

# **59th Annual Meeting of the Delaware Water Resources Center Advisory Panel**

**Rust Ice Arena  
University of Delaware  
Newark, Del.  
May 9, 2024**

Gerald Joseph McAdams Kauffman, Jr.  
Director and Associate Professor  
University of Delaware  
Water Resources Center

Martha B. Narvaez  
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**JOSEPH R. BIDEN, JR. SCHOOL OF PUBLIC POLICY & ADMINISTRATION**

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TO: Advisory Panel of the University of Delaware Water Resources Center  
Undergraduate/Graduate Water Research Students and Advisors

FROM: Gerald J. Kauffman, Director  
Martha B. Narvaez, Associate Director  
University of Delaware Water Resources Center

DATE: March 15, 2024

SUBJECT: 59<sup>th</sup> Annual UDWRC Advisory Panel Meeting, May 9, 2024, 10 am-1 pm

You are invited to the 59<sup>th</sup> Annual Meeting of the Advisory Panel of the University of Delaware Water Resources Center on Thursday, May 9, 2024 at 10 am to be held at the Fred Rust Ice Arena (549 S. College Ave., Newark, DE) on the campus of the University of Delaware. The purpose of this meeting is to present the FY24 undergraduate and appropriation and our research projects, discuss upcoming FY25 research projects, discuss the DOI/USGS Water Resources Research Act (WRRRA) FY25 budget appropriation, and establish water research priorities in Delaware for the upcoming year. The detailed meeting agenda is provided below.

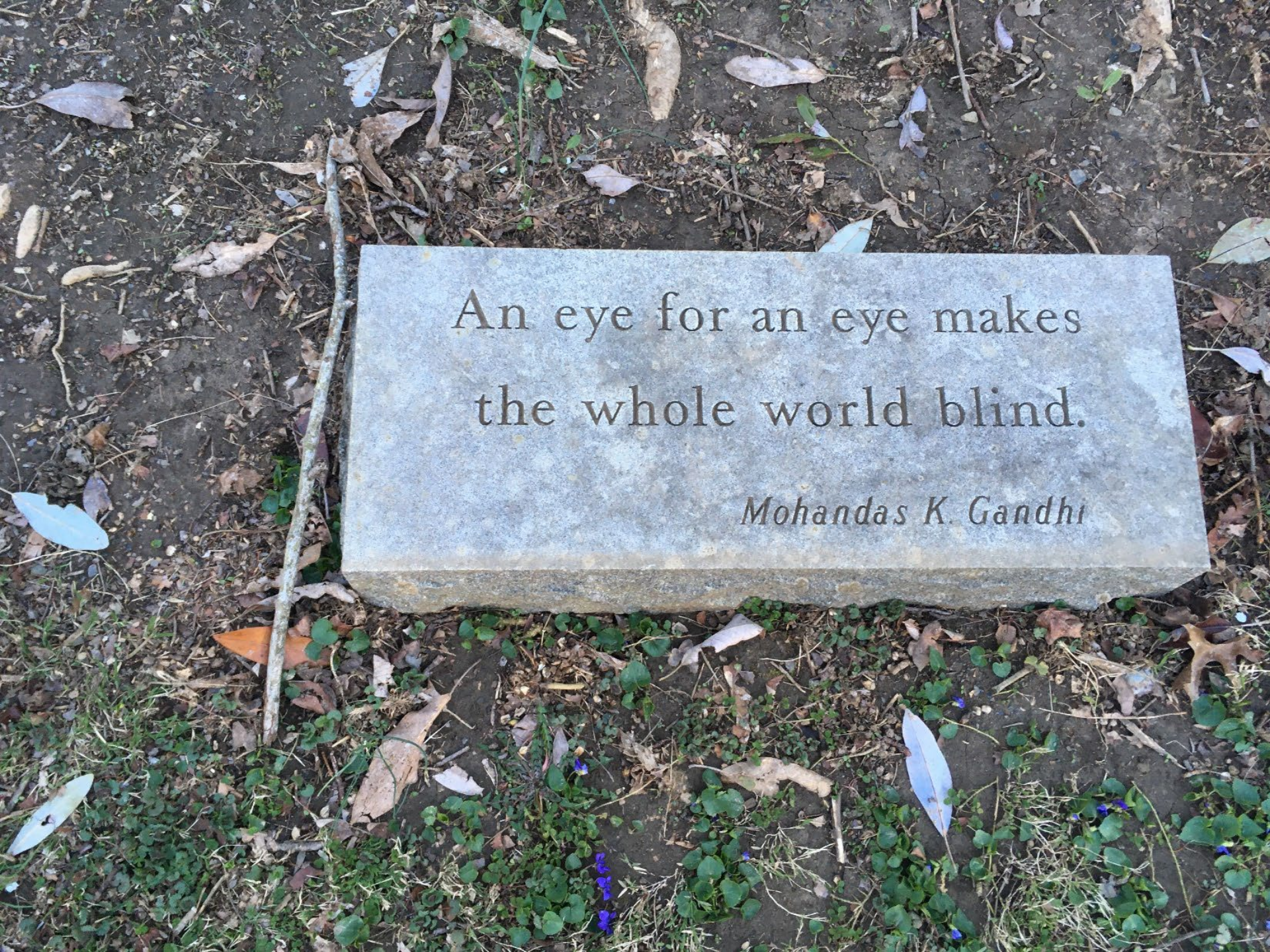
**AGENDA**  
**DELAWARE WATER RESOURCES CENTER**  
**59<sup>TH</sup> ANNUAL ADVISORY PANEL MEETING**

