



# Freshwater Collaborative of Wisconsin

## Presentation to the Speaker's Taskforce on Water Quality

J. Val Klump, Dean School of Freshwater Sciences, UW-Milwaukee,  
July 11, 2019

**Moving Wisconsin and the World Forward**

Capitalizing on Wisconsin's  
Leadership in **Freshwater**

***Finding Solutions & Developing the Workforce***

# Water → a **global** issue:

- Single greatest resource challenge of the 21<sup>st</sup> c
- Water sector global economy → \$500B/yr
- \$23T to deal with supply, aging infrastructure, and global change by 2030<sup>1</sup>

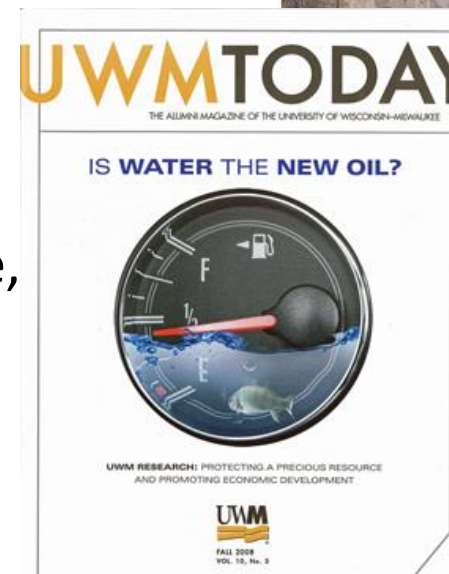
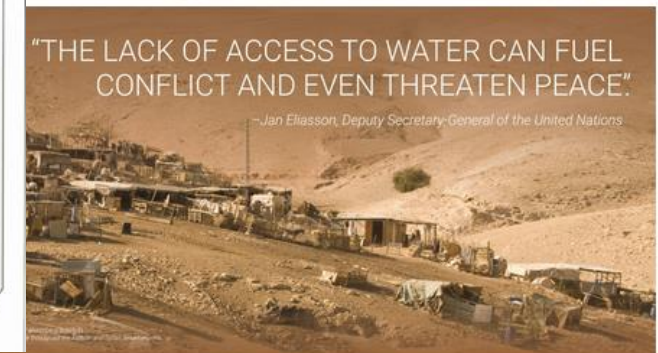
## and a **Wisconsin** issue:

“Every Wisconsinite should have access to safe, clean drinking water.” Speaker Robin Vos

“2019 is the Year of Clean Drinking Water in Wisconsin.” Governor Tony Evers

[WHY WATER](#)[WHY MILWAUKEE](#)[GLOBAL IMPACT](#)[PROGRAMS](#)[RESEARCH](#)[EVENTS](#)[GET INVOLVED](#)

## WHY WATER?



<sup>1</sup> Water Matters: Venture Investment Opportunities in Innovative Water Technology, Artemis Project 2008

# Wisconsin's Water Industries



Agriculture



Commercial  
Fisheries



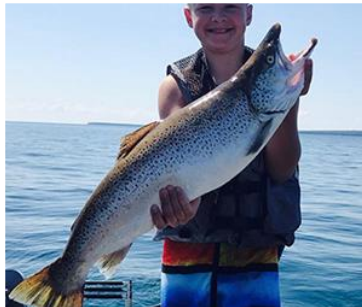
Energy  
Production



Manufacturing



Mining



Recreation and  
Tourism



Shipping



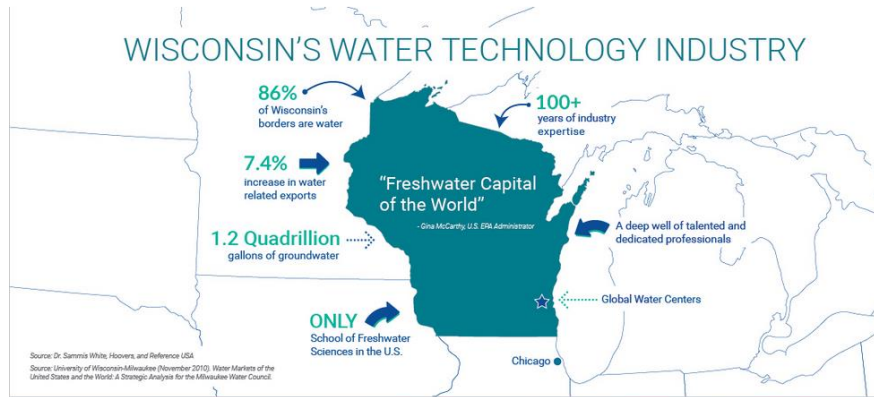
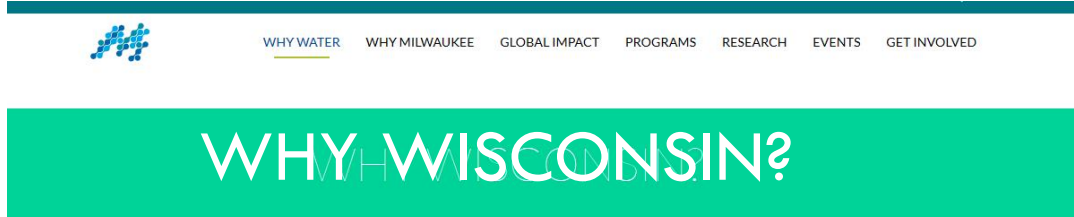
Water  
Infrastructure



