Club's annual program bringing Science Fair winners for weekend visits to Grand Valley's aquatic education program.

describing the damage and exploring ways to correct it. Eventually researchers and administrators concluded that the best approach involved carefully measured optimal chlorine levels and the use of

area teachers signed up for summer workshops.

Among the high school students were groups from Indianapolis, brought to Grand Valley by D.J. Angus' friends and colleagues, most of them mem-

bers of the Scientech Club he founded in 1918. Initially, Angus's friends made gifts to help repair and maintain the vessel. Then, after observing West Michigan interest in high school student activities aboard the vessel, they began sponsoring a visit to Grand Valley for Indianapolis students.

James Zumberge resigned as president in 1969 after seven years at Grand Valley's helm. In Zumberge's place, the school's Board of Control placed a young 29-year-old man who was already an experienced college administrator and who had strong West Michigan ties.

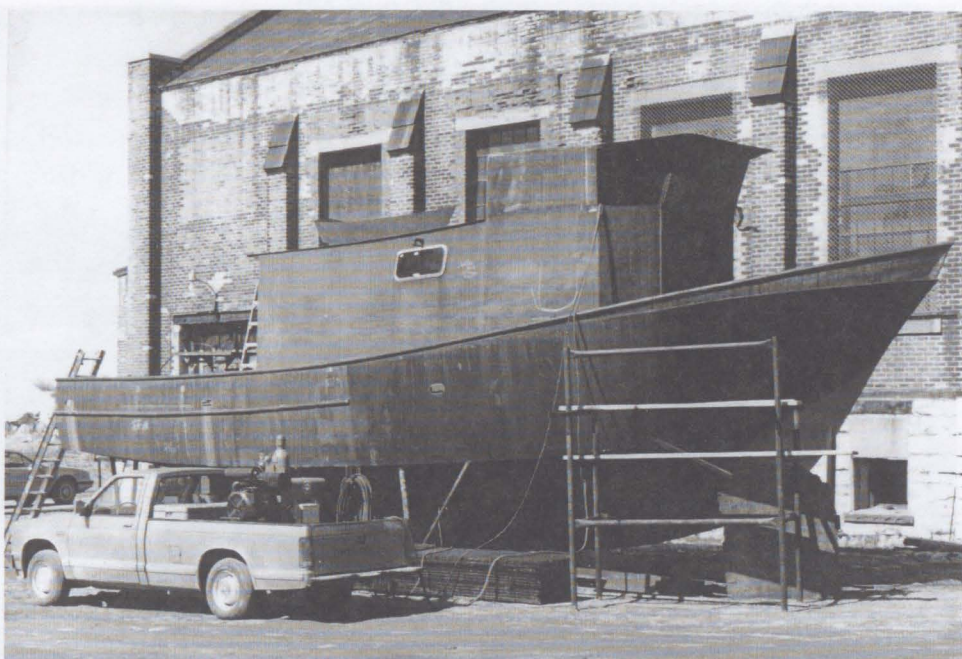
Arend D. "Don" Lubbers was raised in nearby Holland, Michigan, where his father Erwin, had been president of Hope College. Lubbers was serving as president of Central Iowa University in Pella, Iowa, a private liberal arts college affiliated with the Reformed Church in America at the time he accepted the Grand Valley appointment.

The school that Lubbers took over was still struggling to establish its identity, and one of the new president's first steps was to create a Reorganization Committee to reconcile the competing notions about how the school should go about its business.

When its deliberations were complete, the committee called for a cluster of several academic units, including two colleges: the College of Arts and Sciences and the experimental Thomas Jefferson College. In the next few years, three more colleges—William James College, College IV (later named Kirkhof College) and the Seidman School of Business—were added. Largest of the academic units was the College of Arts and Sciences, which included the Biology Department. For the programs associated with the *Angus*, this meant more

students and pressure to find dates and crew to accommodate all those who sought access. Further compounding Ward's efforts was a bleak state economy that brought declining appropriations for higher education.³

As the state struggled, so did Grand Valley. The school's enrollment stagnated, and its harshest critics talked of turning it into a state prison. Others took note of the *Angus* and called for the sale of what they referred to as President Lubbers' "personal luxury yacht."



The *D.J. Angus* received a five-foot extension amidships before it was completed in a Bay City boatyard.

Lubbers refused to yield to the pressure, but he did encourage Ward and others to find alternative financing to cover the *Angus's* rising maintenance and operating costs. Ward proposed the establishment of an endowment to keep the boat afloat. One of the first fundraising ideas was to solicit the donation of used boats for resale. While the effort produced only modest results, it attracted the attention of Herbert VanderMey—a member of the school's Board of Control—who donated the first used boat to the fund and Robert B. Annis—a

member of Indianapolis' Sciencetech Club and longtime friend and business colleague of D.J. Angus.⁴

Annis had been a protégé of Angus—one of several youngsters the older man encouraged in science and outdoor education pursuits. The two men remained friends and business colleagues after Annis formed his own business manufacturing magnetizing and de-magnetizing devices and consulting on industry problems relating to magnetism. They also were active members of Indianapolis' Sciencetech Club founded by Angus and others to foster busi-

ness applications of scientific inquiry. As part of the recruitment campaign administrators sought to improve the college's relationship with West Michigan secondary schools, an effort in which the *Angus* and other programs for science teachers and their classes played an important role.

The Biology Department continued to seek outside funding throughout the 1970s and NSF responded at the end of the decade with funding



The new *D.J. Angus* made its first voyage, with a group of well-wishers aboard, in June 1986.

ness applications of scientific inquiry. In subsequent years Annis would make several substantial gifts to Grand Valley's aquatic programs, carrying on and expanding the support begun by his mentor and friend.

Changing Times, New Ideas

The state's economic woes continued to affect Grand Valley throughout its second decade, and the college's leaders mounted an aggressive cam-

for a four-year project to improve science education for elementary teachers. A collaboration of the Biology, Physics, Chemistry, and Geology Departments, the project's focus was the design of a series of college courses in each of the science units for teaching science to prospective elementary teachers. Water became a major theme of the courses, and this meant time aboard the *Angus* for teachers in training and in-service time during the summer for classroom teachers.⁵

Enter The *D.J. Angus*

In spite of project funding, increased pressure for use of the *Angus* came at a bad time. The old vessel had passed its 45th birthday and its engines and hull needed major work. As the University's manager of boat operations, Ward went to Lubbers with the news that the school's popular aquatic program was dealing with a sinking ship. Lubbers, always appreciative of the *Angus's* value, authorized Ward to investigate prices for both repair of the *Angus* and the acquisition of a new vessel.⁶

Ward began contacting Great Lakes boat builders. He soon received a telephone call from Robert Schieser in Bay City, who had seen the school's ad requesting old boats for the aquatic program's endowment fund. "I've got a boat here," he said, "that's half finished. I would finish it for you for a nominal cost. Would you be interested?" Schieser proposed donating the boat to Grand Valley after it was completed, less his costs, counting the majority of the vessel's value as a tax-deductible gift. Schieser owned a boiler welding firm that served the sugar beet industry and built boats as a sideline, including the partially finished 40-foot-vessel he was offering Grand Valley. Ward and the *Angus's* captain, Leonard Lamb, visited Bay City, and convinced Schieser to lengthen the center of the hull by five feet and then finish construction. The deal was struck in the fall of 1985, and the boat was delivered the next spring.⁷

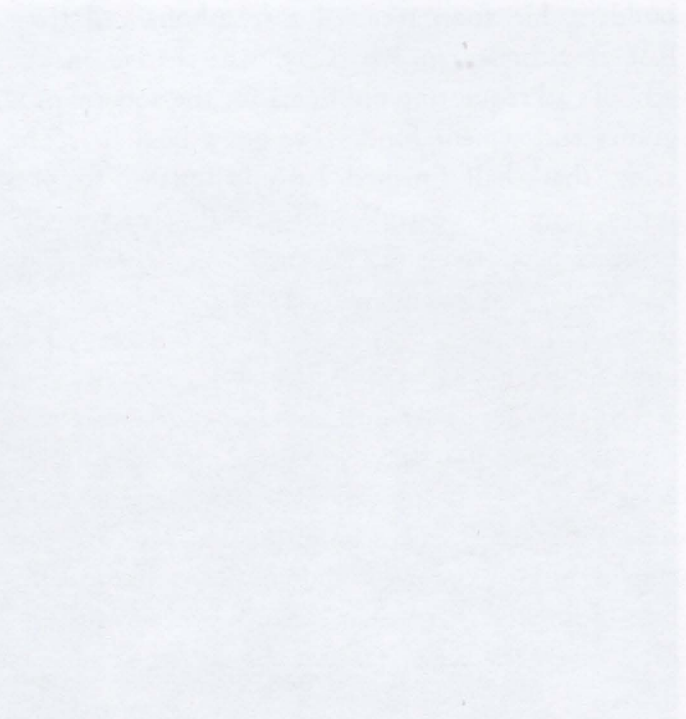
Named the *D.J. Angus*, to honor the man whose gift started the school's aquatic program 20 years earlier, the vessel was launched at its home port in Grand Haven in June 1986 with appropriate fanfare. Freshly painted in the white and blue trim of Grand Valley's school colors, the forty-five-foot-long and fourteen-foot-wide boat had a draft of four feet, with a top speed of ten knots. It was outfitted with laboratory equipment to analyze water quality, with fish and plankton sampling gear, sediment sampling equipment, a refrigerator for storing samples, and meteorological equipment to measure wind speed and direction, air temperature, and barometric pressure.

As the *D.J. Angus* sat moored to the dock of Grand Haven's Holiday Inn where the launching celebration was about to take place, an older man walked up and looked over the boat. Ward asked if he would like to come aboard the boat and the man asked if the vessel was named for Donald Angus of Indianapolis, Indiana. When told it was, he momentarily broke down, explaining that he was once a rough kid on the streets of Indianapolis, and that Angus had gotten him interested in science and eventually helped him attend college. Ward invited the now successful Detroit businessman to attend the launching dinner, giving him an opportunity to renew acquaintances with Angus's relatives and members of the Sciencetech Club who were in attendance. The unexpected guest's presence produced many "D.J." stories and comments about the pleasure he would take from the many positive benefits produced by his original gift. Inevitably, talk also turned to the future, and what new programs and activities the college was planning.⁸

ENDNOTES

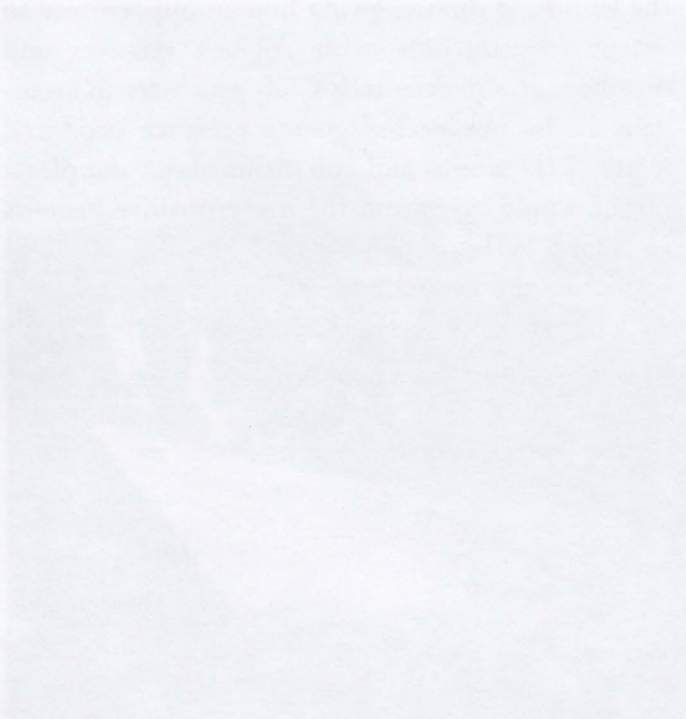
1. Interview with Dr. Ronald Ward, November 28, 2005, p. 20.
2. Interview with Dr. Ronald Ward, November 28, 2005, p. 21.
3. Anthony Travis, *History of Grand Valley State University* (Grand Valley State University website: www.webtest.gvsu.edu/gvhistory, 2006), pp. 32, 39, 43, 45-55.
4. Interview with Dr. Ronald Ward, December 1, 2005, pp. 11-12.
5. Interview with Dr. Ronald Ward, December 1, 2005, pp. 9-10.
6. Interview with Dr. Ronald Ward, December 1, 2005, p. 11.
7. Interview with Dr. Ronald Ward, December 1, 2005, p. 13.
8. Interview with Dr. Ronald Ward, November 28, 2005, pp. 18-19.

Enter the Dr. Angus...
...the news that the school's popular...
...the acquisition of a new...
...had been...
...the news that the school's popular...
...the acquisition of a new...
...had been...



...the news that the school's popular...
...the acquisition of a new...
...had been...
...the news that the school's popular...
...the acquisition of a new...
...had been...

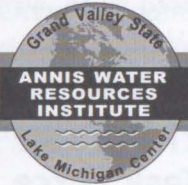
...the news that the school's popular...
...the acquisition of a new...
...had been...
...the news that the school's popular...
...the acquisition of a new...
...had been...



...the news that the school's popular...
...the acquisition of a new...
...had been...
...the news that the school's popular...
...the acquisition of a new...
...had been...

Creating the Water Resources Institute

1985 - 1991



At the time of the *D.J. Angus's* launching, plans were also underway for a dramatic change in Grand Valley's aquatic education and research program. For some time, members of the Biology Department had talked of a more formal approach to the use of the *Angus* and to aquatic studies in general. Their interest came, in part, from the heavy use of the old boat, and also from increased funding available from government sources such as NSF and EPA, along with local foundations and individuals.



Dean P. Douglas Kindschi (right), shown here with Robert Annis (left) and Dr. Ron Ward, appointed the faculty task force that recommended the creation of the Water Resources Institute.