May 9, 2024  
10:00 am

Fred Rust Ice Arena  
University of Delaware  
Newark, DE

- |                                                        |          |
|--------------------------------------------------------|----------|
| 1. Introductions                                       | 10:00 am |
| 2. DWRC Special Report from DC                         | 10:10 am |
| 3. FY24 Undergraduate/Graduate Research Presentations  | 10:30 am |
| 4. DOI/USGS WRRRA FY25 Budget Request                  | 11:30 am |
| 5. FY25 Undergraduate Water Internship Proposals       | 11:40 am |
| 6. DWRC Advisory Panel Membership                      | 11:55 am |
| 7. Fluctuating Federal/State Fiscal Landscape in Water | 12:10 pm |
| 8. Luncheon                                            | 12:30 pm |





An eye for an eye makes  
the whole world blind.

*Mohandas K. Gandhi*



# 1. Introductions



Alabama (AL)



Alaska (AK)



Arizona (AZ)



Arkansas (AR)



California (CA)



Colorado (CO)



Connecticut (CT)



Delaware (DE)



Florida (FL)



Georgia (GA)



Hawaii (HI)



Idaho (ID)



Illinois (IL)



Indiana (IN)



Iowa (IA)



Kansas (KS)



Kentucky (KY)



Louisiana (LA)



Maine (ME)



Maryland (MD)



Massachusetts (MA)



Michigan (MI)



Minnesota (MN)



Mississippi (MS)



Missouri (MO)



Montana (MT)



Nebraska (NE)



Nevada (NV)



New Hampshire (NH)



New Jersey (NJ)



New Mexico (NM)



New York (NY)



North Carolina (NC)



North Dakota (ND)



Ohio (OH)



Oklahoma (OK)



Oregon (OR)



Pennsylvania (PA)



Rhode Island (RI)



South Carolina (SC)



South Dakota (SD)



Tennessee (TN)



Texas (TX)



Utah (UT)



Vermont (VT)



Virginia (VA)



Washington (WA)



West Virginia (WV)



Wisconsin (WI)



Wyoming (WY)





## 2. DWRC Special Report from DC





The UDWRC is recognized as a national leader in water resources research, education, and public service:

1. **UDWRC is a Congressionally-charted water research institute:** Established on-campus in 1964, one year after Lyndon Baines Johnson signed the Water Resources Research Act (WRRRA) of 1964, the UDWRC is one of the 54 Congressionally-chartered National Institutes for Water Resources (NIWR) supported by the Department of Interior and U.S Geological Survey at land grant universities in the 50 states, D.C., and island territories of Guam, Puerto Rico, and U.S. Virgin Islands.
2. **UDWRC top ranked in the nation by USGS:** The UDWRC is recognized as "exceptional" in supporting students at Delaware universities. In accordance with the Water Resources Research Act of 1984, the Secretary of Interior and Director of the U.S. Geological Survey informed the President of the University of Delaware by letter that the UDWRC is "unique nationally" and its collaborations are "impressive" amounting to a "high rating and top 12 ranking nationwide among the 54 land grant universities. The five-year evaluation of the 54 National Institutes for Water Resources (NIWR) at land grant universities that stretch from Maine to Micronesia noted that our institute: (1) engages with universities/colleges around the state, (2) has strong leadership on the part of the Institute Director, and (3) facilitates research and information transfer closely tied to the state's water resources needs/issues of Delaware.
3. **UD AWRA voted national student chapter of the year:** Our national prominence in water is further cemented with news that the University of Delaware student section of the American Water Resources Association (UDAWRA) was voted for the 4th time as the national chapter of the year, a feat matched by the University of Wisconsin and University of Florida. Martha Narvaez is faculty advisor of the nationally prominent UD student section of the AWRA.
4. **American Water Resources Association (AWRA) 51<sup>st</sup> President:** In 2015 Martha B. Narvaez was elected as the 51<sup>st</sup> President of the American Water Resources Association (AWRA) established in 1964 and with 25,000 members is the largest water resources professional organization in the world.
5. **Brandywine Red Clay Alliance (BRC) 77<sup>th</sup> President:** In 2021 Andrew R. Homsey was elected as the 77<sup>th</sup> President of the Brandywine Red Clay Alliance of West Chester, Pennsylvania which was established in 1944 and is the oldest small watershed association in the United States.
6. **Universities Council on Water Resources (UCOWR) 59<sup>th</sup> President:** In 2022 Gerald J. Kauffman was elected as the 59<sup>th</sup> President of the Universities Council on Water Resources (UCOWR) which represents the water resources research and degree-granting institutions of higher learning in America. Established in 1964, the UCOWR board is composed of faculty from the University of Delaware, Texas A&M, Minnesota, Oklahoma State, Mississippi State, Penn State, Purdue, Virginia Tech, Kansas State, University of Hawaii, University of California Berkeley, Washington State, and Southern Illinois University.