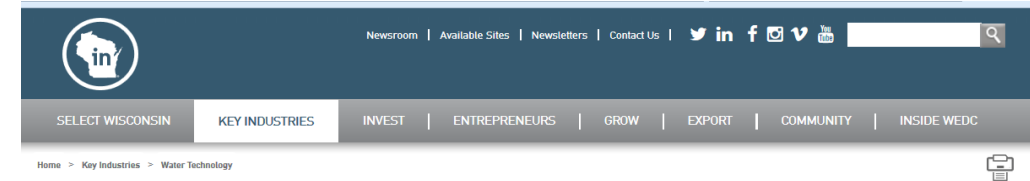
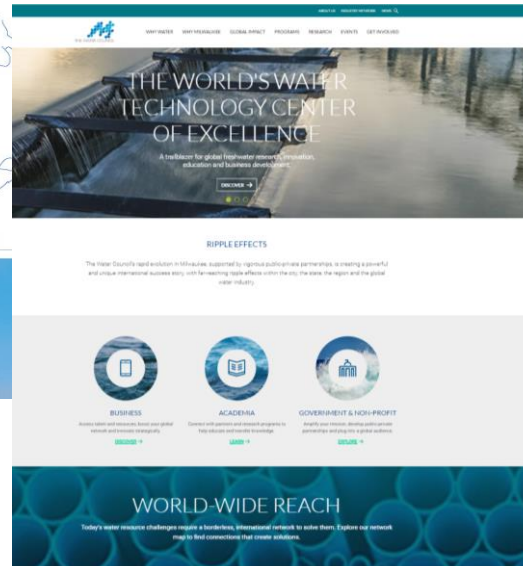
Water Technology



# Meeting Wisconsin's Needs: Freshwater is tied to economic development and workforce development.



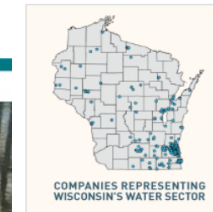
OVER 200  
WATER TECHNOLOGY COMPANIES



## WATER TECHNOLOGY

### WATER TECHNOLOGY EXPERTISE RUNS DEEP IN WISCONSIN

With the two largest Great Lakes—Lake Michigan and Lake Superior—and the Mississippi River forming three of Wisconsin's borders, plus 15,000 lakes within the state's boundaries, Wisconsin has made the most of its unique geography to build core industry strengths that draw upon abundant fresh water. And tapping this precious natural resource to create commercial activity and improve the lives of our citizens, we've also learned to treat it with the respect it deserves. When it comes to using water in a sustainable manner, Wisconsin possesses world-leading knowledge based on a long history of innovation.



The concentration of global water industry leaders and the presence of **The Water Council** in Wisconsin have bolstered a reputation for the state as an authority on water technology advancements. Milwaukee is one of only two North American cities in the elite list of 13 worldwide United Nations Global Compact Innovating Cities (UNGCCIP) and the only one in the world focused on the full cycle of water.

- >> [Forbes article on Milwaukee's globally recognized success as a water technology Mecca](#)
- >> [Read about The Water Council's U.S. Small Business Administration's Innovation cluster grant.](#)
- >> [Learn more about The Water Council's JPMorgan Chase & Co. grant.](#)

**37k** employed



**The silicon valley of freshwater**  
Leadership as a Water-Centric region



Email Coleman Peiffer or call him at 608.210.6714 to learn more about the business opportunities and perfect Wisconsin location for your next project.

**MARKETPLACE: ONCE FAMOUS FOR BEER, MILWAUKEE NOW BETS ON WATER**

Read the Marketplace report on the growing cluster of Milwaukee companies dedicated to solving the world's water woes.

