

# 2011 Executive Summary



**NIWR**

THE NATIONAL INSTITUTES  
FOR WATER RESOURCES



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**Water is  
life's mater  
and matrix,  
mother and  
medium.**

**There is no  
life without  
water.**

1937 Nobel Prize winner  
Albert Szent-Györgyi

From Niagara Falls to the California coastline, from the headwaters of the Mississippi River to Louisiana's bayous, water is a defining feature of America's landscape, heritage and prosperity. Managing this critical resource is increasingly important, given the challenges from mankind and Mother Nature. That's where the National Institutes for Water Resources (NIWR) plays a major role, by providing a national platform for research, training and collaboration needed to manage our water resources. Housed in the country's top land-grant universities, NIWR member institutes are uniquely positioned to assist state and federal governments in advancing the state of water knowledge and management to protect and preserve our water supply for generations to come.

**OVERVIEW**

The National Institutes for Water Resources promotes water-related research, education and technology transfer at the national, state and local levels. The 54 institutes that make up the network are located at major universities in all 50 states, three U.S. territories and the District of Columbia.

NIWR represents the Water Resources Research Institutes established under the Water Resource Research Act of 1964. The act authorized a state-based network of institutes dedicated to solving problems of water supply and water quality in partnership with universities, local governments and the general public.

The Water Institutes network is the only federally mandated research program that focuses on applied water resource research, education, training and outreach.

Each Water Institute works in consultation with state and local agencies, leading experts in higher education and private industry, stakeholders and the general public to determine its research agenda. The U.S. Geological Survey provides each institute with an administrative grant to target local priorities, recruit researchers and leverage federal funds with state money and private funding.





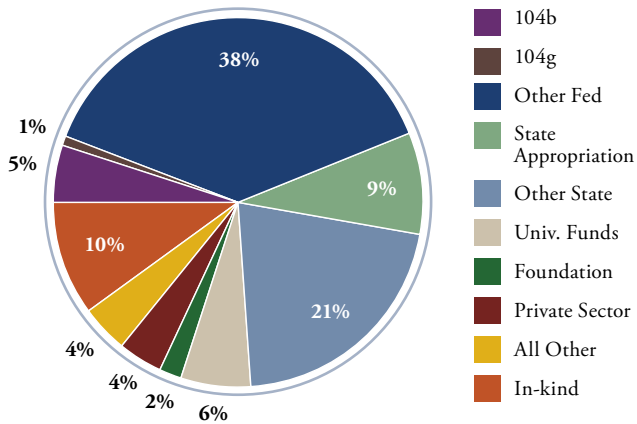
The Water Institutes program is funded by federal appropriation. The 109th Congress reauthorized the Water Resources Research Act through 2011 (P.L. 109-471) and authorized base funding for the institutes at \$12 million per year for 2007 through 2011. The authorization adds research funding for competitive grants for projects of regional or national significance at \$6 million per year.

The Water Resources Research Institutes are required to match federal support with non-federal dollars at a ratio of 2-to-1. But NIWR member institutes regularly exceed that match — often at ratios of more than 5-to-1 — thus multiplying the impact of the federal investment many times over. In fact, the Water Institutes program is one of the most cost-effective, cost-shared national research programs in the country — with a federal-to-non-federal funding ratio that outpaces other federal science programs, including the National Science Foundation.

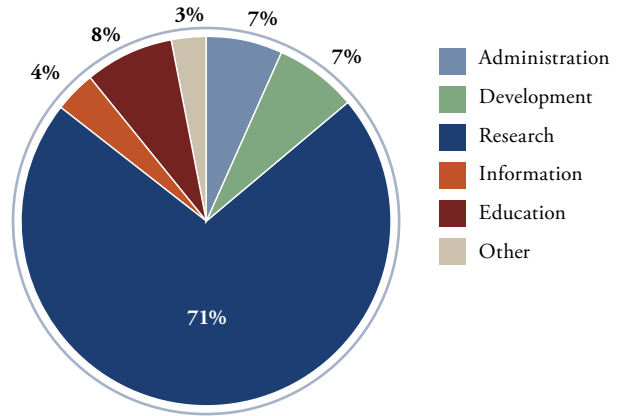
Most NIWR institutes have an advisory panel made up of state water experts that provide guidance on institute priorities and oversight of outreach goals. In addition, each institute is evaluated every three years by the U.S. Department of the Interior. The program is administered by the U.S. Geological Survey as the Water Resources Research Act Program under the general guidance of the Secretary of the Interior.