Changes within the college had an impact on program focus as well. During the ongoing fiscal crisis that extended into the early 1980s, Grand Valley moved closer to becoming a regional university, changing its name in 1983 to Grand Valley State University. Dr. P. Douglas Kindschi, Dean of Kirkhof College from 1976 to 1983, became Dean of the Division of Science and Mathematics. While Kindschi was fully appreciative of Grand Valley's emphasis on teaching over research, as well as the reality the smaller school could not compete with

the state's larger, well established universities, he also believed that there were research opportunities if the school targeted them to specific niches. One such area he had identified was aquatic science.

Upon arriving in West Michigan nearly a decade earlier, Kindschi, like Zumberge and others at Grand Valley, had noted the remarkable degree to which its people oriented their lives around water. Here was an area where Grand Valley could make a difference. In fact, it already was doing so. In addition to Ward and the activities of the *Angus*, other Grand Valley faculty members

were engaged in water-related studies. For example, Dr. Norman TenBrink of the Geology Department was doing groundwater research, Dr. Edward Baum of the Chemistry Department employed factor analysis to find the source of air pollution and believed similar techniques could be used with water, and Health Sciences Professor William Bell was investigating how epidemiology was connected to water.

The Water Resources Institute Task Force

Kindschi saw an opportunity worth pursuing. In 1985, after discussions with President Lubbers and several science faculty members, Kindschi appointed a 20-member faculty task force chaired by Ward to consider the establishment of a research institute focused on water. Meeting regularly throughout the last half of 1985, the task force produced a recommendation that the Grand Valley Board of Control authorize the creation of a Water Resources Institute.

The group's extensive report pointed to the importance of water in the state's history and economy, as well as its increasing value as "Michigan's greatest natural resource." The report's authors maintained Grand Valley was a logical choice for playing a major role in understanding and preserving this resource, citing the presence of the *Angus* and the various courses, programs, and research projects it produced, as well as a faculty with multidisciplinary expertise in water resource studies. Summing up the many factors calling for the creation of the Institute, the task force's authors stated:

...we can clearly identify that Michigan has a need and that Grand Valley has resources which can help fill this need. For this reason we propose a Water Resources Institute dedicated to the protection, development and improvement of our aquatic resources.

The report outlined five objectives for the Water Resources Institute and a like number of research and technical assistance areas.

The objectives were:

- To focus the attention of the West Michigan community on the importance of water to public health and economic development
- To provide local business, industry and government with information and technical assistance
- To assist in the development and conduct of faculty research
- To develop a laboratory facility
- To cooperate with existing institutions and agencies

The areas of potential research and technical assistance were spelled out with equal clarity:

- Water supply
- Water quality
- Protection of waters
- Shoreline processes
- Lake and stream ecosystems

Initially oriented towards research and technology transfer rather than academic coursework or degrees, the Institute was to serve as a "clearing-house for communicating technical information to the public, governmental agencies, business and industry of the area," offering faculty consultations on water quality problems, and regularly publishing a newsletter as well as topical reports.

To achieve its objectives the Institute would employ a full-time, tenured director "with primary emphasis on research and limited teaching responsibilities," supported by a secretary and a technical assistant "as soon as warranted by project work." Setting institutional policy and overseeing the director's work would be a seven-member Policy Board composed of the Institute's director and two community members, and four faculty members appointed by the Dean of Science and Mathematics. The two community members would also serve, along with faculty representatives, on an Institute Advisory Committee that would meet twice yearly

to review the general direction and purpose of the Institute. A starting budget of \$50,000 for staff and equipment was projected to grow to \$100,000 by the third year of the Institute's existence.¹

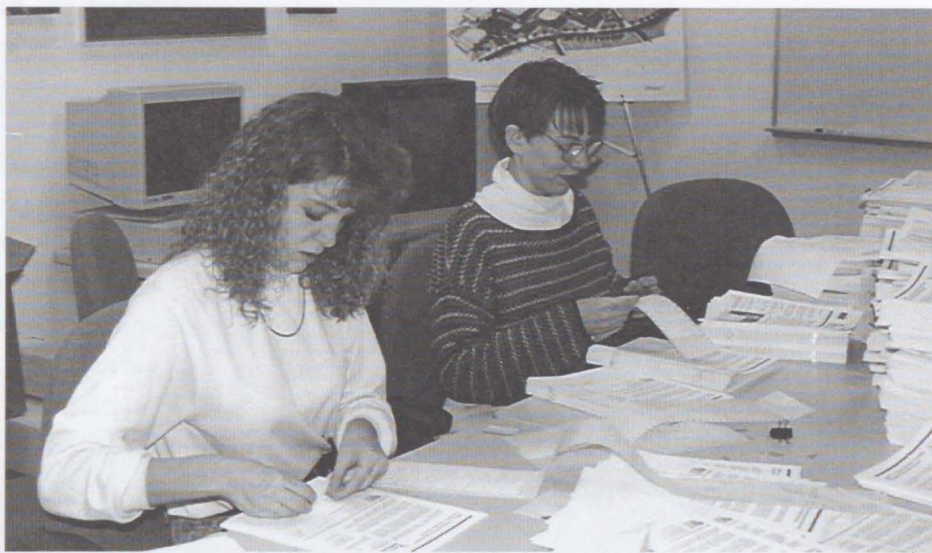
Dean Kindschi forwarded the task force's report to the school's Board of Control early in 1986 and at its May 8, 1986 meeting the board voted its unanimous approval of the Institute. Professors Edward Baum, Donald Hall, Melvin Northrup, and Norman Ten Brink were appointed faculty representatives to the Institute's Policy Board. They were joined by community representatives Lawrence Austin, John Koches, Dr. Richard Rediske, and Dr. Ronald Waybrant. In a move that surprised few, Dr. Ronald Ward was named the Institute's first director with 25 percent release time from his teaching obligations.²

The Water Resource Institute's First Years

In its initial years, most activity of the new Water Resources Institute centered on the *D.J. Angus*. Although work on the new vessel had been completed before the Institute was established, the Institute's first public event was the vessel's official launching on June 13, 1986. It was a splendid beginning. Nearly 200 people gathered for a first look at the new vessel and to celebrate the creation of the Water Resources Institute.

There were rough waters ahead, however. The Institute's first two years were a struggle. Even though the college was growing, the state continued to suffer economically and the college faced annual budget cuts. In the process, the school often found itself without adequate classroom and office space. With no place for an office, and no money for staff, Ward coordinated use of the *D.J. Angus* and conducted all other Institute business from his Biology Department office in the college's Loutit Hall.

Even without permanent staff other than Ward, the Institute began work in earnest. In addition to Ward's management of day-to-day operations, three other faculty members were designated research associates as they pursued projects endorsed by the Institute's board. Norman Ten Brink sought to identify groundwater aquifers in Ottawa County, Edward Baum was compiling a data base for chemical analyses of surface and groundwater quality, and William Neal began studying the dynamics of the



Student workers performed a variety of tasks at the newly formed Water Resources Institute. Here two students in the early 1990s assemble the *Water Resources Review*, a newsletter begun by the Institute in 1988 to inform interested parties about its activities.

Lake Michigan shoreline. Ten Brink's project was jointly sponsored by Ottawa County and the Center For Environmental Study, founded by Grand Rapids environmentalist and philanthropist Peter Wege. The others received small grants from the college's Research and Development Office.

Ward and the Institute's research associates continued their work without support staff assistance through 1987, even though it was clear that secretarial help was essential if the Institute was to expand its activities. Finally, in 1988, the college provided funds to hire Tonya Cnossen, a part-time worker in the Research and Development Center, for additional part-time work as secretary for the Water Resources

Institute. However, with the Institute still without an office of its own, Crossen remained at the Development Center while doing work for the Institute. She eventually became a full-time employee and is today the Institute's longest serving staff member and a key source of its institutional memory.³

From its earliest days, Ward understood the need to regularly tell community members about the Institute and its activities. Making presentations to government and education leaders, environmental organizations, service clubs, and other community

ties. Regular accounts of visits on board the *DJ. Angus*, research activities, and accounts of grant and contract projects filled its pages. Twenty years later, the *Review* was still a primary vehicle for communicating Institute activities to supporters.

With a modest organizational structure in place, Ward focused a portion of his time on the road ahead. In spite of its initial success, Ward realized the Institute would not grow without major grant funding. Throughout 1987 he, Norman Ten Brink, and other faculty scientists had worked on major proposals to the W.K. Kellogg Foundation and NSF. Both proposals represented initiatives that reflected growing concern over the environment, and the need to better prepare elementary and secondary school science teachers. Ward learned of the Kellogg Foundation's interest in groundwater research through colleagues at Michigan State University who were going to be responsible for managing the new program in regional centers around the state. Armed with information they provided, he and his colleagues used the new Water Resources Institute as the vehicle to bring together community members involved in groundwater and land use planning and development. With their input, the Institute submitted a proposal. Their initiative was rewarded when the Kellogg Foundation awarded Grand Valley its first Groundwater Education in Michigan (GEM) grant in 1988, designating the school the first of six groundwater education regional centers in the state.⁴

Totaling \$580,680 over three years, the GEM grant enabled the Water Resources Institute to hire its first full-time staff member, John Koches, as a project manager. Koches was a 1973 graduate of Grand Valley, whose career goals had been influenced by his interactions and experiences aboard the original *Angus*. He was a member of the Institute Advisory Committee and a planner for the West Michigan Shoreline Regional Development Commission when he was hired, and now heads the Institute's Information Services Center. The GVSU project was divided into four specific areas of emphasis: Networking,



Water Resources Review

GRAND VALLEY STATE UNIVERSITY WATER RESOURCES INSTITUTE

January, 1991 Volume 4 Supplement 1

G E M E X T R A

SUPPLEMENT TO THE WATER RESOURCES REVIEW

FROM THE GEM PROGRAM MANAGER

Long time readers of the *Water Resources Review* will remember when the Water Resources Institute (WRI) was selected in November 1988 by The W.K. Kellogg Foundation as a Regional Center for its Groundwater Education in Michigan (GEM) Program. WRI has completed the first two years of its work for the Foundation and is now in its third and final year.

WRI has been able to accomplish much in its first two years with GEM. This "Special Edition" of the *Water Resources Review* highlights our accomplishments to date and sets the stage for next year's activities and beyond. The article which appears on this same page touches upon how WRI has organized its GEM Program. It also identifies the accomplishments realized during Program Year II. The next article introduces the reader to our goals for the last scheduled program year. The concluding article looks at what the WRI has achieved as a result of GEM activities, and what lies ahead beyond Program Year III.

John K. Koches
GEM Program Manager



WRI CONCLUDES ITS SECOND YEAR AS A REGIONAL CENTER FOR GEM

Over the last two years, the WRI has made significant progress toward achieving its GEM Program goals. The work program is divided into four "Areas of Emphasis," which follows the originally conceived proposal to The W.K. Kellogg Foundation. Each area of emphasis has associated with it a corresponding goal (See below).

GEM Goals by Area of Emphasis

Information Networking:

- Goal #1 - To increase groundwater understanding by serving as a regional "hub" in a state-wide groundwater communication network.

Groundwater Research:

- Goal #2 - To protect and enhance groundwater quality.

Community Out-Reach:

- Goal #3 - To cooperate with and assist all GEM and other groundwater projects.

K-12 Education:

- Goal #4 - To develop and promote groundwater education.

Networking

Networking activities associated with this goal include an annual conference, a newsletter, and communications between and among all groundwater projects.

The WRI sponsored its Second Annual Groundwater Conference on October 9, 1990. It involved presentations from more than a dozen speakers, and attracted over 100 participants.

The *Water Resources Review* has evolved as a direct consequence of the GEM Program and has become a powerful information tool for the Institute. The *Review* has a new editor and its production has become an integral responsibility of all WRI staff and Research Associates. The mailing list has grown to more than 1,600 individuals and represents public and governmental officials, schools and universities, interest groups, media representatives, private consultants, business and industry, and numerous Foundations.

Groundwater Research

Groundwater Research Projects include the establishment of a Geographic Information System (GIS), geologic studies to determine aquifer recharge/discharge areas and aquifer vulnerability, and chemical studies to identify areas of groundwater contamination.

The WRI has created and currently manages a Well-Log Data Base which includes more than 13,000 wells in Ottawa, Muskegon, (See page 2)

A 1988 Groundwater Education Michigan (GEM) grant from the Kellogg Foundation gave the Water Resources Institute early recognition and important financial resources.

groups became a part of his routine. Under his direction, in 1988, the Institute began assembling a distribution list and publishing a modest newsletter, titled the *Water Resources Review*, to tell Grand Valley faculty, community leaders, financial supporters, and others who were interested, about staff activi-

Groundwater Research, Community Outreach, and K-12 education. After successfully completing the first grant period, the Institute received two additional grants to carry the project to its completion.⁵

When Koches arrived, the Water Resources Institute was still headquartered in Ward's office and, with no where else to turn, he moved in. It was an untenably overcrowded situation and Ward, Koches, and Clossen were ready to occupy just about any space the college offered. The solution turned out to be an area in the basement of Loutit Hall used for maintenance and storage. The approximately 850 square-foot space was quickly cleaned, painted and redone as the first official home of the Water Resources Institute. Soon after, when a wet laboratory space was needed, the Institute arranged to share space with a small photography studio in the building. Ward remained in his first floor office while other Institute workers moved to their basement quarters in February, 1989. Although it was not luxurious, it was their home for the next two years. The three staff members, plus students and faculty research associates, now had space to work and store their materials.

The move came just in time. That same year, the University received a three-year \$361,319 Project to Improve Science Education (PRISE) grant from NSF to incorporate water resources into Grand Valley Biology, Chemistry, Geology, and Physics courses for elementary teachers. The grant enabled Grand Valley to hire a project coordinator to work with science faculty to develop classes for elemen-

tary teachers, beginning with a prerequisite Biology offering followed by courses developed by the Geology, Chemistry, and Physics departments. Other smaller grants were added and the Institute's room was soon filled, with as many as 20 people sharing the space at peak times.