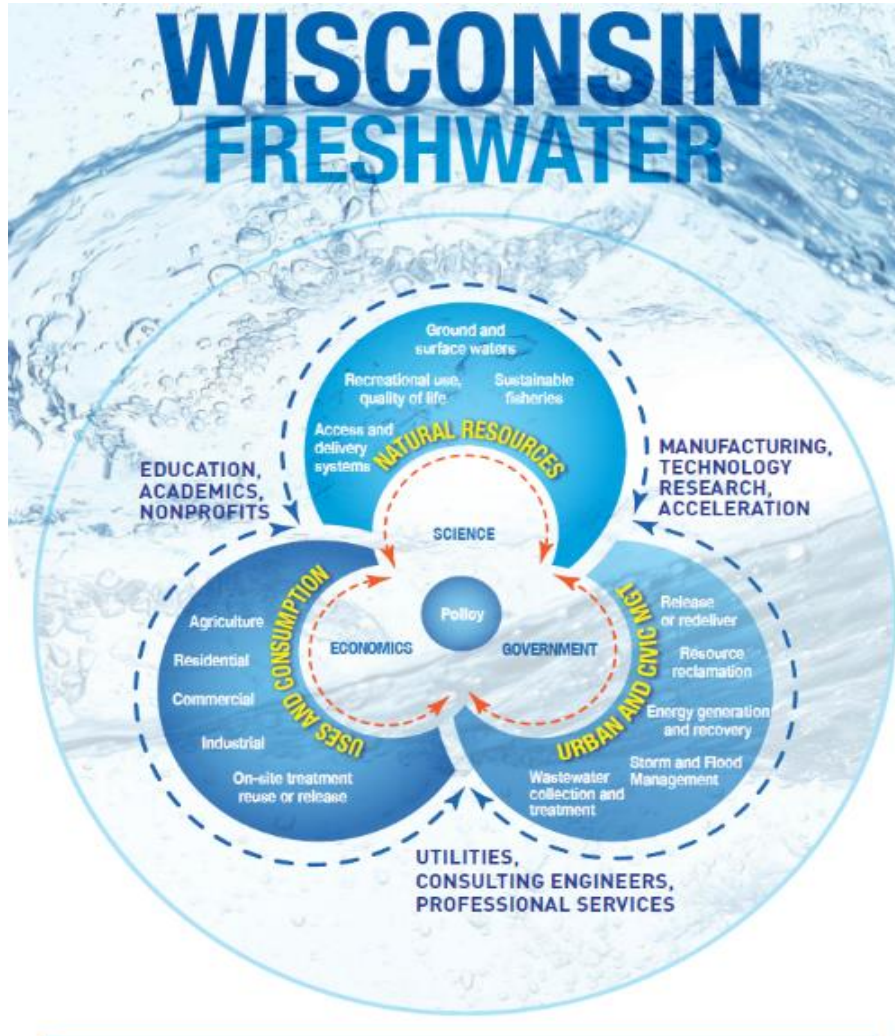
**WALKER'S POINT NEIGHBORHOOD ECONOMIC INVESTMENT ANALYSIS**

Download the complete report on the impact of economic investments in Milwaukee's water technology district.

**INDUSTRY PROFILE**

Download the complete report on water technology advancements in Wisconsin.