# DWRC Faculty and Scientists



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**Nicole M. Minni**  
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The Delaware Water Resources Center (DWRC) is a unit of the Institute for Public Administration (IPA), a research center within the Biden School of Public Policy & Administration at the University of Delaware.

## Directions

DWRC has two Delaware offices its main office on the University of Delaware's Newark campus, between Penny Hall and the Perkins Student Center, and on the Hugh R. Sharp campus of the University of Delaware in Lewes. Detailed directions for both locations are at [www.wrc.udel.edu](http://www.wrc.udel.edu).



**DWRC Newark Office**  
DGS Annex  
261 Academy Street  
University of Delaware  
Newark, Delaware 19716

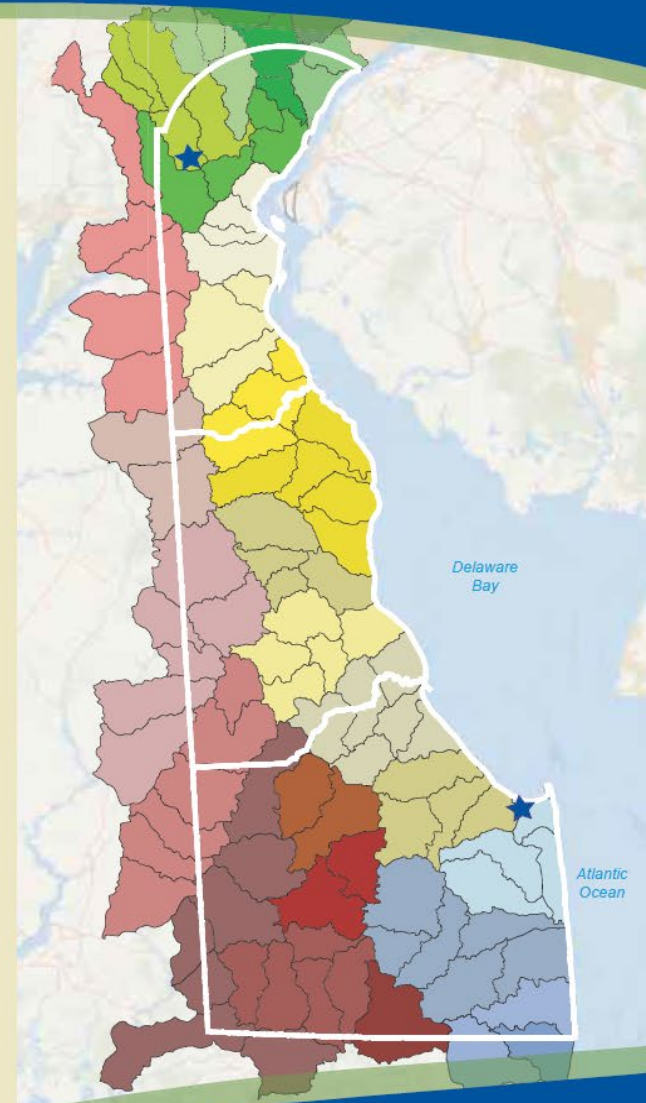
**DWRC Lewes Office**  
805 Pilottown Road  
Pollution Ecology Lab, Room 109  
Lewes, Delaware 19958



### An Equal Opportunity / Affirmative Action Employer

The University of Delaware is committed to assuring equal opportunity to all persons and does not discriminate on the basis of race, color, gender, religion, ancestry, national origin, sexual orientation, veteran status, age, or disability in its educational programs, activities, admissions, or employment practices as required by Title IX of the Education Amendments of 1972, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, the Americans with Disabilities Act, other applicable statutes and University policy. Inquires concerning these statutes and information regarding campus accessibility should be referred to the Affirmative Action Office, 305 Hullen Hall, (302) 831-2835 (voice), (302) 831-4563 (TDD).

## Water Resources Center





## Mission

The University of Delaware Water Resources Center (DWRC), established in 1965, is one of the 54 National Institutes for Water Resources (NIWRs) at land-grant universities in the 50 states, District of Columbia and island territories of Guam, Puerto Rico, and U.S. Virgin Islands. The DWRC receives funding through Section 104 of the Water Resources Research Act of 1984, which was originally signed into law by Lyndon Baines Johnson in 1964. The U.S. Geological Survey administers the provisions of the Act and provides oversight of the nation's Water Resources Centers through the National Institute of Water Resources (NIWR).

As a member of the NIWR, the DWRC has two key missions related to Delaware's water resources – our precious groundwater aquifers and our streams, ponds, lakes, and coastal waters to: (1) support research, education, and public outreach programs that focus on water management issues of importance to Delaware citizens and (2) to foster and support training and education programs for the future water scientists, engineers, managers, and policy-makers.



## Education

DWRC provides an important role in water resources education at the University of Delaware and to the greater public. The DWRC carries out its education role through participating in outreach activities; offering courses, seminars and forums with a water resources focus; and advising undergraduate and graduate students through funded assistantships.