The Water Resources Advancement Campaign

Its first two large grants and resulting addition of staff increased the Water Resources Institute's



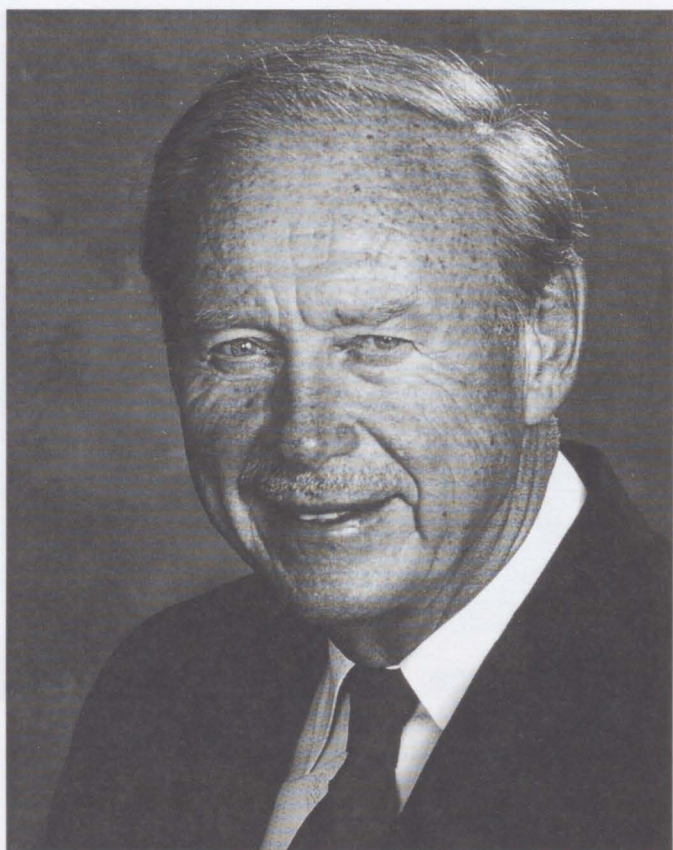
John Koches came to the Water Resources Institute to coordinate GEM activities and remained to head its Information Services Center (ISC). This photo shows John in ISC's laboratory at the Lake Michigan Center, with Muskegon Lake in the background.

profile on campus, in the state scientific community, and with West Michigan business and community leaders. That increased visibility received another boost in 1989 with the announcement of a Water Resources Institute Advancement Campaign guided by a steering committee led by Amway Corporation co-founder and Grand Valley Board of Control member, Richard DeVos. The campaign's announced goal was \$5.1 million, a far cry from the

initial grants of a few thousand dollars each that launched the Institute less than five years earlier.

Its goal in place, the Campaign began approaching potential funders. High on its list was the Grand Rapids Foundation. Hoping to secure a gift of as much as \$250,000, Ward, President Lubbers, and Joyce Hecht of the school's development office met over lunch in late 1989 with Foundation director Diana Sieger, Foundation board chair Herbert VanderMey, and board member David LeClaire. Ward made a brief presentation describing the role

makers were thinking along the same lines. Foundation representatives saw both short- and long-range benefits in the Water Resources Institute's proposal, and in response to the presentation asked a simple question: "What would you do if you had a million dollars for the Institute to work with?" Surprised by the amount, Ward jotted notes—possibly on a napkin—and asked for a few days to draft a response. Shortly thereafter, he came back with a proposal for equipment and research that meshed the Foundation's interest with the Institute's needs. When the



Herbert VanderMey, past chair of the Grand Rapids Foundation, was instrumental in helping the Water Resources Institute secure Foundation support for the Grand River Watershed Project. He also created an endowment that funds student internships at AWRI.

that the Institute hoped to play in understanding and controlling pollution, and in promoting community awareness of the Grand River as an asset in the redevelopment of downtown Grand Rapids.

Grand Rapids leaders and Foundation policy



To publicize the Grand River as a regional resource, Expedition 1990 featured a boat and canoe flotilla traveling down the Grand River, with many participants in historic costumes.

\$1 million grant was announced as a five-year contribution beginning in February 1990, it was front page news in the *Grand Rapids Press*.⁶ From notes written on a napkin at a noon luncheon, a project had emerged that helped define the early work of the Water Resources Institute.

Grand Rapids Foundation funds were put to work immediately. Under the banner of the Grand River Watershed Project, the Institute organized seven faculty/research associate projects for the 1990 summer season, including a 12-day canoe expedition led by well-known canoe explorers, Verlen and Valerie Kruger, that covered nearly the entire length of the Grand River from southeast of

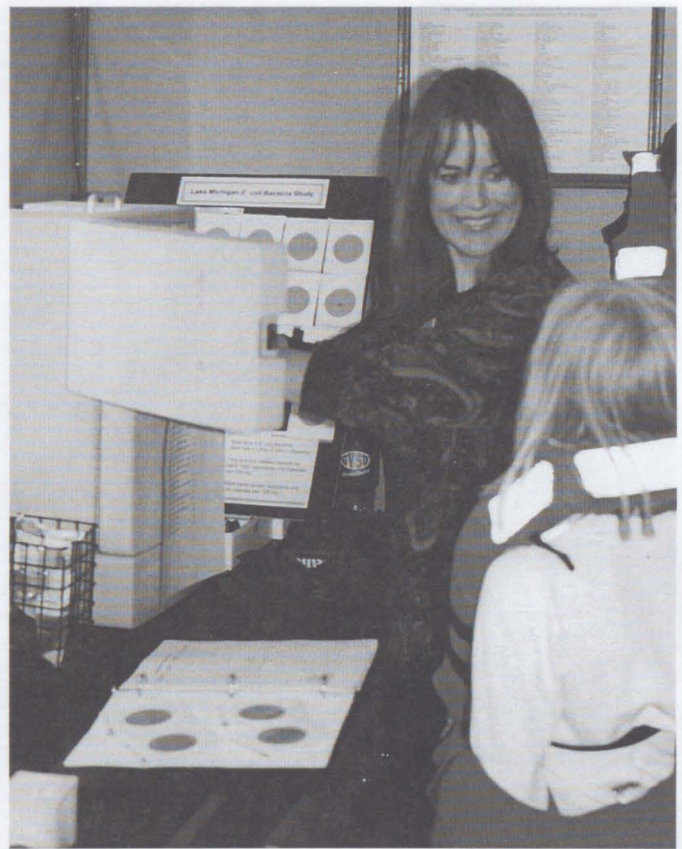
Lansing to Grand Haven (a distance much shorter than the Kruger's previous canoe trip from the Arctic to the tip of South America). The expedition was joined by teachers, scientists, historians, writers and community leaders as it collected water samples and made presentations at stops along the way. Also joining the expedition were students from area high schools. They were part of a new group of summer research associates at the Water Resources Institute funded by a \$53,664 grant from the Michigan Youth Corps received in early April 1990. The students worked throughout the summer collecting and analyzing water samples, participating in Grand River cleanup activities, and assisting Grand Valley faculty members engaged in watershed-related research.

Grant Money Begins To Flow

Events were moving quickly for the Institute. Another major grant, a three-year project for business and industry, completed the Water Resources Advancement Campaign fund raising efforts. The project involved \$106,871 from the Michigan Research Excellence Fund established under former Governor James Blanchard in 1984 to encourage the state's colleges and universities to develop research projects that would enhance the competitiveness of state businesses and industries. The state funds were complemented by a \$100,000 gift from the Grand Rapids-based Autocam Corporation. The project's purpose was to initiate proactive efforts to reduce industrial pollution, and recommend environmentally-friendly manufacturing improvements.

Janet Vail was hired to design and direct a program using the combined Michigan Research Excellence Fund and Autocam grants. She named the program the Waste Reduction and Management Program (WRAMP). A Grand Rapids native, and University of Michigan graduate, Vail had taught in California before returning to Michigan, where she began teaching part time in Grand Valley's Biology Department while working on her Ph.D. degree in Science Education at West-

ern Michigan University.⁷ Vail maintained an ambitious schedule. Her efforts included Industrial Waste Management Workshops, formation of a local industry group in the Muskegon-Ottawa county area named MOPP (Muskegon-Ottawa Pollution Prevention Alliance), and site visits to help businesses find ways to reduce wastes. With additional funding from the EPA and increasing pressure on companies to control pollution, WRAMP continued for several years, and like others who came to work in the early years of the



Dr. Janet Vail, who currently heads the Annis Water Resources Institute's Education and Outreach program, joined the Institute in 1990 to coordinate its Waste Reduction and Management Program (WRAMP). Here, she is working onboard the *W.G. Jackson*, teaching students about water quality.

Water Resources Institute, Vail remained a key part of its growth. Today she heads its education and outreach program.⁸

The Advancement Campaign continued throughout the early 1990s, highlighted by major

gifts and community fund raising events. In June 1990, Jay D. Hair, president of the National Wildlife Federation, addressed 500 business, industry, and academic guests at a luncheon meeting titled "For Our Earth and Its Waters," sponsored by campaign chair, Rich DeVos. Hair urged his audience to "think globally and act locally" to continue the environmental advances of the 1980s into a new decade.⁹ A year later, a concert featuring musician John Denver, and sponsored by the developers of Eastbank Waterfront Towers in downtown Grand



In 1991, John Denver, shown here with Dr. Ron Ward (left) and Matthew McLogan (center), Vice President for University Relations, gave a concert that raised \$75,000 for the Water Resources Institute.

Rapids, raised \$75,000 for the campaign. Both events not only raised money but, coupled with growing public concern over the quality of the region's water supply, heightened the Water Resources Institute's public image.

ENDNOTES

1. Water Resources Institute Task Force, *Proposal For The Establishment Of The Water Resources Institute, 1986*, in *The Grand Valley State University Water Resources Institute: An Overview Of The Institute's First Decade* (Allendale, Grand Valley State University Water Resources Institute, 1996), pp. 6-9.
2. *The Grand Valley State University Water Resources Institute: An Overview Of The Institute's First Decade* (Allendale, Grand Valley State University Water Resources Institute, 1996), pp. 1-2.
3. *Ibid.*, p. 2
4. Interview with Dr. Ronald Ward, December 1, 2005, p. 18.
5. *Water Resources Review* (Grand Valley State University Water Resources Institute), January 1991, Vol. 4, Supplement I, pp. 1-4. Hereafter cited as *Water Resources Review* with date, volume no., and page.
6. Interview with Dr. Ronald Ward, December 1, 2005, pp. 22-23; Gordon Olson, *History of the Grand Rapids Foundation* (Grand Rapids, Grand Rapids Foundation, 1992), p. 43.
7. Interview with Dr. Janet Vail, January 25, 2006, pp. 3-4.
8. *Water Resources Review*, November 1990, Vol. 3, No. 3, pp. 1-2.
9. *Water Resources Review*, August 1990, Vol. 3, No. 2, p. 2.

A Growing Water Resources Institute

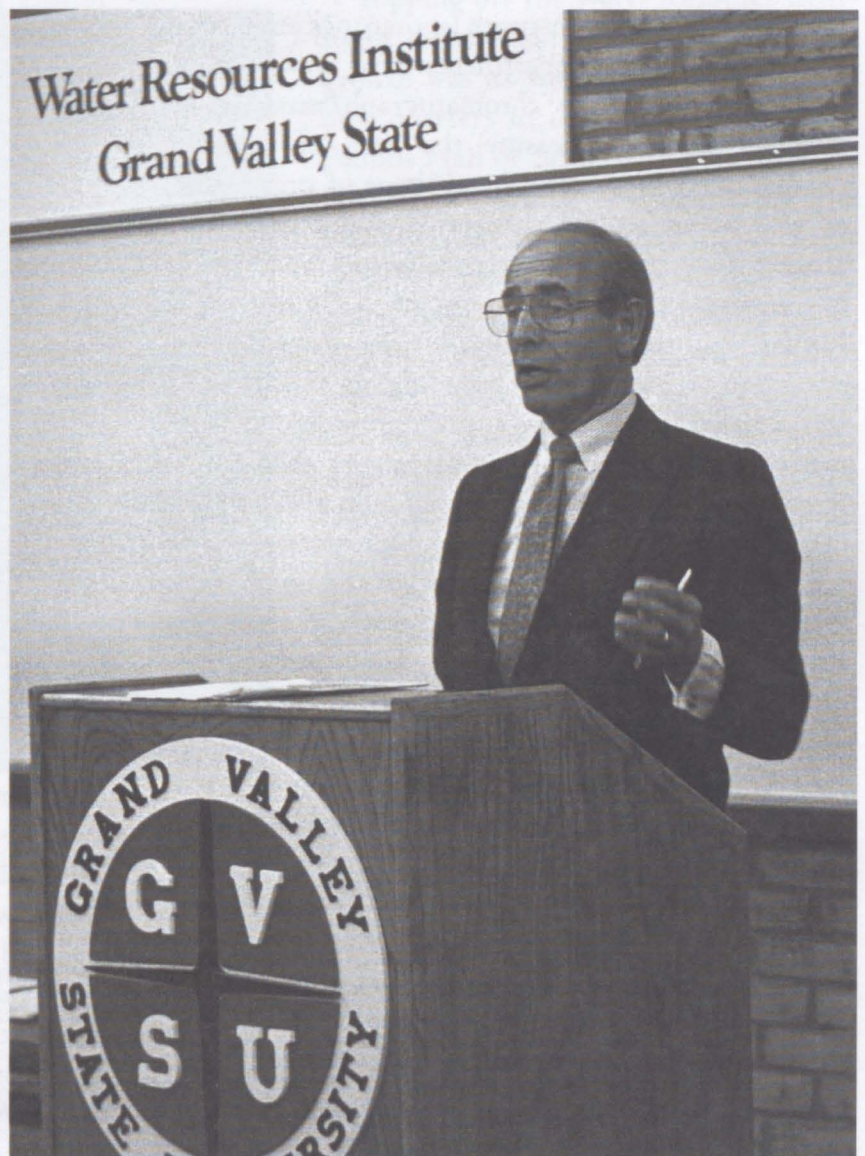
1991 - 1995



By 1991, the efforts of the advancement campaign and the additional staff pushed the Water Resources Institute space in Loutit Hall to its limit. At peak summer times, the 20-foot by 40-foot space overflowed, as part-time research associates and student workers joined full-time staff members. A larger work area was desperately needed.