- the **premier water cluster in NA**
- Economic development thru 2016  
→\$500m



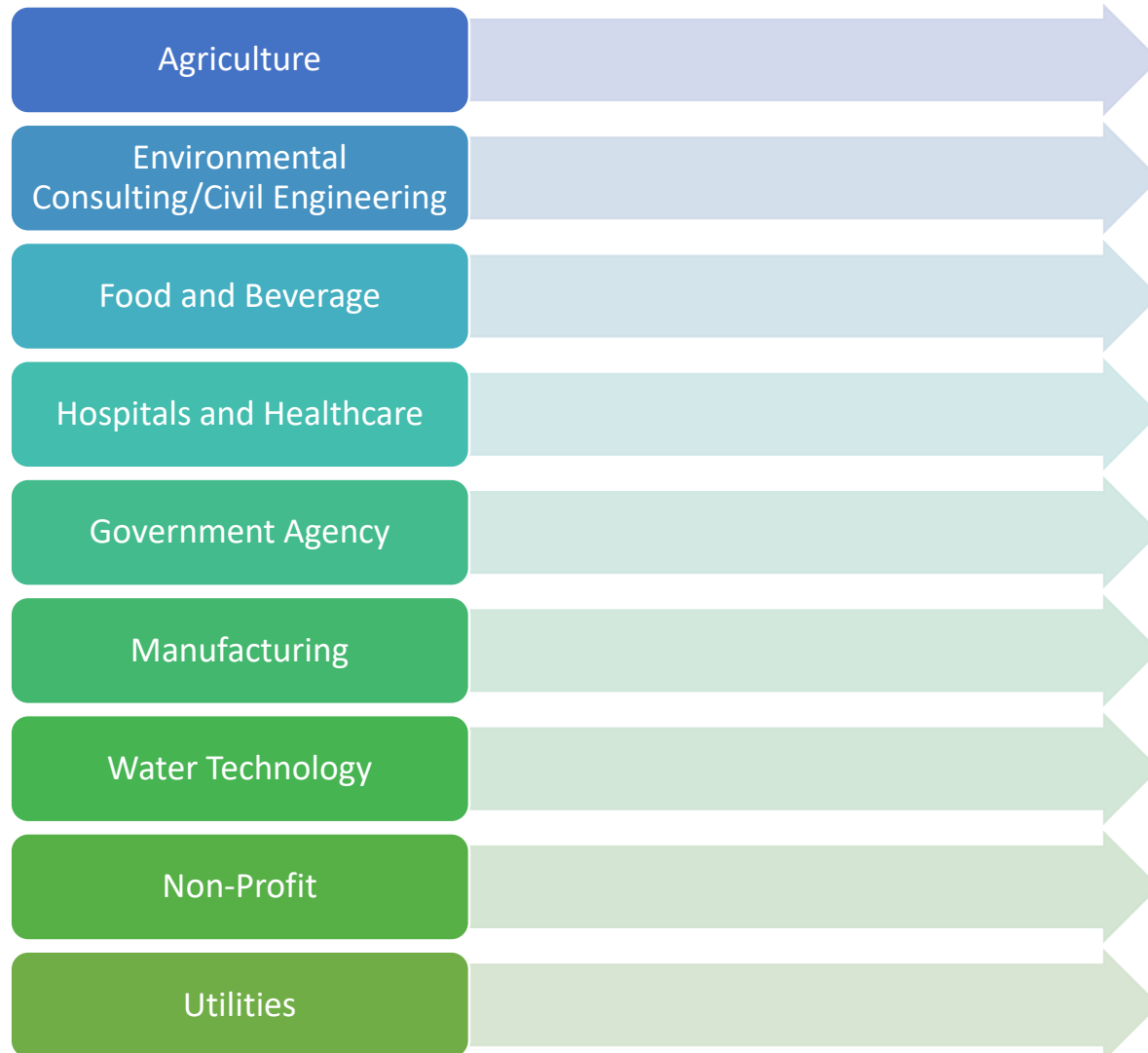
## *Demand for a workforce*

- 78% of all jobs globally are water-dependent (UNESCO)
- Fastest growing sector of world economy
- **Wisconsin industries are facing significant workforce shortages**
- **Survey = 68% of WI water sector employers struggle to find well prepared employees**
- The number of college-age Wisconsin residents is declining. Eighteen of the 29 most common occupations that require a BA/BS or higher had fewer Wisconsin grads in 2016 than the estimated number of water sector job openings available.

# 2017 Water Sector Employer Survey

Conducted in  
Summer 2017

114 Respondents  
Completed Survey



new hires required **extensive training** in water-related issues, technologies or processes.

A plurality **favored water-focused degree** programs with specializations.

water-related positions were a **growth area** in their organizations ~ 50%

**Careers in the water sector make up 2% of the state's workforce**



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## EPA warns of aging workforce within water industry

VIDEO: Lack of Environmental Protection Agency workers



By Brittany Schmidt | Posted: Wed 5:06 PM, Jun 26, 2019 | Updated: Wed 6:18 PM, Jun 26, 2019

GREEN BAY, Wis. (WBAY) -- "If we don't take the time to train, diversify the workforce and bring in the next generation of water and waste-water treatment operators, the people who protect us every day, are not going to be there in 10-15 years," said David Ross, assistant water administrator with the Environmental Protection Agency.