### Courses Offered

- UAPP 611: Regional Watershed Management
- GEOG 432: Environmental Hydrology
- CIEG 440: Water Resources Engineering
- UAPP 667: GIS Applications in Public / Nonprofit Sectors
- UAPP 652: GIS in Public Policy

### Conferences

- Water Policy Forum
- Delmarva GIS Conference

### Community Events

- Delaware Clean Water Rally
- Delaware GIS Day
- University of Delaware Ag Day
- University of Delaware Coast Day



## Public Service

DWRC provides water policy assistance to governments in Delaware and the surrounding region. This public service role is significant to the mission of the College of Arts & Sciences and the School of Public Policy & Administration (SPPA). DWRC takes a regional, intergovernmental approach to water management since watersheds and aquifers cross many political jurisdictions.

The Water Resources Agency, a project of the DWRC, receives support from Delaware, New Castle County, and the cities of Wilmington and Newark to provide water resources assistance to the public with regard to water supply, water quality, and watershed planning and management.



### Water Supply

- Delaware's Water Supply Coordinating Council
- Office of the State Water Coordinator
- New Castle County Water Resource Protection Areas, Technical Advisory Committee
- Delaware Source Water Assessment and Protection Program

### Watershed Management and Planning

- Christina Basin Clean Water Partnership
- White Clay Creek Wild and Scenic Management Committee
- Nonpoint Education for Municipal Officials (NEMO)
- Floodplain/Stormwater Management

### Mapping and Data Services

- Comprehensive Plan Mapping
- Mapping Applications
- Public and Private Education (K-12) Assistance
- Regional Watershed Mapping, Data Creation, and Analysis



## Research

DWRC seeks opportunities to collaborate with University faculty, scientists, and students to fund, conduct, and publish water-resources research.

### University of Delaware Experimental Watershed

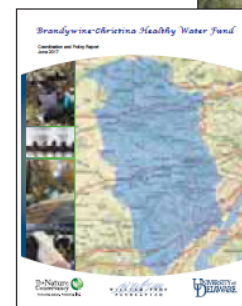
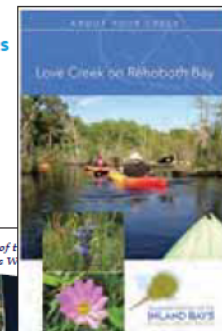
Development of an experimental watershed as an on-campus education and research laboratory.

### Geospatial Analysis and Information Management

Repository of core DWRC data and information collaboration in water research with other groups on campus and beyond. Advancement of GIS and remote-sensing technologies for water resources management.

### Publications and Presentations

Research on topics such as water policy, watershed management, water rates, and public-private water management at regional and national conferences.





## Delaware Water Resources Center (UDWRC)

A research unit of the *Institute for Public Administration*  
in the *Joseph R. Biden, Jr. School of Public Policy & Administration*



### UDWRC Faculty/ Scientists/Students

**Gerald J. Kauffman, Ph.D.**  
Director/Associate Professor

**Andrew R. Homsey**  
Policy Scientist  
(GIS Services Manager)

**Nicole M. Minni**  
Associate Policy Scientist  
(GIS Laboratory/Lewes Office)

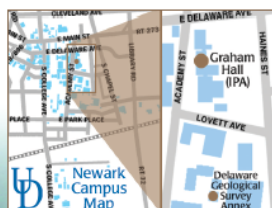
**Martha C. Narvaez**  
Associate Director/Policy Scientist

**Marta Driscoll**  
Senior Budget Officer

**Jhaney Hamlett**  
Master of Public Admin. (MPA)

**Megan Wassil**  
M.S. Water Science & Policy (WSP)

**Lydia Franks**  
M.S. Water Science & Policy (WSP)



### What is UDWRC?

Established on campus in 1965, the University of Delaware Water Resources Center (UDWRC) is one of the 54 National Institutes for Water Resources (NIWR) at land grant universities in the 50 states, District of Columbia, and island territories of Guam, Puerto Rico, and U.S. Virgin Islands. The UDWRC is supported by the U.S. Geological Survey through Section 104 of the Water Resources Research Act signed into law by Lyndon Baines Johnson in 1964. The mission of the UDWRC is to: (1) support water resources research, education, and public outreach programs in Delaware and (2) sponsor training of future water scientists, engineers, managers, and policymakers in the First State.

### What is WRA?

Established in 1977 and modified in 1990 and 1997, the Water Resources Agency (WRA) is a program of the UDWRC and provides regional water resources assistance to governments in Delaware and the Delaware Valley through the University of Delaware's land-grant public service, education, and research role. The WRA is supported by federal, state, and local government partners, including the State of Delaware, New Castle County, City of Newark, and City of Wilmington.

### Where is UDWRC?

The UDWRC is located in Newark, Delaware, on UD's main campus at 261 Academy Street in the Delaware Geological Survey (DGS) Annex, behind Penny Hall and the UD Rain Garden.