A New Campus Home

The solution to the Institute's need for expansion came in two parts: a large interim space on campus, followed by an even larger, permanent home for offices, work spaces, and a laboratory. The first step was the 1991 announcement that a new 5,100-square-foot building, designated Cedar Studios II, was being built in the complex of art buildings on the south side of the campus. The Institute's newsletter happily reported that the structure would be large enough to house a "cartography lab, a sediments lab, an analytical lab, a computer lab, an organism lab, a reference/conference room, and office space." Not only that, but the new space was to be temporary. The school had also recently announced it was adding a new life sciences building, the Padnos



Prominent West Michigan businessman, Richard DeVos, headed the \$5 million Water Resources Advancement Campaign fund raising effort.

Hall of Science. When completed in three years, the Institute would move into a permanent, state-of-the-art space there and relinquish Cedar Studios II to the Art Department.¹

Grants And Projects Expand

Good news for the Water Resources Institute kept coming from the fund raising campaign. In late 1990, Richard DeVos, who had become chair of the Institute's Advisory Committee, renamed the Water Resources Council, announced that Grand Valley had received a Kresge Foundation \$500,000 challenge grant to purchase scientific equipment for the Water Resources Institute laboratories and other University science departments. The new equipment included a gas chromatograph/mass spectrometer used to measure the level of organic contaminants in air, water, and tissue of organisms, as well as an atomic absorption spectrometer to analyze heavy metals in water, sediments, and tissues of organisms. Calling the grant a "milestone," DeVos said it acknowledged "the growth and potential of the science programs at Grand Valley..., [and] will be a superb stimulus to our Advancement Program/Campaign for the Water Resources Institute." He was right on the money, literally. The grant called for the University to raise a \$2 million endowment to maintain and update the equipment. By February 1991 the school reported that \$1 million was already secured. Additional grants from the Steelcase foundation, DeVos Foundation, and Loutit Foundation followed, and by June 1994 the campaign had reached its goal.²

In addition to the Advancement Campaign, the Institute staff continued with its own grant writing, securing a second Kellogg Foundation grant in 1993 for \$269,000 to sustain the role as a GEM Regional Center for three more years. The original GEM grant facilitated the creation of a groundwater data base that included information on over 20,000 wells in six counties. The second grant enabled the Institute to create new and innovative ways to access the data and make it available to local units of government and community leaders seeking

to implement groundwater protection strategies.³

A smaller, but renewable \$25,000 grant from the EPA set the Institute on a multi-year stream restoration project for Bear Creek in Cannon Township in northeastern Kent County. Intended as a demonstration endeavor, the project explored the relationship between ecological restoration and water quality, the restoration work itself, and the ability to educate residents about the value of such undertakings and their implementation elsewhere.⁴

The Institute's work on the Michigan Air Use Permit Guidance Document Project made a major impact throughout the state. In partnership with Lacks Industries and the Michigan Department of Environmental Quality (DEQ), Janet Vail prepared a guide to help businesses comply with air quality regulations. This \$250,000 project concluded in 1995 with the preparation of a 600-page technical manual on air quality permits that is still being used in Michigan.

The Institute staff's ability to gather and organize data earned it additional funding, such as a 1993 grant from the Frey Foundation of Grand Rapids. Concerned about the loss of prime agricultural lands, increased pollution, and the loss of wildlife habitat due to rapid growth of several Kent County areas, the Foundation financed a study to measure county growth trends and determine future tendencies. The three-year study enabled the Institute to purchase satellite imagery to use with its existing data bases to determine changing socio-economic and natural systems. Speaking on behalf of the Institute, John Koches stated "When we have a better picture of where people will most likely live, and where businesses and industries are apt to locate, we can plan for growth in a much more logical and effective way." A similar project for the York Creek watershed in Alpine Township further demonstrated the Institute's value as a partner with local government units, citizens groups, and businesses. Although not designed to restore the stream, the project sought to bring several groups together to better manage land use in the watershed.⁵

Dawn Of The Institute's Second Decade

From a new idea without an office and a (very) part-time director, Grand Valley State University's Water Resources Institute had grown in just 10 years into a comprehensive environmental education and research center. It had 15 full-time employees working on various grant-funded projects, as well as faculty research associates and student assistants. An additional group of seasonal employees operated the *D.J. Angus*, which had taken



Dr. Rick Rediske, Senior Research Scientist and head of the AWRI Environmental Chemical Laboratory is shown here analyzing sediment samples in the Chemical Extraction Laboratory at the Lake Michigan Center.

over 30,000 guests, mostly K-12 students from throughout Michigan and northern Indiana, out on Lake Michigan.

Two successful funding initiatives secured \$6 million to support projects and ongoing operations. The Water Resources Institute Advancement Campaign met its \$5.1 million goal in June 1994, and by 1995, the D.J. Angus Endowment Fund, estab-

lished to provide funds to maintain the Institute's research and education vessel, was quietly approaching \$1 million.

Numerous projects, most notably the Grand River Watershed Project, succeeded in gathering information, building data bases, forwarding public education, and promoting cooperation among local governments, citizen groups, and business and industry. Throughout the region, Institute staff members were known for their public presentations to schools, community groups, and professional organizations.

Topping off the Water Resource Institute's steady, and at times spectacular, growth was its summer 1995 move into new quarters in the recently completed Padnos Hall of Science on the Allendale campus. It seemed as though, for the first time, the Institute had a permanent home of its own with sufficient office space, well-equipped laboratory space, and ample room for its Data and Information Services Center. The new laboratory was named the Robert B. Annis Analytical Laboratories to honor the Institute's long-time patron. Headed by Dr. Rick Rediske, a former vice-president of the environmental consulting and laboratory company, Earth Tech Corp., and a past member of the Institute's Advisory Committee, the laboratories were everything the Institute's staff and policymakers had once only dreamed possible.⁶ During his first year at the Water Resources Institute, Dr. Rediske collaborated with Dr. Gary Fahnenstiel

from the Great Lakes Environmental Research Laboratory (part of the National Oceanic and Atmospheric Administration) in Muskegon to obtain a \$150,000 grant to investigate contaminated sediments in White Lake. This grant marked the start of a research program in environmental chemistry and toxicology at the Water Resources Institute that is still active today.

ENDNOTES

1. *Water Resources Review*, August 1990, Vol. 3, No. 2, p. 6.
2. *Water Resources Review*, February 1991, Vol. 4, No. 1, p. 1; February 1993, Vol. 6, No. 1, p. 5; *An Overview Of The Institute's First Decade*, pp. 2-3.
3. *Water Resources Review*, June 1993, Vol. 6, No. 2, pp. 1-5.
4. *Water Resources Review*, February 1993, Vol. 6, No. 1, p. 3.
5. *Water Resources Review*, October 1993, Vol. 6, No. 3, pp. 1; 3; June 1994, Vol. 7, No. 2, p. 3.
6. *Water Resources Review*, October 1995, Vol. 8, No. 3, p. 2; February 1995, Vol. 8, No. 1, p. 5.

A New Home in Muskegon

1995 - 2001



Even as the Water Resources Institute was getting accustomed to its new campus quarters, forces were at work that would move the entire operation to Muskegon and give it both a second, larger research and education vessel and impressive new headquarters.

The *W.G. Jackson*, a Vessel For Muskegon

At one time a nationally-known lumbering and industrial center, Muskegon suffered in the second half of the 20th century as industries closed or moved, leaving behind empty factories and polluted land and water. Struggling to rebuild its economy, city leaders moved away from the city's industrial heritage toward cleaner industries and tourism, and a refashioned image of a cleaner lakefront with ample public access to the water and all the recreational activities it promised. Among Muskegon's leaders was Roger Andersen, owner of Peninsular Investment Company.

Andersen was also an active supporter of Grand Valley State University and served on the Water Resources Institute Advancement Campaign. During the course of that campaign, Andersen asked Ron Ward if the Institute would consider bringing the *D.J. Angus* to Muskegon. He and others hoped that the University of Michigan would locate its



Dr. William Jackson, long-time advocate for stopping the pollution of Muskegon Lake, was the primary donor for the Institute's second vessel, the *W.G. Jackson*, docked in Muskegon, and has been a key supporter of AWRI over the years.

research vessel, the *Laurentian*, in their city, but when that failed to happen the group turned to Grand Valley. Ward conferred with President Lubbers, and reported to Andersen that the university was committed to keeping the *D.J. Angus* at its Grand Haven home. Ward also noted, however, that the Institute's single vessel was extremely busy, taking over 5,000 visitors per year on educational/research tours of the lake, and suggested that the Institute might be interested in building a second vessel that would be home-ported in Muskegon. As Andersen and Ward talked, the conversation covered the tangible benefits of having a research vessel flying Muskegon's

flag up and down the lake each season, and traveling to other cities on Lake Michigan as well, and Ward pointed out that the school would need a lakefront site to support the vessel.

Andersen gave the idea a weekend's consideration, then reported to Ward that he and fellow Muskegon businessman, Dr. William Schroeder, a well-known environmentalist and owner of the environmental testing lab, Trace Analytical Laboratories Inc. would agree to serve as co-chairs of a fund raising committee. The effort was christened

high purity solvents for chemical laboratories. Like Schroeder, Jackson was an environmental activist who, when he had seen raw garbage being dumped into Muskegon Lake, formed a citizen advocacy group named Save Our Lakes (S.O.L.). Jackson was among those Schroeder had approached to contribute to the "Making Waves" campaign.

"I'd like you to consider \$25,000," Schroeder recalls saying.

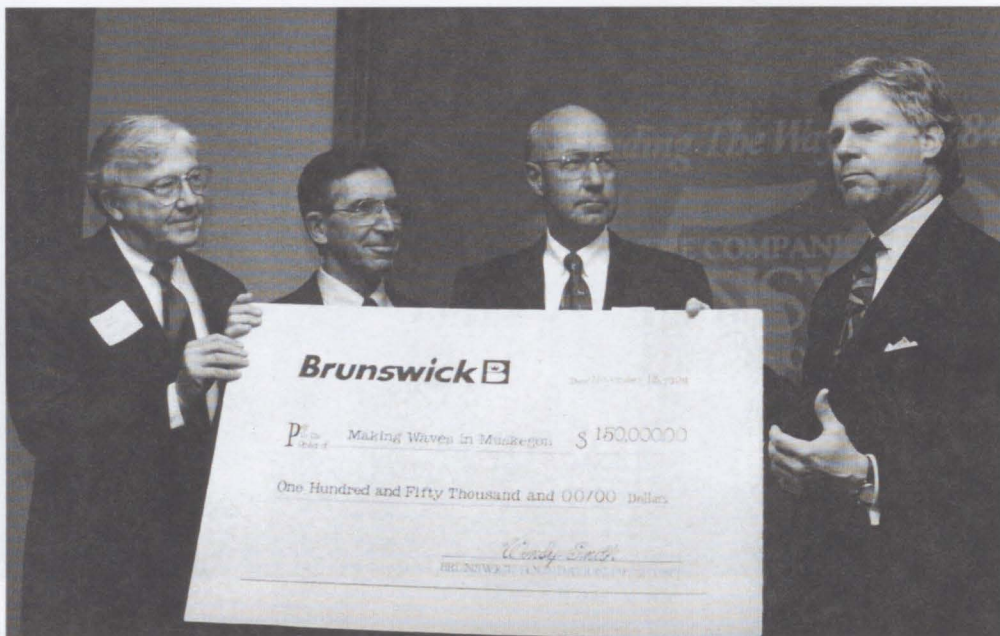
"Yes, I would consider that," his friend responded. "In fact I might even consider a little more than that."

Schroeder recalls musing to himself that perhaps his friend might consider \$50,000. "Great, Bill," he replied, "What can I put you down for?"

His old friend quietly said, "I think I could go for a quarter of a million." It was an important endorsement for the campaign and, to get maximum effect, Jackson made his gift in the form of a challenge grant to be matched by a similar amount from other sources. Thanks to Jackson's challenge, and the active support of Patricia Johnson, president of the Community Foundation

for Muskegon County, "Making Waves In Muskegon" reached its \$1.6 million goal in less than a year with a total of slightly more than 200 large and small donations. Larger gifts included \$232,500 generated through the auspices of the Muskegon Community Foundation, \$250,000 from the Michigan Commerce Department's University Business Research Development Fund, and \$150,000 from the Brunswick Corporation.¹

Larger than its sister vessel, the *W.G. Jackson* was similarly trimmed in Grand Valley's blue and white



In 1995, Brunswick Corporation President Frederick J. Florjancic (right) presented a \$150,000 check to the "Making Waves In Muskegon" campaign to fund a new research vessel. Accepting the gift were (left to right) GVSU President Arend Lubbers and campaign co-chairs Dr. William Schroeder and Roger Andersen.

"Making Waves In Muskegon" and launched in the fall of 1995 with a goal of \$1.6 million. A year later the group had sufficient funds to sign a contract with the Kanter Boat Company of St. Thomas, Ontario, Canada to build a 65-foot steel-hulled research vessel.