*"If we don't take the time to train, diversify the workforce and bring in the next generation of water and waste-water treatment operators, the people who protect us every day, are not going to be there in 10-15 years."*

*"The money we throw in to build infrastructure, if you don't have the workforce to run it, you are not protecting those taxpayer investments."*



**David Ross**, Asst. Administrator, USEPA Office of Water



# Freshwater Collaborative of Wisconsin

- A System-wide, one-of-a-kind network of undergraduate programs in Freshwater
- Solution-focused research on Wisconsin's (& the world's) water issues

- ! *Unleash UWS collective assets*
- ! *Elite program of training and research*
- ! *Launch talent development multidisciplinary course of study across UW campuses.*





# *New Educational Pipelines*

## Elements of a System-wide FCW:

- **Interdisciplinary** – by nature of the subject –
- **Multiple pathways** ~ focus of course of study
- Maximizes & capitalize on the **strengths of each campus**
- Highly **Individualized** ~ student chooses a path to degree
  - Combination of
    - Flexibility – individually designed based upon students' interest
    - Core requirements – rigorous standards, areas of competency, demonstration of achievement
    - **Seamless**: no impediments to curriculum/coursework/credit across System.
      - Admission to one is admission to all
- **Uniqueness** – stands out from existing programs at other Institutions
- **Keep, Attract & Grow talent** – global recruitment & local retention
- **Leverage WI's assets**



# FRESHWATER COLLABORATIVE CONCEPT MAP

- UG Scholarships
- Common Core competencies
- Required Cross-campus experiences
- Specialized Institutes

**Training**

Problem  
Solving  
Research

- Research collaboration networks
- Attracting funding & Investment to WI
- Shared Facilities/Resources
- Grad & UG Traineeships & RE

International  
Marketing &  
Recruiting

Workforce,  
Industry, &  
Community

- One Brand supporting all programs
- Recruiting and Marketing staff
- Targeting new markets
- WI as a Water Training destination

- Create the “Silicon Valley of FW”
- Foster internships & work study
- Student Chapters
- Advisory Boards & Engagement
- Workforce development for the Blue Economy







Timing for leveraging our state's competitive advantages has never been better and Wisconsin has a unique opportunity to be a global player in **water.**



### TARGETED INDUSTRY PROJECT

This program supports industry cluster and sector development in the state of Wisconsin.

[Learn More](#)

Workforce development is the most critical ingredient for growing Wisconsin's competitive advantage in the global water economy.

~\$335,000/yr for 2 years – matched by \$1.4M from UWS  
Goal: kick start the FCW





## Appendix Briefs: Strengths and Assets of UW System



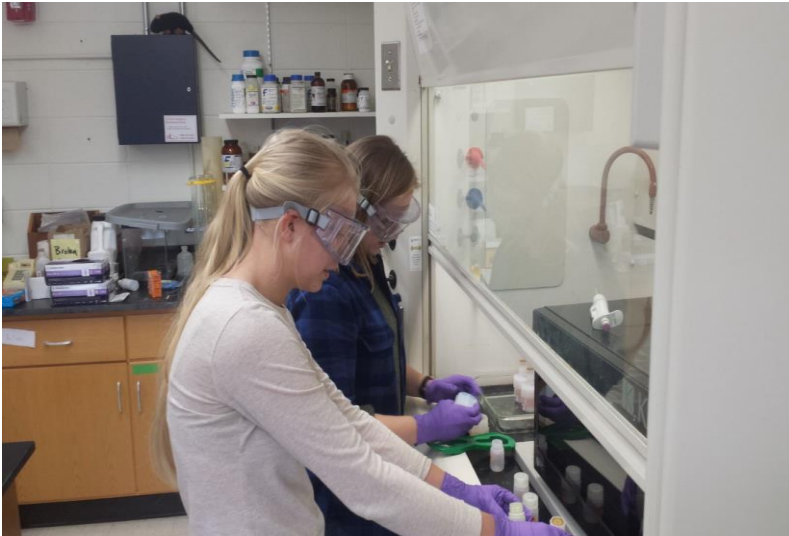


**WE GROW  
BIG IDEAS**

THANK YOU







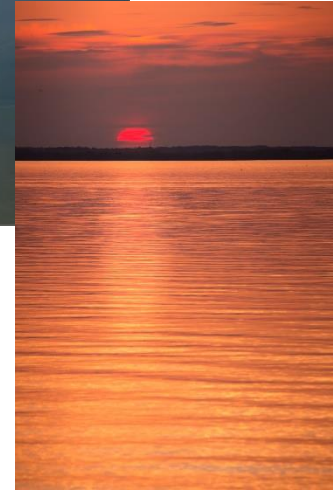
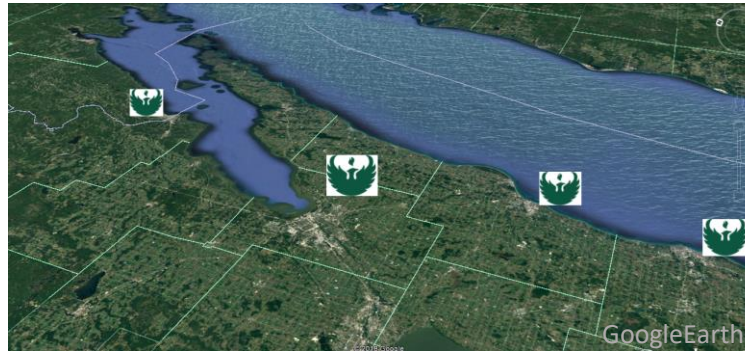
## Assets