### UDWRC Partners

Brandywine Conservancy  
Brandywine Valley Association  
City of Wilmington  
City of Newark  
Delaware Nature Society  
Delaware Center for Horticulture  
Delaware Greenways  
Delaware Department of Transportation  
Delaware River Basin Commission  
Delaware Department of Natural Resources and Environmental Control  
FishAmerica Foundation  
New Castle Conservation District  
New Castle County  
National Oceanic and Atmospheric Administration  
National Park Service  
Partnership for the Delaware Estuary  
Veolia Water Delaware  
The Nature Conservancy (Delaware)  
DE Sea Grant  
U.S. Environmental Protection Agency  
U.S. Geological Survey  
William Penn Foundation

### UDWRC is involved with...

- Christina Basin Clean Water Partnership
- City of Wilmington Green Jobs Program
- Delaware Flora Database
- Delaware Source Water Assessment and Protection Program
- Delaware Water Supply Coordinating Council
- Delaware Watersheds
- Economic Value of Watersheds
- GIS Services/Education/Outreach
- Sussex Economic Development Action Committee
- Sustainable Coastal Community Initiative
- White Clay Creek Wild and Scenic Management Committee

[www.wrc.udel.edu](http://www.wrc.udel.edu)





### Lydia Franks

Lydia is a second-year Master's student in the Water Science and Policy Program and Co-Chair for the University of Delaware Student Chapter of the American Water Resources Association (AWRA). She is from Northeast Ohio and completed her Bachelor's degree in Environmental Science at the University of Akron. Prior to joining the University of Delaware community, Lydia worked in county parks systems and environmental consulting. Currently, at the Water Resources Center, she conducts water quality monitoring for the White Clay Creek National Wild and Scenic River Program, works with the City of Wilmington to locate and inventory water service lines according to the EPA's Lead and Copper Rule, assists with GIS projects on shoreline conditions and stormwater management, and is assisting with an economic valuation report of the upper Delaware River watershed in New Jersey. Lydia's primary research interests include human impacts on water quality and watershed restoration.

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### Jhaney Hamlett

Jhaney is a 2019 graduate of Delaware State University where she received her bachelor's degree in Mass Communications with a specialization in Public Relations. After graduation, Jhaney's background of connecting with communities and personal affinity for protecting the environment led her to work at Delaware Nature Society as a Communications and Outreach Coordinator. In this position, Jhaney found an appreciation for nonprofit work to service and improve the community. Jhaney's work experience, mentorship, and encouragement from colleagues have brought her to the University of Delaware to continue her studies at the Biden School's Institute for Public Administration to pursue a Master of Public Administration (MPA) degree, where she will specialize in Nonprofit Management. During Jhaney's time in the MPA program, she will be working as a fellow with the University of Delaware's Water Resources Center. Jhaney hopes that specializing in nonprofit work will give her the skills to be able to locate and do work that can bring social justice.



### Megan Wassil

Megan is a first-year Master's student in the Water Science and Policy program. She is from Lincoln University, Pennsylvania, and received her Bachelor's degree from the University of Delaware in Environmental Engineering. Megan has worked on various projects with the Delaware Water Resources Center in her undergraduate career which included water quality testing of the White Clay Creek, sampling of the tidal Christina River, and PFAS testing in various locations. This past summer Megan reviewed work orders of public water lines in the City of Wilmington to track lead pipes in Wilmington's drinking water system.







Figure 1. Map of Newark and environs (source: Water Resources Agency, Institute for Public Administration, University of Delaware\*, 2008)

The University of Delaware is fortuitously situated on campuses ideally suited by hydrology and geography to study water resources.

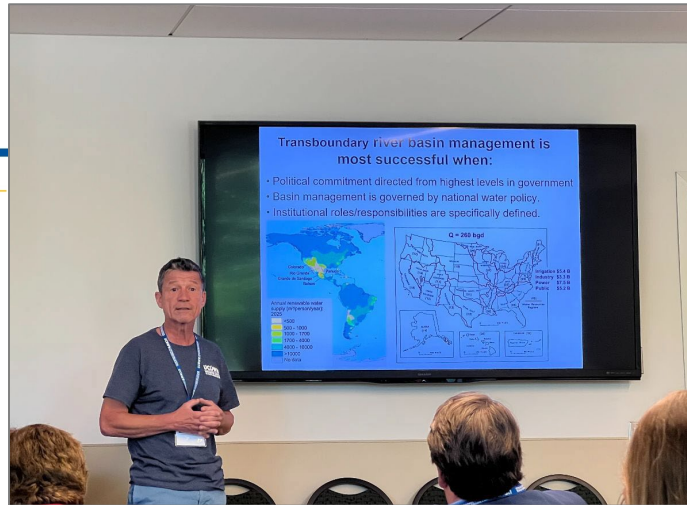


## UDWRC Director's Message

The UDWRC, Presentially Speaking...  
Dr. Gerald Joseph McAdams Kauffman, Jr., Director  
University of Delaware Water Resources Center



Newly inducted President Gerald Kauffman at the UCOWR Annual Conference on June 14, 2023, at Colorado State University in Ft. Collins, CO.









## Mission Statement

Established in 1965 as one of the 54 National Institutes for Water Resources (NIWR) in the United States, the mission of the University of Delaware Water Resources Center (UDWRC) is to provide water science and policy assistance to governments and the public through the University's land-grant public service, education, and research role. The UDWRC is a research unit of the Institute for Public Administration within the Joseph R. Biden, Jr. School of Public Policy & Administration.