The project moved quickly in large part because of a challenge grant from Schroeder's friend and business colleague, Dr. William Jackson, who had built and ultimately sold Burdick and Jackson Laboratories Inc., a specialty company that produced

colors. The 65-foot boat had a 19.5-foot beam and a speed of 12 knots. It had on-board sleeping quarters for eight people, offering greater range for scientific research and making for easier summer port-to-port travel. Like the *D.J. Angus*, the *W.G. Jackson* was outfitted with winches, nets, and other sampling gear, as well as a 350-square-foot laboratory space specially designed for education as well as research.²

Launched in June, 1996, the *W.G. Jackson* was immediately busy, and its presence produced a banner year for Water Resources Institute research and education vessels. A total of 6,268 students, teachers, and community leaders took trips and participated in dockside events. Future years promised to be even busier when, late in the 1996 season, science instructors Gus Unsel III and Chuck Vanderlaan began to develop pre- and post-visit activities that aligned boat trips with State of Michigan Essential Goals and Objectives for Science Education, as well as with specific objectives developed by Kent County educators.

The Muskegon community benefited as well. The *Jackson's* presence at the Mart Dock on the city's waterfront attracted curious onlookers and over 3,600 scheduled guests for III separate events, more than fulfilling the expectations of its Muskegon benefactors. Along with scheduled group tours, the vessel participated in "Celebrate White Lake," the Grand Haven Coast Guard Festival, the Lake Michigan Forum meeting, and the Muskegon North Side Summer and Shoreline events.

Eighteen students from Indianapolis, Indiana, were among the groups spending time aboard the *D.J. Angus* in the summer of 1997, marking the 30th year that Robert Annis brought winners of the Indianapolis Regional Science Fair to Grand

Valley. Their reward was a weekend at Grand Valley participating in a variety of science activities. Although it was not announced until fall, the university decided to rename the Water Resources Institute in honor of Robert Annis for his long-time support. At a ceremony recognizing Annis during a meeting of Indianapolis's Scientech Club in October, the name officially became the Robert B. Annis Water Resources Institute.³ Annis continued to actively support the Water Resources Institute until his death in 1999.



One of its longest serving instructors, Chuck Vanderlaan, who joined AWRI in 1996, is shown here with a group of students onboard the *W.G. Jackson*.

Two research/education vessels made it possible for the Institute to expand the number of ports visited each year. In addition to the nine stops the boats made in 1996, the Institute announced a three-day visit to Petoskey-Harbor Springs for the *Jackson* in late May 1997. This visit would include cruises for students, along with dockside tours, a public open house, and a teacher workshop. Plans also were underway to further develop the Institute's Lake Michigan presence by taking the *Jackson* on a cruise with stops in Indiana, the Chicago area, and along the lake's Wisconsin shore. The plan became a

reality in summer 1998, when the SC Johnson Wax Fund and the EPA provided funds for a southern tour including Racine, Milwaukee, Chicago, and Indiana; later there was a separate week-long repeat of the previous year's northern tour to Traverse City and Petoskey.⁴

Education programs at the Water Resources Institute received a further boost when Herbert VanderMey, who earlier played a key role in securing the Grand Rapids Foundation's Grand River Watershed grant for the Institute, announced a gift

Michigan Department of Education, and oversee student activities to ensure that student visits were well organized and consistent with the school's overall science curriculum.

A Permanent Home In Muskegon

Within its first two years, the *W.G. Jackson* exceeded the expectations of its advocates. For Grand Valley, it meant more education experiences for its students, a broader university presence along the Lake Michigan shoreline, and increased research opportunities.

Muskegon boosters saw their city's new image on display at home and at ports all around Lake Michigan. But there was more to being in Muskegon than the boat. Ron Ward dreamed of a new home for the Institute in Muskegon, and before long, Muskegon leaders and Grand Valley representatives were talking about additional collaboration to give the *Jackson* a more permanent location than the Mart Dock.



In 1993, GVSU President Arend Lubbers (left) and Dean Douglas Kindschi conferred an honorary doctorate of science degree on Robert Annis in recognition of his support for the Water Resources Institute.

of more than \$100,000 to create the VanderMey Endowment. Annual earnings from the endowment were to be used for education programs and "action that will improve the water resources of our region and guarantee the value of those resources for future generations."⁵ Further demonstrating the Institute's continuing commitment to its education programs was the appointment of Dr. Janet Vail as coordinator for environmental education programs. She was given the responsibility to continue developing teacher workshops with grants from the

Once again, William Jackson led the way, presenting a gift of \$300,000, which was complemented by \$200,000 from Grand Valley alumni John Bultema and George Bailey, owners of Great Lakes Marina and Storage. These were among the largest gifts raised to purchase Rust Marine Company's unused 2.5 acre industrial location on Muskegon Lake. The site had 1,000 linear feet of dock and several buildings, the largest with 10,000 square feet of storage and offices. Immediate plans called for the Institute to use the 10,000-square-

foot warehouse building for off-campus offices, research, and education programs until a new permanent Institute headquarters could be built on the site. Janet Vail was the first staff member to occupy the building and she organized the Lake Michigan "State of the Lake" Conference in 1999, which drew over 200 people to Muskegon.⁶

The site was near a waterfront area called Heritage Landing, developed as part of Muskegon's makeover to draw tourist crowds to summer festivals. Heritage Landing was Muskegon's first step



Charles Johnson II (right), chair of the campaign to raise funds to build the Lake Michigan Center, and José Infante (left), member of GVSU's Board of Trustees.

toward redefining its waterfront; the second major step came in April 1999, with the announcement of \$5.0 million campaign to build a permanent Muskegon home for the Robert B. Annis Water Resources Institute. At that time, it was the largest capital campaign ever conducted in Muskegon, and the campaign's chair, Charles E. Johnson II, marshaled support from individuals, corporations, and foundations in and outside of Muskegon. All told, the campaign raised pledges of \$5,021,639, thereby exceeding the goal. Fourteen gifts ranged from \$100,000 to \$1 million, including a \$1 million grant from the Community Foundation for

Muskegon County and a \$1 million grant from the State of Michigan. Groundbreaking for the new Lake Michigan Center, as the Annis Water Resources Institute's new home was to be called, took place on June 15, 2000. Community leaders, elected officials, Grand Valley alumni and a sizeable crowd of Muskegon residents were present for a boat parade, tours of the *D.J. Angus* and *W.G. Jackson*, music by the Muskegon High School band, fireworks, and a flyover by the U.S. Coast Guard's search and rescue helicopter.⁷



Rust Marine Company's unused 2.5 acre location on Muskegon Lake, including the 1,000-foot of dock and a 10,000-square-foot building shown in the center of this aerial view, became the Water Resources Institute's off-campus home in 2001.

Construction on the 24,500-square-foot Lake Michigan Center, designed by Hooker-DeJong Architects and Engineers of Muskegon, began shortly after the groundbreaking, with its completion and official opening set for June 2001. When it was finished, the Center would, for the first time, bring the Institute's education, research, conferencing, docking, and vessel support operations to a single location. Inside the building were spaces devoted to laboratories, classrooms, conference areas, meeting rooms, and administrative offices. It

would be, said its proponents, the

"focal point for partnerships, research, education, and outreach in the Lake Michigan Basin..., [facilitating] the building of new coalitions of partners throughout the region and foster[ing] programs that will effectively disseminate the results of research and other projects in a way that is understandable to the general public and decision-makers."⁸

The Lake Michigan Center was completed on schedule and dedicated at a June 21, 2001 ceremony attended by an estimated 1,000 guests featuring



With the launching of the *W.G. Jackson* to join the *D.J. Angus*, the Water Resources Institute had two vessels, shown here docked together at the Lake Michigan Center in Muskegon, to serve its education and research needs.

Michigan Governor John Engler and other elected officials, Grand Valley State University President Arend Lubbers, and other leaders of the Muskegon fund raising campaign.

For Ron Ward, who had decided to retire after 35 years at Grand Valley and 15 years as the Institute's first and only day-to-day leader, the dedication capped a successful career as an educator and researcher. Starting with remodeling a diesel-powered yacht at a brand new college, Ward presided over the steady growth of an aquatic sciences education and research program that included a splendid new home for the Annis Water Resources Institute, and two research and education vessels that were known throughout the region. The program's successful combination of practical environmental education and specialized research made it a model recognized by researchers and educators around the nation. When Ward officially left his

position following the Lake Michigan Center's dedication, Dr. Douglas Kindschi, the university's Dean of Science and Mathematics credited him with much of the Institute's initial success. He said:

"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. 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."⁹



Cutting of the ribbon in 2001, marking the Lake Michigan Center's official opening. From left to right, State Senator Leon Stille, Commander Roger Dubuc (US Coast Guard Group Grand Haven Commander), Dorothy Johnson (President of GVSU Board of Trustees), Chris McGuigan (President of Community Foundation for Muskegon County), and Michigan Governor John Engler.

ENDNOTES

1. Gordon L. Olson, *William G. Jackson: Enterprising Scientist* (Allendale, Grand Valley State University), 1996, pp. 26-27.
2. Great Lakes Association of Science Ships website: www.canamglass.org.
3. *Water Resources Review*, Fall 1997, Vol. 10, No. 2, p. 1.
4. *Water Resources Review*, Spring 1998, Vol. 11, No. 1, p. 5.
5. *Water Resources Review*, Fall 1997, Vol. 10, No. 2, p. 2.
6. Interview with Arnold Boezaart, March 10, 2006, pp. 4-6; *Water Resources Review*, Spring 1999, Vol. 12, No. 1, pp. 1-3.
7. Interview with Arnold Boezaart, Ibid; *Water Resources Review*, Fall 2000, Vol. 13, No. 2, pp. 1-2.
8. *Water Resources Review*, Fall 2000, Vol. 13, No. 2, p. 2.
9. *Water Resources Review*, Spring 2001, Vol. 14, No. 1, pp. 1-3.

Stepping Up to a New Level

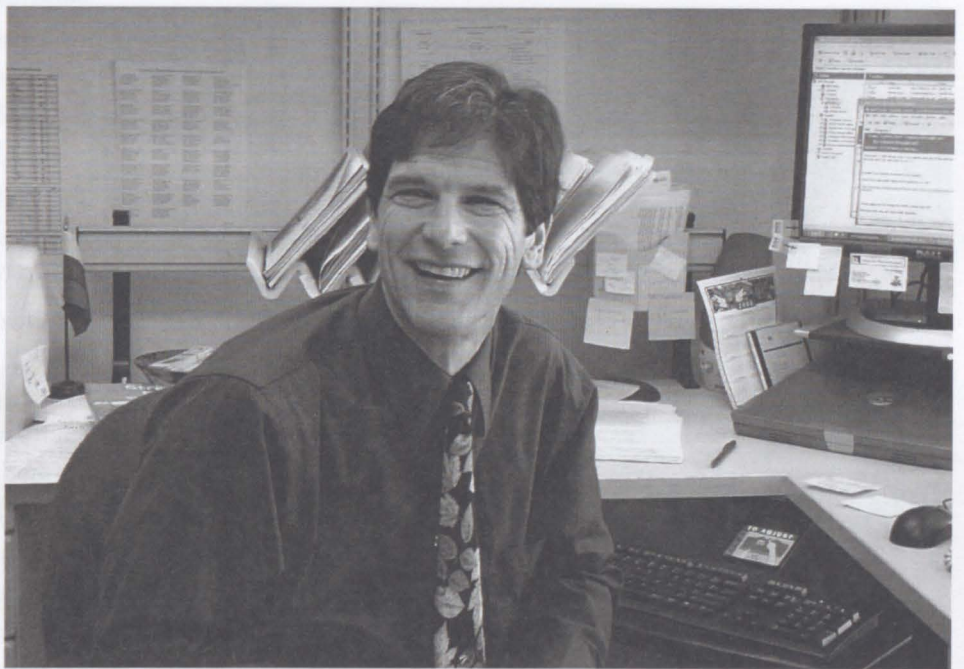
2001 - 2006



The opening of the Lake Michigan Center signaled that the Annis Water Resources Institute was ready to step up to a new level as a research and education facility. Its three-part mission to educate, serve the West Michigan community on water and environment-related projects, and undertake scientific research did not change, but with greater financial, physical and human resources, the Institute was able to undertake many more research projects. Along with its two vessels, it now had significantly increased and improved laboratory space and, equally important, university encouragement and funding to expand its research undertakings.

Dr. Alan Steinman Becomes Director

The Institute's shift in emphasis came into sharper focus during its search for a new director. While the new facility and its greater laboratory space was an implicit expression of the university's desire to encourage increased research, the criteria established for a new director made that shift explicit. When Dr. Ron Ward retired, Dr. Douglas Kindschi,



Dr. Alan Steinman became the Robert B. Annis Water Resources Institute's second director shortly after the Lake Michigan Center opened in 2001.

Dean of Science and Mathematics, and other university officials sought as his successor a candidate with a strong research portfolio as well as proven administrative talents. Their quest led them to Dr. Alan Steinman, a scholar whose credentials seemed ideally suited for a more research-oriented Annis Water Resources Institute. Director of the Lake Okechobee Restoration Program for the South Florida Water Management District, Steinman led a staff of 50 with a \$30 million budget involved in research, planning, construction, and regulation. Prior to that

position, Steinman, who held a Ph.D. degree in Botany and Aquatic Ecology from Oregon State University, worked for a consulting firm in San Diego, California, and at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. While at Oregon State, he studied algal-herbivore interactions in streams and the impact of disturbance in stream ecosystems, including the impact of the Mt. St. Helens eruption. At Oak Ridge he studied how nutrients cycle in stream ecosystems and the factors that contribute to stream recovery after disturbance.¹

versity budget allocations. A portion of these funds went to the operation and maintenance of the Lake Michigan Center, including the rapid construction of laboratory facilities in rooms that had been set aside for expansion, and a back-up power supply system that assured the integrity of experiments in case of a power interruption.