- Department of Geology
- Materials Science and Engineering
- Department of Biology
- Watershed Institute
- Department of Chemistry
- Department of Geography

## Strengths

- Surface and Ground Water Chemistry
- Environmental Pollutants
- Industry Collaborations
- Water Quality and Emerging Contaminants
- Creation of Bathymetry Maps (GIS)





## Assets

- 420 miles of coast connecting campuses in four coastal cities
- Established programmatic strengths addressing coastal resources
- Deep history of community-focused education & research partnerships
- NERR initiative & relevant centers (e.g. CCB, EMBI)

## Strengths

- Great Lakes Coastal Science, Restoration, & Management
- Watershed Management & Restoration
- Water Quality Safety & Emerging Contaminants
- Agricultural Water Management







## UNIVERSITY of WISCONSIN LA CROSSE



## Assets

- River Studies Center
- Upper Midwest Science Center (USGS)
- Prairie Springs Science Center
- Research boats on Mississippi River

## Strengths

- River Science
- Aquatic Contaminants
- Nutrient Dynamics
- Invasive Species





**College of Agricultural and Life Sciences**  
 Community and Environmental Sociology  
 Forest and Wildlife Ecology  
 Biological System Engineering  
 Soil Science  
 Agronomy  
 Life Sciences Communication  
 Entomology  
 Bacteriology  
 Agricultural and Applied Economics  
 Horticulture

**College of Letters and Science**  
 Geoscience  
 Center for Limnology  
 Geography  
 Integrative Biology  
 Botany  
 Atmospheric and Oceanic Sciences  
 Planning and Landscape Architecture  
 English  
 Computer Sciences  
 Anthropology  
 Chemistry

**100 affiliated faculty/scientists**

**College of Engineering**  
 Materials Science and Engineering  
 Civil and Environmental Engineering  
 Engineering Professional Development

**Other schools/units**  
 Art Department  
 Dance Department  
 School of Veterinary Medicine  
 Wisconsin Geological and Natural History Survey  
 Geological Engineering  
 Nelson Institute for Environmental Studies  
 Center for Limnology  
 Aquatic Sciences Center/Sea Grant  
 State Lab of Hygiene  
 Wisconsin Institute for Discovery  
 UW-Extension  
 Center for Climatic Research  
 Center for Sustainability and the Global Environment

## Assets



- Aquatic Sciences Center
- Center for Limnology
- Water Science and Engineering Lab
- Diverse water-focused graduate degree programs
- Many large interdisciplinary water-focused research initiatives
- Water@UW-Madison: 100+ faculty/PIs with diverse interests in water

## Strengths



- Watershed/Ecosystem Management and Restoration
- Water Quality and Emerging Contaminants
- Water Treatment, Infrastructure, and Engineering
- Agricultural Water Management





## Assets

- School of Freshwater Sciences
- College of Engineering & Applied Science
- Water Technology Accelerator
- Great Lakes Research Fleet
- Endowed Centers for Water Policy & GL Genomics
- NSF IUCRC Water Equipment & Policy Center

## Strengths

- Great Lakes/Coastal Ecosystem Management
- Water Quality & Environmental Toxicology
- Strong Groundwater and Atmospheric Expertise
- Existing Industrial Collaborations
- Sensor development & observing systems