### Water Resources Center

The UDWRC was established on campus in 1965 as one of the 54 NIWR at land grant universities in the 50 states, District of Columbia, and three inland territories of Guam, Puerto Rico, and U.S. Virgin Islands. The UDWRC is Congressionally-mandated by Section 104 of the Water Resources Research Act (WRRA) of 1984 administered by the U.S. Department of the Interior and U.S. Geological Survey. As part of the national NIWR network at land grant universities throughout the nation, the mission of the UDWRC is to: (1) support research, education, and public outreach programs that focus on water supply, water management, and water quality issues of importance to Delaware citizens and (2) foster/support training and education programs for future water scientists, engineers, managers, and policy-makers who will lead the water resources research, planning, and management efforts in the First State.

### Water Resources Agency

The Water Resources Agency (WRA) provides water assistance to governments in Delaware through the land-grant public service, education, and research role of the University of Delaware. Since the passage of the Federal Clean Water Act amendments in 1977 and then in 1990 and 1997, the WRA is sponsored by a board of the State of Delaware, New Castle County, City of Newark, and City of Wilmington to provide for clean and plentiful water supplies in Delaware. A regional, intergovernmental approach is essential for water management since watersheds and aquifers cross many political jurisdictions. The Brandywine-Christina watershed in northern Delaware with headwaters in the Piedmont plateau of Maryland and Pennsylvania provides drinking water to  $\frac{2}{3}$  of the population of Delaware,  $\frac{1}{3}$  of New Castle County, and 100% of Newark and Wilmington. Public and private water purveyors deliver drinking water from sole source aquifers in the Atlantic Coastal Plain to  $\frac{1}{3}$  of Delaware in southern New Castle, Kent, and Sussex counties. Delaware watersheds contribute \$6 billion annually to the First State economy and support 70,000 jobs and \$2 billion in wages.

## Goals

*The goal of the University of Delaware Water Resources Center is to be one of the preeminent water...*

**Goal #1 - Sharpen the Focus of Public Service and Engagement:** Provide water-science and policy assistance to governments and the public.

#### Significance

The UDWRC is supported by governments and foundations to provide water outreach and translate research to the public. This public service/engagement role is significant to the UD land-grant mission.

#### Challenges

Expand and diversify revenue sources to continue providing water-resources assistance to governments in Delaware, the Delaware Valley and along the Atlantic seaboard.

#### Future Steps

Seek opportunities to pursue more supported work with governments and foundations in the Delaware River and Chesapeake Bay watersheds in Delaware, New Jersey, New York. Expand the capacity of GIS laboratory (the first water resources-based GIS lab in the U.S. established in 1977) to conduct more outreach with federal, nonprofit, and business partners.

**Goal #2 – Enhance the Quality of Education and Learning:** Offer courses, seminars, and forums with a water-resources focus and advise and mentor undergraduate and graduate students with funded internships and assistantships.

#### Significance

Water resources learning at the University is significant to the UDWRC interdisciplinary science and policy education mission. The UDWRC strives to educate students who will thrive and build careers as future leaders in water resources with public-, private-, and nonprofit-sector partners.

#### Challenges

The challenge is to participate in water resources education opportunities on campus while expanding UDWRC support from funding federal, state, and local government and foundation partners.

#### Future Steps

Strengthen courses for water-resources specializations in the undergraduate majors of environmental studies/science, public policy, civil/environmental engineering, geology, geography, environmental humanities and partner with the graduate programs of Water Science and Policy Public Administration, Urban and Regional Planning, Disaster Research, Water Resources Engineering, Geography, and Marine Science and Policy. Co-sponsor courses and seminars in water science and policy.

**Goal #3 - Strengthen Programs of Research and Scholarship:** Collaborate with University faculty, scientists, and students to fund, conduct, and publish supported water-resources research.

#### Significance

Research and scholarship, the search for new knowledge, is central to the mission of the University.

#### Challenges

The challenge is to obtain federal, state, private, and foundation support to carry out water-science and -policy research while maintaining a focus on the public service and education role of the UDWRC.

#### Future Steps

Pursue funded research and partnerships in emerging water-resources areas of GIS-based watershed modeling, climate change, water economics, water quality, and flood/drought management.

## UD Strategic Initiatives

The University of Delaware Strategic Plan (May 2022) stresses that UD is an institution engaged in addressing the critical needs of the state, nation and global community. UD's goal is to be a pre-eminent learner-centered research university led by exceptional faculty and staff dedicated to excellence. Faculty effort, long defined in terms of teaching, research and service, will emphasize learning, scholarship and engagement, reaffirming that this work must have a meaningful impact for UD students and the world. The University of Delaware Water Resources Center seeks to contribute to these initiatives through the five strategic pillars of the **Forever and Beyond** planning process.

### Strategic Pillar 1. Expanding Student Access & Success

- Teach multidisciplinary courses based in the Biden School, College of Engineering, and Geography Department such as CIEG 440 Water Resources Engineering, UAPP 411/611 Regional Watershed Management, UAPP 225 Public Policy, UAPP 655 GIS in Public Policy, GEOG 432/632 Environmental Hydrology.
- Sponsor an annual Delaware water-and policy forum on campus.
- Partner with the Delaware State chapter (DEAWRA) and the UD student section (UDAWRA) of the American Water Resources Association (AWRA).
- Coordinate the Wilmington Green Jobs program for high school students.
- Provide service-based and problem-based learning opportunities for undergraduate students within the White Clay Creek National Wild and Scenic River watershed.
- Serve in leadership positions with the AWRA, NIWR, and Universities Council on Water Resources (UCOWR).