When Steinman accepted the position as Director of the Annis Water Resources Institute, it was understood that four new principal investigator positions would be added, with the university assuming full responsibility for their salaries. This differed from previous practice that required investigators to generate revenue to help support their positions. Including Steinman, the additional positions brought the number of full-time principal investigators on staff to eight and a half. The half included Dr. Mark Luttenton from GVSU's Biology Department. Dr. Luttenton provided an important bridge between the main campus and AWRI, maintaining a half-time appointment in both departments. As Steinman looked for researchers to fill the new positions, he felt that the university would be best served if he sought young, ambitious scholars, eager to establish their personal academic reputations as well as those of the University and the Institute. After a careful search, the Institute selected Dr. Donald Uzarski, Dr. Carl Ruetz, Dr. Bopaiah Biddanda and Dr. Xuefeng (Michael) Chu.

In addition to increased university support, the Institute increased the amount and diversified the sources of its outside funding. From the outset, Institute staff had relied on outside funding to complement direct university funding. With the move to Muskegon, and the addition of new principal investigators, equipment, and space the need and expectation for external funding increased as well. Financial assistance also came from the area's Congressional delegation. At the Lake Michigan Center, initiatives by Rep. Peter Hoekstra, whose



Initially built with space for growth, the Lake Michigan Center filled all its laboratory space by 2005.

Expanding Staff, Facilities and Services

The shift in emphasis resulted in an overall increase in each of the Institute's programs. The education and outreach program benefited from greater classroom space, while updated geospatial and computer facilities significantly enhanced the capabilities of the Information Services Center in the new Lake Michigan Center. The ecological research program experienced substantial growth, thanks to expanded, state-of-the-art facilities and increased staff.

At the core of this growth were increased uni-

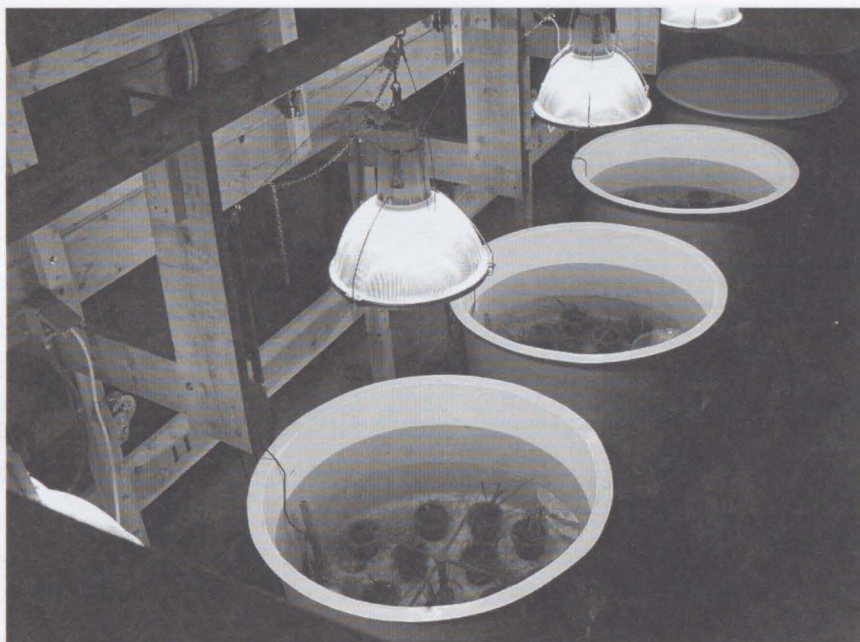
2nd U.S. Congressional district is home to the Institute, enabled it to secure Federal funding for seawall and field station improvements. Speaking of his efforts to support the Institute, Rep. Hoekstra remarked:

"With nearly 200 miles of Lake Michigan shoreline and countless lakes, rivers and streams within my district, protecting our water resources remains one of my top priorities. The Annis Water Resources Institute serves an important role in connecting with local communities and helping them to manage a number of important environmental matters."²

On the eve of its 20th anniversary, Institute faculty and staff were involved in over 20 projects with a total value of more than \$2 million. Project topics ranged far and wide, including the study of impacts from nonpoint source pollution, the influence of coastal wetland fragmentation on habitat structure and function, the environmental and human health implications from algal toxins in West Michigan lakes, developing new visualization techniques to assess the effects of land use change on the sustainability of the region, and gathering data for a system-wide model to perform risk assessment in the Muskegon River Watershed.³

The Institute also looked to several endowments for additional annual funding. Its earliest endowment fund had been created for the maintenance and operation of the *D.J. Angus*. It was later matched by two funds, the *W.G. Jackson* Fund and the GVSU-Muskegon Water Research and Education fund, to provide support for the operation of the Institute's second vessel. In 2004, the R.B. Annis Educational Foundation established an endowment for K-12 classroom activities. The Institute's largest endowment, the Water Resources Institute Equipment Fund, generated nearly \$100,000 annually in earnings for

equipment repairs and replacements. By 2005, funds from additional sources, including Herbert VanderMey, William and Diana Wipperfurth, the Indianapolis Scientech Club, Allen Hunting, the Michigan Space Grant program, and the National Oceanic and Atmospheric Administration complemented the older Annis Water Resources Institute Endowment Fund to support a total of ten high school and college student internships. In combination, the endowments provided nearly \$300,000 for Institute education, research, and equipment.



Twelve large 350-gallon tanks (mesocosms) located in the AWRI field station have been used for a variety of experiments. In this experiment, the effect of sediment type on the growth of submerged plants from White Lake was being investigated.

Although no longer central to the Institute's budget, contracts remained a part of the Institute's funding. In 2003, for example, Dr. Neil MacDonald of the GVSU Biology Department and Dr. Rick Rediske, head of AWRI's Environmental Chemistry Laboratory, conducted a contractual study for the Michigan Department of Environmental Quality to study soil and vegetation responses to the irrigation of municipal solid waste leachate at the Fenske landfill site in Walker, Michigan.⁴ The DEQ continued to fund this project for multiple years.

To accommodate the new positions and the additional work generated by the Institute, the university moved to finish office and laboratory space at the Lake Michigan Center. Within its first five years, all space in the building was fully used and plans were underway to renovate the old field station adjacent to the Lake Michigan Center so that it might be used for additional offices, laboratories and education activities.

Twelve large, experimental mesocosms—tanks that are larger than aquariums (microcosms) but

nutrients on plant growth, the role of invasive species in Great Lakes food webs, and the impact of toxic sediments on aquatic life.

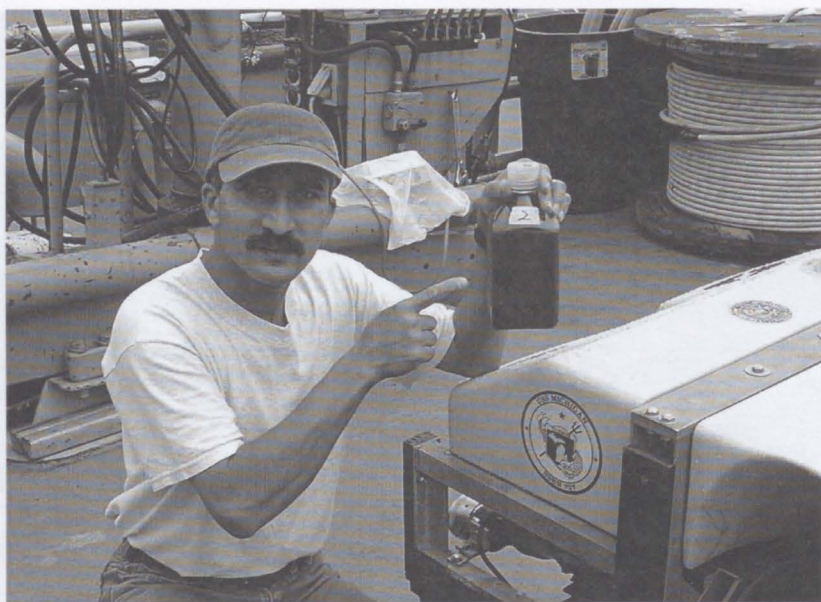
The Ecological Research Program

The organization of the Institute into its current three main programmatic areas—Ecological Research, Education and Outreach, and the Information Services Center—helped emphasize its mission: to integrate research, education, and outreach to enhance and preserve freshwater resources. The

Ecological Research Program, which included Drs. Bopaiah Biddanda, Xuefeng (Michael) Chu, Mark Luttenton, Rick Rediske, Carl Ruetz, Alan Steinman, and Donald Uzarski, addressed questions about water resources, hydrology, watershed ecology and management, environmental chemistry and toxicology, aquatic ecosystem structure and function, aquatic conservation, land use change, pollution prevention, and aquatic food webs.

Dr. Biddanda, a microbial ecologist, studied the interaction of land, water and the atmosphere, and the critical role microorganisms played in driving the large-scale biogeochemical cycles in nature. One of his more intriguing projects focused on a submerged sinkhole over 300 feet below the surface in Lake Huron. There, aided by the University of Michigan's remotely operated vehicle for education and research (U-ROVER), he studied a unique ecosystem, so deep that microbes and bacteria depend on chemosynthesis (using chemical energy to sustain life) instead of photosynthesis, thereby creating an entirely different ecosystem from the surrounding lake environment.

Dr. Chu specialized in hydrologic modeling, creating sophisticated computer models to simulate pesticide fate and transport, watershed runoff and soil erosion, and to estimate sediment yield and transport. His work provided an accurate picture of how contaminants and pollutants flowed into and



Dr. Bopaiah Biddanda points to a sample of water that he collected from a submerged sinkhole in Lake Huron.

smaller than natural ponds (macrocosms)—holding about 350 gallons of water each, were installed in the field station. Their operation uses water from Muskegon Lake, passed through filters and into each tank. A small amount of the electricity used to power the artificial lights that hang above each tank comes from solar (photovoltaic) panels attached to the front of the field station. The mesocosm tanks host experiments on the effect of light on phytoplankton growth and their ability to form nuisance algal blooms, and the interactions between different fish species, particularly round gobies and yellow perch. Future plans call for studies of the effects of

through water systems. In 2005, Chu established ten data collection sites to measure water temperature and pressure, stream discharge, and other data for a model evaluating metal and sediment contamination in Muskegon's Mona Lake Watershed. Explaining his work, he wrote: "How are sediments or heavy metals transported? Where do they end up? What portion of the stream or lake are they affecting? We need to use computer modeling to answer questions like these."

Much of Dr. Luttenton's work focused on the impact of controlled disturbances on aquatic environments. His work on White Lake in Muskegon County, near the communities of Montague and Whitehall, sought to explain how and why excess nutrients were making their way into White Lake, and the effect they were having on the lake. The results of his study indicated groundwater was carrying high concentrations of nutrients and chemicals into the lake, and that the most likely culprits were lawn fertilizers and leaky septic tanks. These sources, the result of increased residential development around the lake, produced excess nutrients that were quickly carried through the area's sandy soil to the lake. Luttenton's study encouraged community leaders to stem the nutrient growth by convincing residents to switch to phosphorus-free lawn fertilizers and by enacting and enforcing tighter restrictions for the construction and maintenance of septic tanks.

In addition to heading the Institute's analytical chemistry laboratory, Dr. Rediske conducted research analyzing contaminated sediments and plant and fish samples, laying the groundwork for restoration ecology. In 2005, he saw some of his earlier efforts come to fruition with the restoration of Ruddiman Creek. Ten years earlier, he had conducted tests on the creek and documented the presence of hazardous chemicals in the ecosystem, including PCBs, heavy metals, and petroleum

byproducts from industries that had long since closed. The creek is a major tributary to Muskegon Lake, which had been designated a heavily polluted "Area of Concern" by the EPA, and the work begun in 2005 involved removing 80,000 cubic yards of contaminated sediment and restoring native plants and habitats. Muskegon Lake was one of 43 United States and Canadian Areas of Concern in the Great Lakes region. As part of his work, Rediske received grant funds from the EPA to establish restoration targets which, when reached,



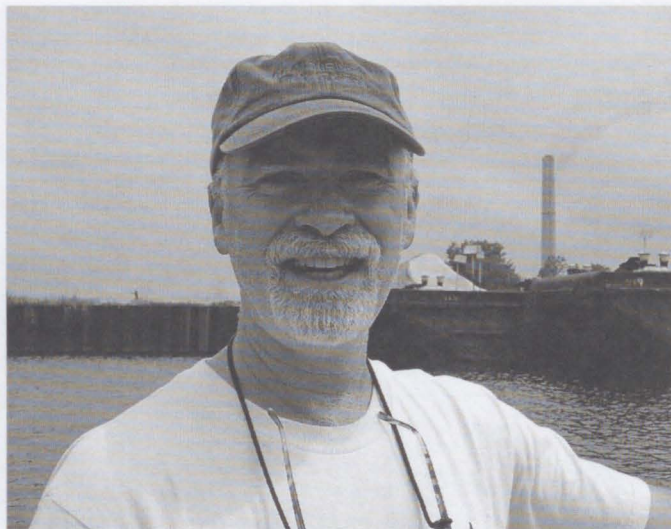
Dr. Michael Chu (right), shown here gathering water samples with a field assistant, on a frigid West Michigan winter day. The data collected are used to develop computer models that simulate the effect of pesticides and sediment erosion on aquatic ecosystems.

would permit the site to be removed from the list.

A fisheries biologist, Dr. Ruetz's various research activities included long-term fish monitoring in Muskegon Lake. While obtaining samples of smaller organisms such as plankton and invertebrates is a relatively straightforward process, it is much more difficult to accurately count fish populations. Dr. Ruetz, in collaboration with student assistants, designed techniques to net and count fish, including invasive species such as round gobies (a small fish that entered the Great Lakes in the

1990s). His work as part of the Muskegon Lake long-term monitoring project has helped document the increase in round goby numbers, and has led to several grants designed to further examine the ecological impacts of this invasive species.