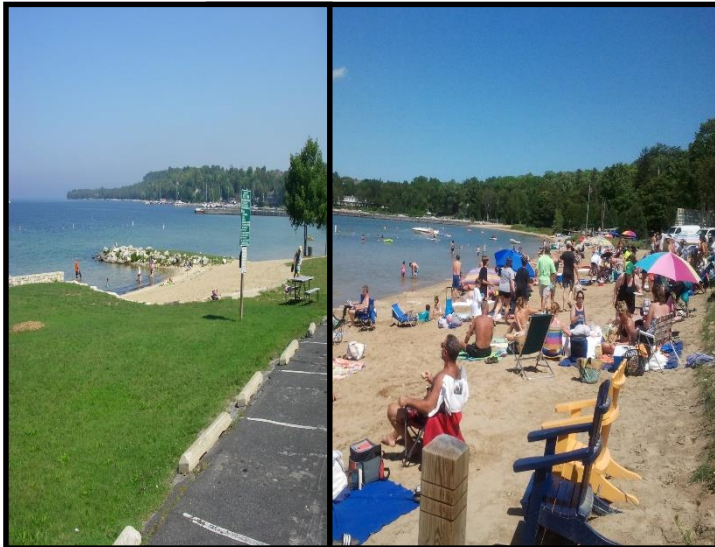


# UNIVERSITY OF WISCONSIN OSHKOSH



Before

After



## Assets

- Environmental Research and Innovation Center (ERIC) – State Certified Lab
- Water testing labs and long-term research sites in Oshkosh, Eagle River, Sturgeon Bay, and Manitowoc.
- Educational programs related to water in Environmental Engineering Tech., Biology, Geology, Chemistry, etc..
- Research Boat with lab and ramp access to the Lake Winnebago System
- Multiple research labs in several departments actively conducting water research.
- BS and MS programs in water related areas

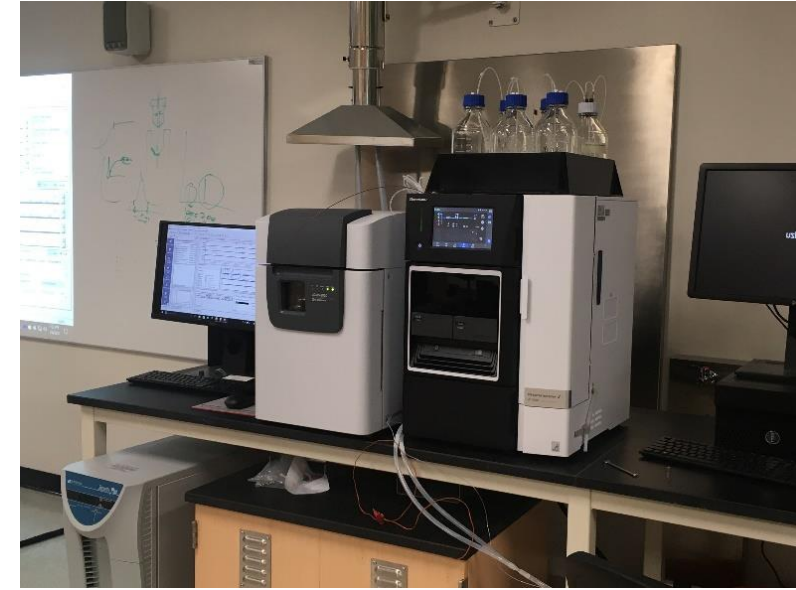
## Strengths

- Recreational water and sustainable stormwater treatment technology
- Field site access to water rich areas of WI
- Access to 50+ paid water-related internships per year.
- Multidisciplinary educational programs





# UNIVERSITY OF WISCONSIN PARKSIDE



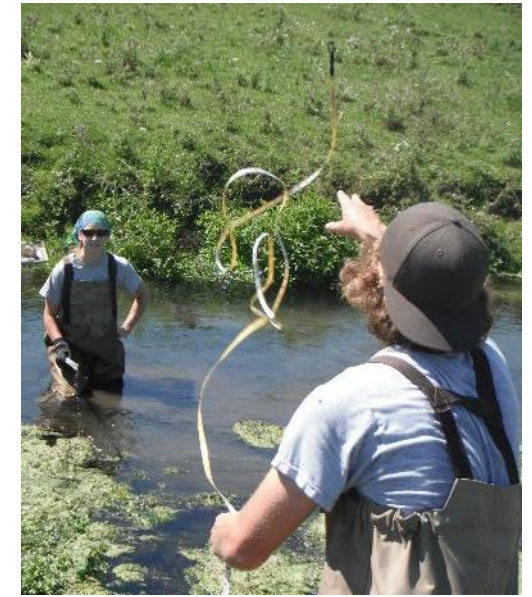
## Assets

- SC Johnson Integrated Science Lab
- GIS/Spatial Analysis Lab
- Outdoor laboratory with access to aquatic habitats and infrastructure
- Root River Environmental Education Community Center (REC)
- Center for Environmental Education, Demonstration, and Applied Research (CEDAR)

## Strengths

- Biomonitoring, restoration, remediation, and habitat management
- Hydrology and water quality
- Community-based learning and partnerships
- Outreach through REC and CEDAR