# FUNDING & ACCOUNTABILITY

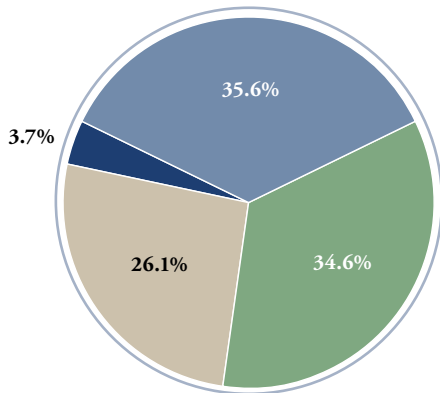
## REVENUE SOURCES 2007-2009



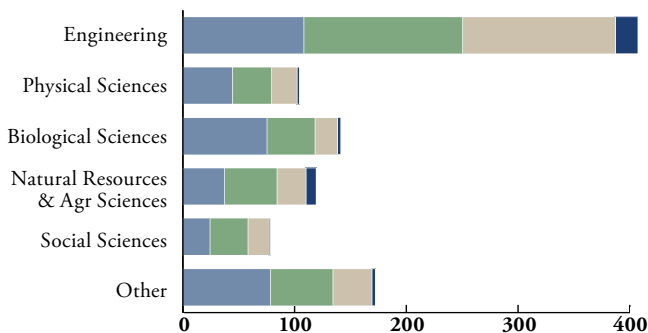
## EXPENDITURES 2007-2009



## STUDENT TRAINING 2007-2009



Undergraduate: 366    Master's: 356    Ph.D.: 269    Post-doc: 38  
**Total: 1,029 Students**



## STUDENT TRAINING BY CATEGORY 2007-2009

### TACKLING WATER ISSUES

#### A voice in water withdrawals

Michigan State University's Institute of Water Research (IWR) has given the ecosystem a voice in decisions involving water withdrawals with the country's first-ever online, interactive tool for industry and water resource managers.

Designed to prevent water withdrawals that could adversely impact the habitats and ecosystems of Michigan's streams and rivers, the Water Withdrawal Assessment Tool was created by a team of experts from the U.S. Geological Survey, Michigan State University and the Michigan Departments of Environmental Quality and Natural Resources.

Water managers use the tool to create a model that estimates how water withdrawal from a particular area would impact local ecosystems. The marriage of science and technology was bolstered by legislation; in 2008, Michigan Gov. Jennifer Granholm signed a law requiring the tool be used for all large-capacity water withdrawals in the state.

The project, facilitated in part by IWR's director Jon Bartholic, has also racked up the awards, winning the Renewable Natural Resources Foundation's 2010 Outstanding Achievement Award and the Environmental Council of States' State Program Innovation Award, and is serving as a model for other states.

Last year, nearly 75 percent of the Water Institutes grant and research revenue was a result of local, state and foundation grants. NIWR member institutes collaborated on projects with 258 universities, 168 state agencies, 182 federal agencies, departments and divisions, and more than 167 local and municipal offices. NIWR member institutes assist these groups in their mission to protect human health, environmental resources and economic sustainability in three key areas: research, education, and technology transfer and public engagement.

## RESEARCH

Last year, NIWR member institutes sponsored more than 1,200 ground-breaking research projects ranging in topic from water supply to water quality to public policy issues of water management. Grants are awarded through a competitive, peer-review process.



# IMPACT & COLLABORATION

## TACKLING WATER ISSUES

### Using switchgrass as biofuel

The Virginia Water Resources Research Center at Virginia Tech is taking part in a regional forest biofuel sustainability study to evaluate how growing cellulosic biofuels such as switchgrass within pine plantations affects water quality and supply.

As part of the 2007 Energy Security and Independence Act, the federal government mandated the annual production of 36 billion gallons of renewable biofuels of which 16 billion must be cellulosic by 2022. Biofuels are a renewable alternative to fossil fuels, as harvested crops can be replanted and offer new economic opportunities for rural communities. Additionally, switching from intensive row-crop agriculture like corn to cellulosic biofuels may require less water, reduce erosion and decrease nutrient leaching and runoff. Also, cellulosic biofuels like switchgrass are not edible and would not compete with world food markets.

VMRRC researcher Sheila Christopher and her team are studying different combinations of switchgrass intermingled with rows of loblolly pine. They're using computer modeling to determine the hydrologic effects, specifically, how integrating switchgrass into pine plantations would affect water quality and quantity at regional scales.

"There's a great need for alternative energy sources and for understanding all aspects of their environmental consequences, both beneficial and harmful," VWRRC director Stephen Schoenholtz says. The project is a collaboration between VMRRC, North Carolina State University, U.S Forest Service and Catchlight Energy, a joint venture of Weyerhaeuser Company and Chevron Corporation.



## TACKLING WATER ISSUES

### A model plan for water sustainability

Although Minnesota is known for its abundance of water, the state hasn't been all that diligent in managing it. Deborah Swackhamer, co-director of the University of Minnesota's Water Resources Center (WRC), compares Minnesota's current water management strategy to managing a bank account without knowing your balance.

But that's about to change. After Minnesotans passed a constitutional amendment dedicating a percentage of sales tax to fund the environment for 25 years, the state Legislature turned to WRC for help in developing guidelines for making water-related investments toward the goal of sustainability.

As project leader of the Minnesota Water

Sustainability Framework, Swackhamer oversaw eight technical work teams representing a range of expertise, a governing council, a recommendation-reviewing synthesis team and a citizen stakeholder advisory committee. The resulting 150-page report addresses a range of water-related issues including drinking water quality, agricultural and industrial water use, ecological needs, invasive species and Minnesota's water infrastructure system, all within the context of changing climate, demographics and land use and development.