In addition to serving as director of the Annis Water Resources Institute, Dr. Steinman focused a great deal of his research attention to understanding the sources and impacts of nutrients on nonpoint source pollution, defined as pollution that comes from diffuse sources such as lawns, parking lots,



Dr. Mark Luttenton, who shares a joint appointment at AWRI and in GVSU's Biology Department, works on the ecological impact of disturbance, such as the affect of excess nutrients on aquatic environments.

fields, and farms. In the three decades since the passage of the Clean Water Act in 1972, water pollution has shifted from single-point originating sources, such as pipes, ditches, and containers, to nonpoint sources. Dr. Steinman and his research team, utilizing grants from a variety of state and federal sources, have studied the role of excess nutrients in Muskegon Lake, the Lower Muskegon River, Spring Lake, Mona Lake, and other sites to determine how these pollutants travel and their impact on connected river, wetland, and lake ecosystems.

Dr. Uzarski studied inland and Great Lakes coastal wetlands and the relationships between community composition and disturbances from both

natural and anthropogenic (human-related) sources. In 2004, the Michigan Department of Environmental Quality funded Dr. Uzarski and his research team to gather data from Saginaw and Grand Traverse Bays on water quality, and plant, macro- and micro-invertebrate, and fish populations to determine impacts of human disturbance. They especially looked at a recently legalized process known as "beach grooming," which allowed mechanical removal of vegetation in wetlands. Uzarski's team catalogued over 260 species of invertebrates and 60



Fisheries biologist, Dr. Carl Reutz, shown here holding a Silver Red Horse, designed techniques to net and count fish in order to document changing fish populations, and has studied the impacts of invasive species.

different fish species. They concluded that in addition to being essential habitat for organisms of the Great Lakes, these coastal wetlands held sediment and dissipated wave energy while filtering out impurities. "The numbers indicate that wetlands are diverse and dynamic systems," said Uzarski, "[they are] important to the entire Great Lakes ecosystem."

Steinman also placed a greater emphasis on publishing research findings in peer-reviewed scientific journals. This reflected a maturation of the Institute, and resulted in a growth in its regional and national reputation. Since 2003, AWRI faculty and staff have produced 58 peer-reviewed publications, including 23 in 2005 alone,

in scholarly journals such as *Ecosystems*, *Journal of Hydrology*, the *North American Journal of Fisheries Management*, and the *Journal of Great Lakes Research*. Institute members have also produced twelve technical reports and manuals, including *A Vision of Regional Green Infrastructure In West Michigan* and an *Environmental Analysis of Well Water In Mecosta County*.⁵

Faculty in the Ecological Research Program also were active in professional organizations, served on local, state, and federal government planning and investigative commissions, and regularly provided expert testimony to lawmakers. Dr. Bopaiah Biddanda was a member of the editorial board of the *Journal of Plankton Research* and *Aquatic Microbial Ecology*. Dr. Mark Luttenton was appointed to the Rivers and Streams Advisory Committee of the American Fisheries Society Michigan Chapter. Dr. Rick Rediske formerly served as chair of the Muskegon Lake Public Advisory Council, on Michigan Department of Environmental Quality's Environmental Monitoring Advisory Board, and EPA's Federal Advisory Committee for Detection and Quantitation Limits. Dr. Michael Chu served on EPA's FIFRA Scientific Advisory Panel – FQPA Science Review Board.

Dr. Alan Steinman served as the co-editor of the *Journal of the North American Benthological Society*, was appointed to the EPA's Science Advisory Board to review their report on the *State of the Environment*, testified before both the Michigan Senate's Committee on Natural Resources on groundwater resource issues in Michigan and several committees of the U.S. House of Representatives on Great Lakes restoration, was appointed to the Michigan Groundwater Conservation Advisory Council and the Michigan Department of Environmental Quality's Phosphorus Management Policy Advisory Committee, and served on scientific review panels for the U.S. Geological Survey and the

National Science Foundation. Dr. Donald Uzarski served on the EPA and Great Lakes Commission's Project Management Team of the Great Lakes Coastal Wetlands Consortium, the Association of State Wetland Managers' Regional Advisory Committee, and the Michigan Department of Environmental Quality's Michigan Wetland Rapid Assessment Development Committee. In addition, he has testified before the Michigan legislature on his wetland research findings.



Dr. Alan Steinman (left) testifying before a subcommittee at the U.S. House of Representatives on Great Lakes restoration. AWRI staff are often invited to testify before national, state, and local elected officials.

The Information Services Center

John Koches continued as head of the Information Services Center (ISC), managing and supporting environmentally related projects, employing geospatial techniques to analyze watersheds, developing watershed-related outreach tools, and assisting local communities in sustainable growth strategies. Working primarily with local government and other groups, he and his staff explain and interpret data and present it in comprehensible formats to help decision makers visualize how future development might impact their communities. Geographic Information Systems and 3-D visualization tools allow the ISC to predict the impact of devel-

opment on nearby lakes and streams, enabling planners to see what their future community will look like and where they might anticipate problems.

More recent ISC projects have focused on the continued development of interactive tools for several West Michigan watersheds. These tools incorporate information regarding existing watershed management plans, interactive maps, general watershed concepts, recommended Best Management Practices, lesson plans for watershed education, and information on how everyday activities can affect



Dr. Donald Uzarski, shown here assisting an undergraduate student intern, is especially interested in wetland areas and how land use affects their ecological health.

water quality. Analysis and mapping of “Green Infrastructure” has led to the development of “Regional Indicators” for area sustainability and new initiatives to determine the intrinsic value of natural areas. Implementation projects in both the Grand River and the Muskegon River Watersheds have included the building of boardwalks, creation of rain gardens, channel stabilization projects, and the creation of natural vegetative buffers. Recent work in the White River Watershed strengthened local initiatives including master plans and zoning ordinances that support the “Natural River” designation. The Forest Stewardship Project identified “working” forests with management plans and created an evaluation process to objectively identify

high priority forest lands in West Michigan. As of early 2006, ISC projects were supported with grants and gifts totaling more than \$1.3 million.

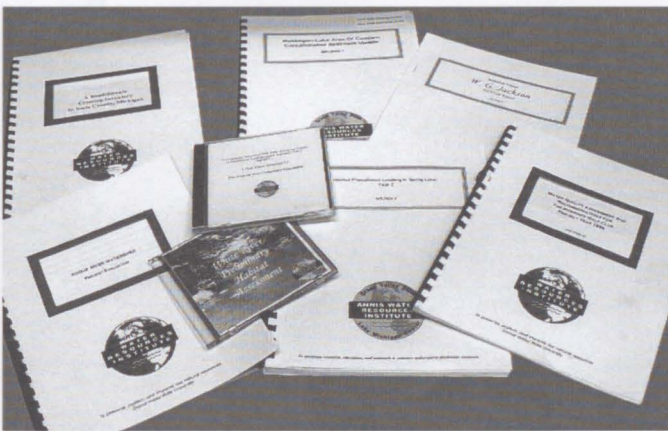
The projects that ISC has worked on over the last 18 years have led to the creation of a significant natural resources database. Several ISC staff members have remained with the Institute for most of these 18 years, which has contributed to the consistency and rigor of their products, and an enhanced understanding of natural systems in the West Michigan area. It also speaks to the overall level of experience and professionalism available at AWRI. The Information Services Center has been a critical player in communicating the value of geospatial technologies in the region, and has trained countless leaders and decision-makers throughout the state in the use of these tools. The ISC is now evaluating and testing new innovations, such as novel ways to collect aerial imagery using remote controlled aircraft; linking hydrologic models, population models, and non-point source pollution assessment techniques as part of a comprehensive decision support system; and ultimately creating systems that contribute directly to the sustainability of the West Michigan region. By integrating social and economic factors along with environmental constraint analysis, the ISC plays an important long-term role in achieving mutual goals and maintaining a viable West Michigan community.

Education and Outreach Program

Dr. Janet Vail’s primary responsibility remained the education programs associated with the *D.J. Angus* and the *W.G. Jackson*, which had hosted over 100,000 students and other visitors by the end of the Institute’s second decade. With two fully-equipped classrooms in the Lake Michigan Center, teachers and students enjoy a variety of educational activities. The building’s conference room provides space for conferences and regional meetings. Dr. Vail’s professional service has consisted of co-chairing the U.S. EPA’s Lake Michigan Forum and chairing the Public Education Division of the Air and Waste Management Association, and being appointed to the Michigan Department of Environmental Quality Advisory

council and the Michigan Small Business Clean Air Compliance Advisory Panel.

The Education and Outreach staff has participated in a variety of other education activities. In 2004 and 2005, funding from the Michigan Department of Environmental Quality enabled Dr. Vail to write an air quality curriculum to be used in the state's middle schools. The Robert B. Annis Water Resources Institute is also affiliated with the Global Learning and Observations to Benefit the Environment (GLOBE) program, an



Each year, the Institute's Information Services Center produces printed and on-line management plans, reports, guidebooks, model ordinances, newsletters and other publications, that provide critical information to elected officials, decision makers, and the general public.

international student environmental monitoring program that links students with scientists, and is the Michigan coordinator for Project WET (Water Education for Teachers). Annual "Make a Splash with Project WET" water festivals reach hundreds of students every year.

Other special events include the annual Making Lake Michigan Great tours funded by the U.S. Environmental Protection Agency. Since 1998, the *W.G. Jackson* has traveled to 30 ports of call in Lake Michigan to spread the word about the Lake Michigan Lakewide Management Plan, produced in fulfillment of the Great Lakes Water Quality Agreement signed between the United States and Canada in 1972 to address water quality in the Great Lakes in

a coordinated fashion. Water sampling cruises and open houses on the *Jackson* have introduced thousands of people to Lake Michigan issues.

Institute-Wide Initiatives

Operations at the Annis Water Resources Institute have attempted to be consistent with its environmentally-oriented mission. For example, the planting of dune grass at the Lake Michigan Center to reduce fertilizer application reflects this ethic. In addition, its two diesel-powered education/research vessels are part of a Bio-diesel Conversion Project. With funding support from Dr. William G. Jackson, AWRI hired Robert Udell, a mechanical and design engineer, to assess what retrofits, if any, would be needed to run these marine engines on biofuel. Based on his findings, the Institute decided to convert their fuel source to a B20 blend of biofuel (20% biodiesel/80% petrodiesel). Additional grant funds from the Michigan Biomass Energy Program enabled the Institute to integrate the information from the study into the educational curriculum taught on board the *W.G. Jackson*. In 2006, both vessels operated on 99.9% biodiesel fuel for the first time.

This map shows the 30 different ports of call that the *W.G. Jackson* has traveled to on its tours of Lake Michigan since 1998.

In 2003, a new element was added to the Institute's program when the Biology Department's graduate program was inaugurated. Graduate students now have the opportunity to obtain a Master of Science degree with an emphasis in aquatic sciences. These students work with the Institute's principal investigators, conduct research, and take classes at the Lake Michigan Center. For its part,



Figure 1. The figure shows the overall range of the *W.G. Jackson* from 1998 to 2006. Ports of call in Lake Michigan are represented by stip numbers with embedded letters to refer to specific sites. The numbers refer to the following list of counties with organizations that have used the vessel in its home port of Michigan.

the Institute sees its research capabilities expanded by the presence of graduate students working on a variety of thesis topics.

By 2005, a staff of 83 carried out the work of the Water Resources Institute, including Alan Steinman and three others in the administrative office, John Koches and seven other full- and part-time workers in the ISC, Janet Vail and seven others in Education and Outreach, Captain Anthony Fiore and eight others for the vessels and field station operation, and Drs. Biddanda, Chu, Luttenton,



A recent group visiting the *W.G. Jackson* on its Lake Michigan tour, included this class of Native American students and their teacher.

Rediske, Ruetz, Steinman, and Uzarski, and a staff of 12 carried out the Institute's ecological research. Rounding out the staff were 13 graduate students, 12 student assistants, and 11 student interns.⁶

Along with providing funds for facility improvements, university officials also supported Steinman when he moved to create a Science Advisory Board as an external review panel of the Institute's work. Called together once every two years, the board reviews each of the Institute's investigators and issues an assessment of how well the Institute is fulfilling its mission. Currently serving on the five-member board are (1) Dr. Stephen Brandt (Chair), Director, Great Lakes Environmental Research Laboratory, National Oceanic and Atmospheric Administration; (2) Dr. Peter Meier, Professor Emeritus, Dept. of Environ-

mental Health Sciences, University of Michigan; (3) Dr. Gary Lamberti, Professor, Dept. of Biological Sciences, University of Notre Dame; (4) Dr. Carol Johnston, Director, Center for Biocomplexity Studies, South Dakota State University; and (5) Dr. Claire Shelske, Professor Emeritus, Dept. of Geological Sciences, University of Florida. The board's assessment is valuable as an internal tool for self-evaluation, but also provides an objective, external perspective on the Institute's strengths and weaknesses. Its 2005 report concluded:



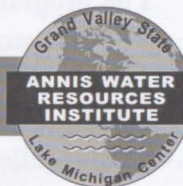
The *W.G. Jackson* often stops in Chicago during its tour of Lake Michigan. Here it is shown docked at Navy Pier.

"We reiterate that the AWRI has made significant and outstanding advancements in their research (staff and facilities) and educational (M.S. Biology) capabilities over the past two years. Once the new staff and graduate program have an opportunity to further mature, we believe that the AWRI will be well poised to achieve its stated objectives."⁷

ENDNOTES

1. *Water Resources Review*, Fall 2001, Vol. 14, No. 2, pp. 1-2; Interview with Dr. Alan Steinman, January 25, 2006, pp. 3-7.
2. *2004 Water Resources Year in Review* (Allendale, Grand Valley State University, 2004).
3. "2005 Grants and Contracts," information provided by the Robert B. Annis Water Resources Institute.
4. Robert B. Annis Water Resources Institute, Grand Valley State University website: www.gvsu.edu/wri.
5. *Ibid.*
6. *2005 Water Resources Year in Review* (Allendale, Grand Valley State University Robert B. Annis Water Resources Institute, 2005).
7. Grand Valley State University Website, Robert B. Annis Water Resources Institute, website: www.gvsu.edu/wri; *2005 Water Resources Year in Review*.