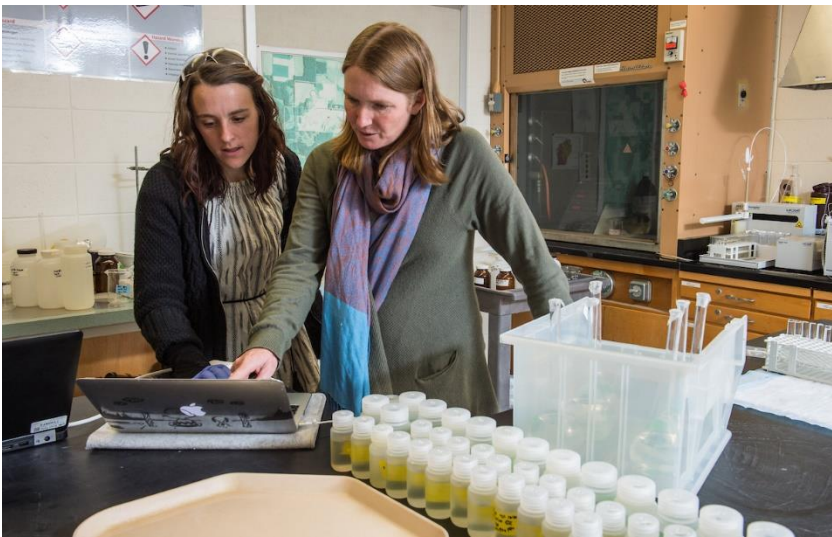
## Assets

- Pioneer Farm
- Tree-Ring, Earth, and Environmental Sciences Laboratory
- Fluid Mechanics Laboratory
- Geotechnical Engineering Laboratory
- Small watersheds in a rural/ag setting
- Unique Driftless Area landscape

## Strengths

- Engineering and agriculture
- Broad spectrum of stream and lake research
- Water infrastructure, waste management, and technological applications
- Groundwater and surface runoff





UNIVERSITY OF  
WISCONSIN

# River Falls

GLOBAL. INNOVATIVE. EXCELLENT.



## Assets

- Heart of St. Croix Basin
- Campus Trout Stream
- Engaged Watershed Community
- Campus Groundwater Well Network
- Urban-Rural Interface
- Strong UW Extension Partnership

## Strengths

- Undergraduate Research Emphasis
- Multiple Agricultural Programs
- Water-focused Curriculum
- Broad Water Management Expertise





College of Natural Resources  
University of Wisconsin - Stevens Point



## Assets

- **3<sup>rd</sup> Largest Water Resources Program in Nation (Undergrad majors)**
- Largest College of Natural Resources in Nation
- 50 years of Water Majors
- USGS WI Cooperative Fishery Unit
- Aquaculture & Aquaponics Facilities
- UW Extension-UWSP Partnership

## Strengths

- Fisheries & Aquatic Sciences
- Water Quantity and Quality
- Great Lakes & Watershed Management & Restoration
- Aquaculture/Aquaponics





# UNIVERSITY OF WISCONSIN STOUT

WISCONSIN'S POLYTECHNIC UNIVERSITY



## Assets

- NSF-funded LAKES REU
- Center for Limnological Research and Rehabilitation
- Tainter-Menomin Lake Improvement Association
- Existing relationships with Wisconsin DNR, MN Pollution Control Agency, US Geological Survey, Army Corps of Engineers

## Strengths

- Polytechnic designation
- Interdisciplinary focus
- Program Advisory Boards
- Programs in Environmental Science, Applied Social Science and Conservation Biology





## Assets

- Lake Superior
- Lake Superior Research Institute
- Great Lakes Maritime Research Institute
- Transportation and Logistics Research Center
- Educational focus areas: aquatic biology, fisheries science, chemistry, environmental science

## Strengths

- Aquatic Invasive Species Research and Education
- Water and Human Health
- Watershed management and planning
- Environmental toxicity testing





# University of Wisconsin Whitewater



## Assets

- Institute for Water Business
- Fiscal and Economic Research Center
- Modern Instrumentation Lab
- Microscopy Lab
- Animal Care Facility
- GIS Center

## Strengths

- Water Business, Law and Finance
- Water Quality, Safety and Emerging Contaminants
- Watershed Management and Restoration
- Community Engagement

## **Speaker's Taskforce on Water Quality, June 11, 2019**

Presenters for Testimony on behalf of the Freshwater Collaborative of Wisconsin:

- **Eric Leaf**, Assistant Dean for Advancement, School of Freshwater Sciences, University of Wisconsin-Milwaukee
- **J. Val Klump**, Dean and Professor, School of Freshwater Sciences, University of Wisconsin-Milwaukee
- **Laurie Parsons**, Senior Vice President – Environmental Science and Engineering, Growth Team, Ramboll Group
- **Jessica Orlofske**, Assistant Professor – Biology, UW-Parkside
- **Elisabeth Harrahy**, Associate Professor – Biology and Toxicology, UW-Whitewater