### Strategic Pillar 2. Building a Social Justice Foundation to Support a Diverse, Inclusive & Intercultural Campus

Diversity is essential in civil society and in the scientific mission at the University of Delaware. The UDWRC will redouble efforts to reach out and recruit talented minority and economically disadvantaged students and researchers. In accordance with the UDWRC mission as designated by Congress under the Water Resources Research Act of 1984, the UDWRC will reach beyond the University of Delaware to strengthen partnerships across the state at research institutions of higher-learning at Delaware State University and Delaware Technical and Community College. In this way UDWRC will strengthen and broaden its research and scientific reach and enhance its ability to serve the needs of Delaware and all Delawareans, to whom water is a critical resource and a prerequisite to health and happiness. UDWRC will focus on:

- Correspond directly with the presidents of University of Delaware, Delaware State University, and Delaware Technical and Community College requesting nominations of diverse students for UDWRC undergraduate water research internships beginning with Fall 2021 semester.
- Examine the composition of the UDWRC Advisory Panel and request feedback from the UDWRC Advisory Panel on ways UDWRC may increase diversity and inclusiveness among its students, board and project work.
- Look at the UDWRC student alumni and celebrate their stories and their background, see <https://www.wrc.udel.edu/about-wra/student-research-assistants/>.
- Continue UDWRC's K-12 STEM education programs which provide opportunities to learn about

- Incorporate demographics of race, ethnicity, gender, and income of the study area into every research report including the rights of people of color and indigenous people. Assess how existing and future projects may be enhanced to improve diversity and inclusiveness.
- Utilize University of Delaware and Coalition for the Delaware River Watershed (CDRW) resources to increase DEIJ at UDWRC, for example: University of Delaware Office of Diversity and Inclusion (<https://sites.udel.edu/diversity/>) and CDRW (<http://www.delriverwatershed.org/equity>).

### Strategic Pillar 3. Expanding Interdisciplinary and Global Opportunities

- Increase collaboration with DE Sea Grant (DESG), UD Environmental Institute (DENIN) and UD Climate Hub.
- Partner on research with philanthropic organizations such as the William Penn Foundation.
- Develop a study-abroad program in water science and policy and advise international students interested in water resources (e.g., Uzbekistan, Kyrgyzstan, Brazil, Portugal, Germany, New Zealand, Georgia, Ukraine, China, and South Korea).
- Work with the International Joint Commission between the United States and Canada.

### Strategic Pillar 4. Redefining Creativity, Innovation & Entrepreneurship

- Utilize USGS NIWR funding with faculty advisors from colleges throughout Delaware to support a cohort of 10-15 undergraduate students in a water research internship program.
- Advise and support graduate research students through the UDWRC and IPA research assistantship program.
- Partner with the State of Delaware, New Castle County, City of Newark, and City of Wilmington in funded support to conduct regional water resources planning and management.
- Serve as technical advisor to the Delaware Water Supply Coordinating Council as per state law.
- Serve as watershed coordinator of the Christina Basin Clean Water Partnership among Delaware and Pennsylvania, Delaware River Basin Commission, and USEPA.
- Serve as watershed coordinator of the White Clay Creek Wild and Scenic River Committee with the National Park Service.

### Strategic Pillar 5. Reimagining Intellectual/Physical Capital for a Sustainable & Boundless Campus

- Develop a strategic plan to raise capital to construct a new building/GIS lab for the UDWRC as a center for innovation for the UD campus community.
- Continue partnerships in Sussex County with the College of Earth, Ocean, and Environment at the Pollution Ecology Lab at the UD Lewes campus.
- Expand the GIS laboratory to serve the Biden School and IPA in the new home at Biden Hall.



Perspective

## What if... the United States of America were based on watersheds?

Gerald J. Kauffman\*

*College of Human Services, Education, and Public Policy, Institute for Public Administration, Water Resources Agency,  
University of Delaware, DGS Annex, Academy Street, Newark, DE 19711, USA*

Received 7 September 2001; accepted 15 January 2002

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### Abstract

Watersheds know no political boundaries. Except for the borders of a few countries and a few of the United States, this adage is true. Most watersheds include many state, provincial, and local governments and this “balkanization” is what makes the policy of watershed management so complex. Employing an historical exercise in counterfactualism, “what if” the United States were originally delineated on a watershed basis? “What if” each state was originally delineated by watershed, basin, or hydrologic planning unit? What would we learn as watershed managers from this exercise? This article reviews a selected history of watershed management in the USA as it relates to the many laws, regulations, and river basin commissions that were created to manage water resources that cross political boundaries. There are several lessons that watershed managers can learn from this exercise in counterfactualism. Watersheds form the best hydrological planning units for land, water, and ecosystem management. The concept of the river basin commission is a particularly effective way to manage water resources. Opportunities should be sought in the USA and overseas to create and recreate governments based on watersheds. Prospects should be explored to delineate the boundaries of sub-government jurisdictions such as water, sewer, stormwater, or planning districts based on watersheds. © 2002 Elsevier Science Ltd. All rights reserved.