Into the Future



The location of the Lake Michigan Center on Muskegon Lake inspired Dr. Steinman to propose a long-term study of this water body that had been designated an EPA Area of Concern, and among the most severely polluted locations in the Great Lakes region. Believing it would be a useful project for both the Institute and the community, Steinman took the idea to Arn Boezaart of the Community Foundation for Muskegon County, who agreed with his assessment. Together they set up an executive committee to coordinate fund raising for the project. On the committee were Roger Andersen, William Schroeder, and William Jackson, all of whom had been central to fund raising for the Lake Michigan Center—along with Mike Cerminaro representing the Muskegon Sportfishing Association, and a number of other community leaders. After hearing Steinman's presentation and request that the committee set a modest goal of \$125,000 to establish an endowment fund, Cerminaro set the tone for the meeting when he announced his organization would pledge \$25,000 to kick off the campaign.

At that point William Jackson, who had called attention to raw garbage pollution of the lake 40



Staff members of the Annis Water Resources Institute gathered for this group photo in spring, 2003.

years earlier with a slide show known as “Bill’s Dirty Pictures,” and who had made previous large gifts to the Institute, took out his checkbook and proceeded to write a check for \$100,000. Once they got over their astonishment at Jackson’s surprise gift, campaign committee members immediately doubled their fund raising goal.

The long-range project had several objectives. It was designed to create a baseline of current conditions in the lake, provide valuable information to the community, create internship opportunities for Grand Valley students, provide data for use in edu-

cation programs and, by documenting the lake clean-up, provide useful information to get the lake de-listed as an Area of Concern.

The Muskegon Lake Long-Term Monitoring project

The program works as follows: three times each year, investigators go to selected sites on the lake and collect fish, invertebrates, zebra mussels, and algae samples. Within three years, sufficient data have been collected to identify restoration targets



Members of the Robert B. Annis Water Resources Institute Science Advisory Board, shown here with Dr. Alan Steinman, meet every two years to assess how well the Institute is fulfilling its mission. Its members are: (top row, left to right) Dr. Gary Lamberti (University of Notre Dame), Dr. Carol Johnston (South Dakota State University), Dr. Claire Schelske (University of Florida); (bottom row, left to right) Dr. Alan Steinman (GVSU-AWRI), Dr. Peter Meier (University of Michigan), and Science Advisory Board Chair Dr. Steve Brandt (Great Lakes Environmental Research Laboratory, National Oceanic and Atmospheric Administration).

for the lake (important for the de-listing process) and to show that water quality—in terms of nutrients in the lake—was improving, also suggesting that the lake was recovering from its low point in the 1970s. It is Steinman's expectation that the project will provide the basis for future graduate theses and undergraduate internships, tying together the teaching, community service and research strains that have been a part of the Institute from its first days.

The Muskegon Lake project is high profile and close to home but it is not alone. Five years after moving into its Lake Michigan Center, the Institute's space allocated for expansion was fully occupied, and planning was underway to renovate the field station for additional office, classroom, and laboratory space. The Institute's full- and part-time staff had reached 83, and its most recent five-year plan called for requesting three new positions to address emerging areas of interest, including an aquatic molecular ecologist, an environmental economist, and a landscape ecologist. Steinman also hoped to see the Institute's continued growth in stature. As it undertook more ambitious research and continued to publish the results in peer-reviewed journals and books, he looked forward to a day when researchers from other colleges and universities would seek opportunities to do postdoctoral and sabbatical research at the Institute.

In 2004, University President Mark Murray acknowledged the Institute's growth and presence in the community:

"For many years, the Annis Water Resources Institute and its dedicated, talented staff have reached out to the community and provided stakeholders, decision makers, and residents with the tools, research, and expertise needed to protect and preserve their water resources and quality of life," he said. "The Institute is an integral part of the Grand Valley State University community and plays a very important role in fulfilling our mission."¹

Conclusion

Few would have predicted the current status of the Annis Water Resources Institute when it was founded in 1986. Surely Grand Valley Presidents Arend Lubbers and Mark Murray, Dean Douglas Kindschi, and Dr. Ron Ward had aspirations for their creation, and probably unspoken hopes that it would exceed its stated goals, but they could not

have expected it would have two research vessels, a home of its own, and a staff of more than 80 full and part-time employees, including eight fully funded principal investigators. Nor could they have anticipated the many research studies generated by staff members, opportunities for Grand Valley students, and the close collaboration that developed between the Institute, government agencies, communities and businesses throughout the region. Thanks to these combined efforts, the Annis Water Resources Institute grew beyond



The Water Resources Institute grew beyond expectations in its first two decades and will continue to provide research information and education opportunities to West Michigan residents of all ages.

expectations during its first two decades. The Institute stood as a symbol of a resurgent Muskegon and Grand Valley's emergence as a regional university, and there was every reason to believe its broad based support and the growth it stimulated would continue well into the future.

ENDNOTES

1. *2004 Water Resources Year in Review.*

...and by documenting the lake's
...provide useful information to get the lake
...is an Area of Concern.

The Muskegon Lake Long-Term Monitoring project

The program works in collaboration with
...to monitor the lake's water quality
...and collect this information. The program
...within three years, and the data
...collected to date.



...the project's goals and objectives.

...the project's progress and findings.

...the project's impact on the community.

...the project's future plans.

...the project's contact information.

...the project's acknowledgments.

...the project's goals and objectives.



...the project's progress and findings.

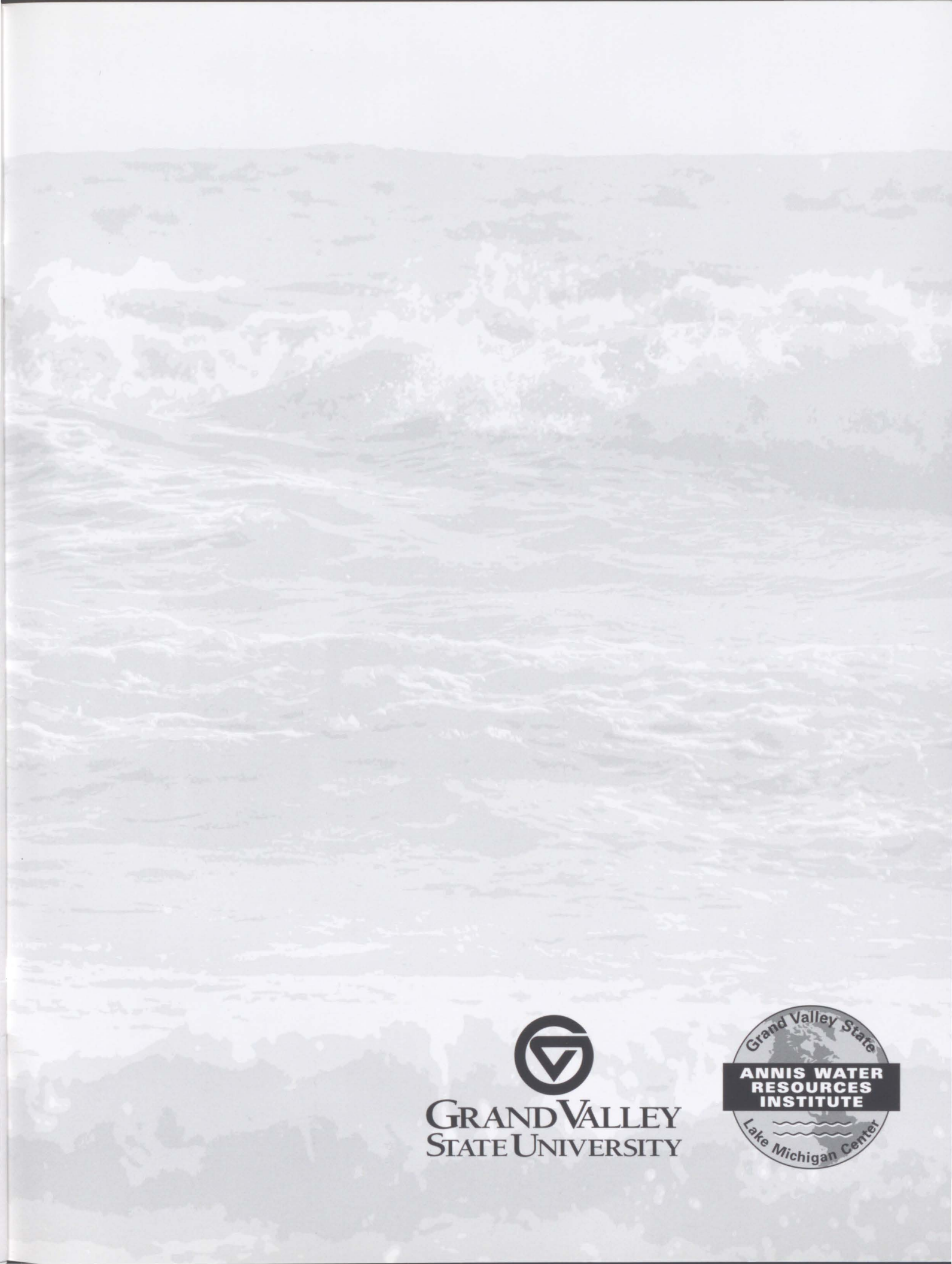
...the project's impact on the community.

...the project's future plans.

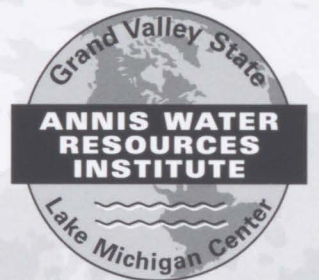
...the project's contact information.

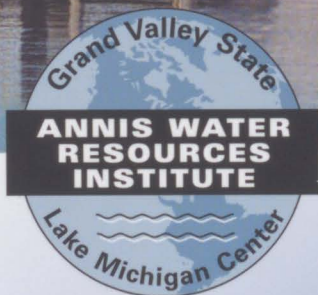
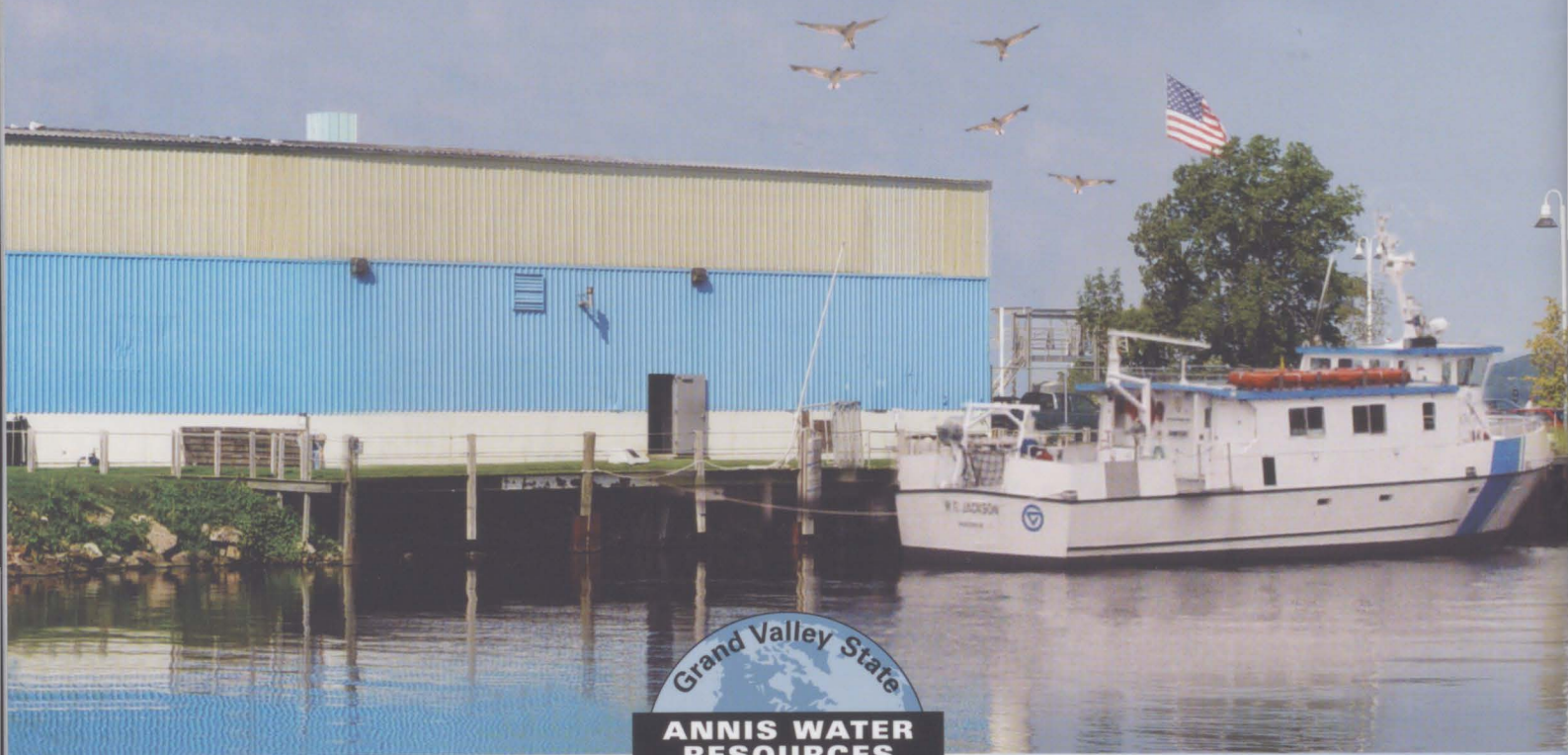
...the project's acknowledgments.

...the project's contact information.



GRAND VALLEY
STATE UNIVERSITY





Annis Water Resources Institute
Lake Michigan Center
740 West Shoreline Drive
Muskegon, MI 49441

231.728.3601
616.331.3749
www.gvsu.edu/wri