"The Framework's recommendations offer Minnesotans a chance to lead the nation in long-term, forward-thinking management of our water resources," says Swackhamer. "Even more importantly, implementation of the recommendations will assure the people of the state that our water resources will be here for generations to come."

## EDUCATION

Located at major U.S. research universities, the NIWR member institutes are the country's single largest training program for the next generation of water scientists, technicians and engineers. Last year, these institutes provided research support for 1,362 undergraduate and graduate students at more than 150 universities studying water-related issues in the fields of agriculture, biology, chemistry, earth sciences, engineering and public policy. Institute-sponsored students receive training in both the classroom and the field, often working shoulder-to-shoulder with the top research scientists in their field on vanguard projects of significant regional importance.

## TECHNOLOGY TRANSFER & PUBLIC ENGAGEMENT

NIWR member institutes play a vital role in the sharing and dissemination of cutting-edge research and best practices. Most institutes host an annual conference and a series of workshops throughout the year that bring together leaders and students in water-related fields from around the region. In addition, most institutes produce region-specific electronic and print communications on current trends and research breakthroughs, as well as opportunities for the general public to engage in water-related volunteer activities.

# IMPACT & COLLABORATION

## TACKLING WATER ISSUES

### Climate change and urban heat islands

The University of Arizona's Water Resources Research Center (WRRRC) is researching the impacts of climate change on the water demands of growing cities.

For years, WRRRC has been at the forefront of analyzing the combined effects of climate change and the urban heat island phenomenon on water demand. The phenomenon, in which an urban area's temperature remains higher than the surrounding area due to building materials' ability

to retain heat, is a particular challenge for cities in arid and semi-arid states where water is required for the vegetation used to counter the heat.

Using climate station data and satellite imagery to relate heat island data to residential outdoor water use, WRRRC researchers recently caught the attention of the U.S. Department of the Interior's Bureau of Reclamation, winning them a much sought-after WaterSMART grant. The grant will allow WRRRC researchers to develop a database to provide scientific support for decision-making by water users, neighborhood groups, utilities and local governments.



## TACKLING WATER ISSUES

### Attacking water-related issues with teamwork

NIWR institutes serve their states by promoting and funding water-related research, education and technology transfer. But they also serve as critical non-partisan, science-based facilitators when it's time to tackle tough problems.

Western states in the Colorado River Basin struggle to satisfy competing demands on a limited water supply. Water presently being diverted for agricultural use is under intense pressure from growing urban populations and ecological demands. Last year, Colorado State University's Colorado Water Institute (CWI) took the lead in convening 35 top water experts from across the seven Colorado River states, sequestered them for two days and charged them with developing recommendations to address the problem.

Participants included farmers, municipal water providers, environmentalists, irrigation district managers, attorneys and scientists. The exercise paid off: Participants emerged with a series of recommended solutions to traditionally contentious problems, including creative ways to share infrastructure, a fast and flexible permitting system to meet drought and emergency needs, and the creation of a governor-appointed liaison to manage a one-stop regulatory process.

The recommendations have been presented to the Western States Water Council and Western Governors' Association for their consideration. "Viewing watersheds holistically instead of piecemeal is important to successful partnerships, as well as to the future management of our water supply," says CWI Director Reagan Waskom. The multi-media report to the Western Governors can be viewed at [www.cwi.colostate.edu](http://www.cwi.colostate.edu).

## THE IMPORTANCE OF FEDERAL FUNDING

Federal funding to the Water Institutes supports information dissemination, technology transfer, and education initiatives that help policy makers all over the country remain on the cutting edge of water-related issues and advancements. It also ensures a national network among states and between state's land-grant universities and other research institutes by linking water investigations, preventing duplication and ensuring that critical topics are addressed. On the state level, federal funding is critical to an institute's leadership within its region and its ability to leverage non-federal funds within their home state.



# WATER IS LIFE

# PROTECTING A PRECIOUS RESOURCE

Floods, droughts and other natural and human-induced disasters like the catastrophic oil spill in the Gulf of Mexico remind us of how precious our waters are to our environment, our health and our way of life. With ever growing populations and increasing pressure on our country's water supply, the 21st century will be marked by how we manage and plan for the sustained use of our water resources.

NIWR plays a critical role in preserving the country's water resources by ensuring regional and state water priorities are addressed through cutting-edge research, by serving as a collaborative platform for scientists, policy makers and stockholders, and by training the next generation of water experts to ensure our country's waters remain pure and plentiful.



[www.NIWR.net](http://www.NIWR.net)

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The National Institutes for Water Resources is a 501(c)(4) organization dedicated to providing representation for the State Water Research Institutes in collective activities to implement the provisions of the Water Resources Research Act of 1984.

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Cover photo: The “bathtub ring” of white rocks on the shoreline of Lake Mead in Nevada shows how low the water level is. In fact, last year’s water levels in the lake dropped to the lowest since 1937 when the reservoir was first filled.