**Keywords:** Watershed; River basin; Counterfactualism

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### 1. Introduction

Watersheds know no political boundaries. Except for the borders of a few countries and a few of the United States, this adage is true. Most watersheds include many state, provincial county,

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E-mail address: jerryk@udel.edu (G.J. Kauffman).



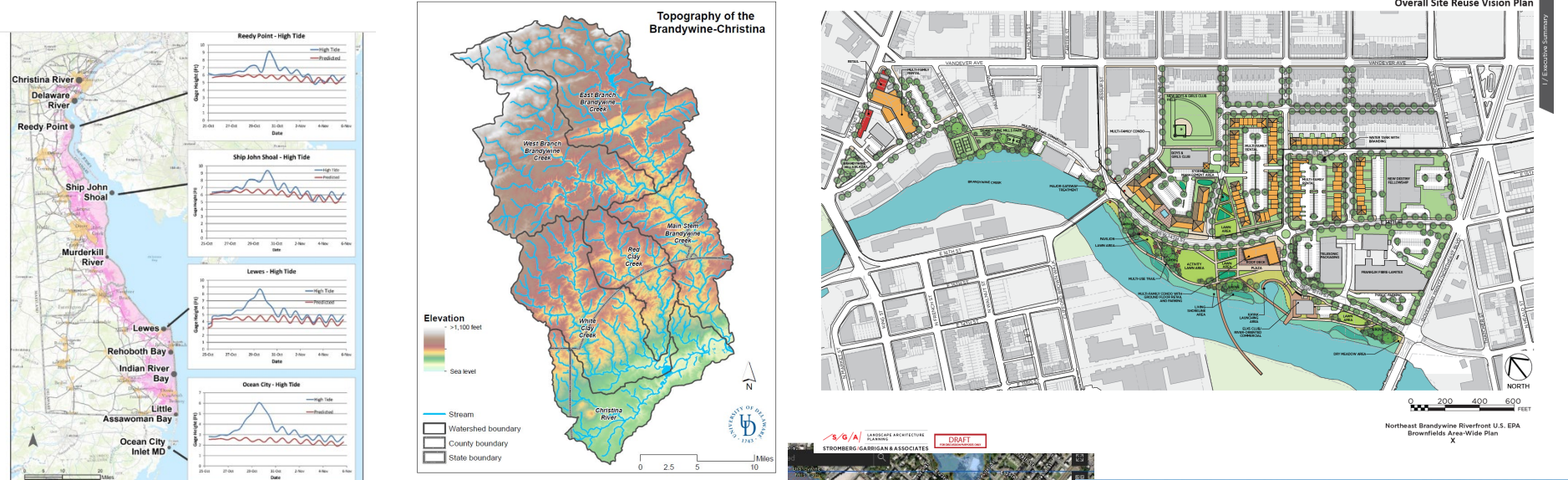
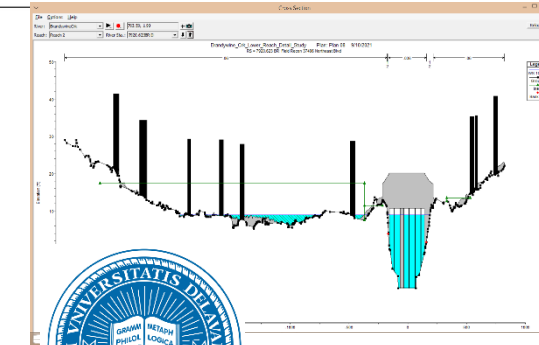
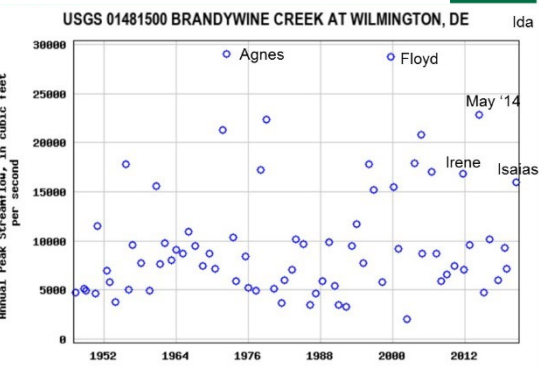


Figure 6.4 Tide levels at NOAA gauges, Delaware Bay and River, Superstorm Sandy (October 2012)



JOSEPH R. BIDEN, JR. SCHOOL OF PUBLIC POLICY & ADMINISTRATION

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Gerald Joseph McAdams Kauffman, Jr.  
 Director and Associate Professor  
 University of Delaware  
 Water Resources Center  
 DGS Annex 261 Academy St.  
 Newark, Del.





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# The Delmarva GIS Conference

*Andrew Homsey and Nicole Minni*

The 2022 Delmarva GIS conference was held at the Hyatt Place in Delaware on November 13th. Coming off over two years of COVID shutdowns, it was refreshing to see more than 175 people in person and applications

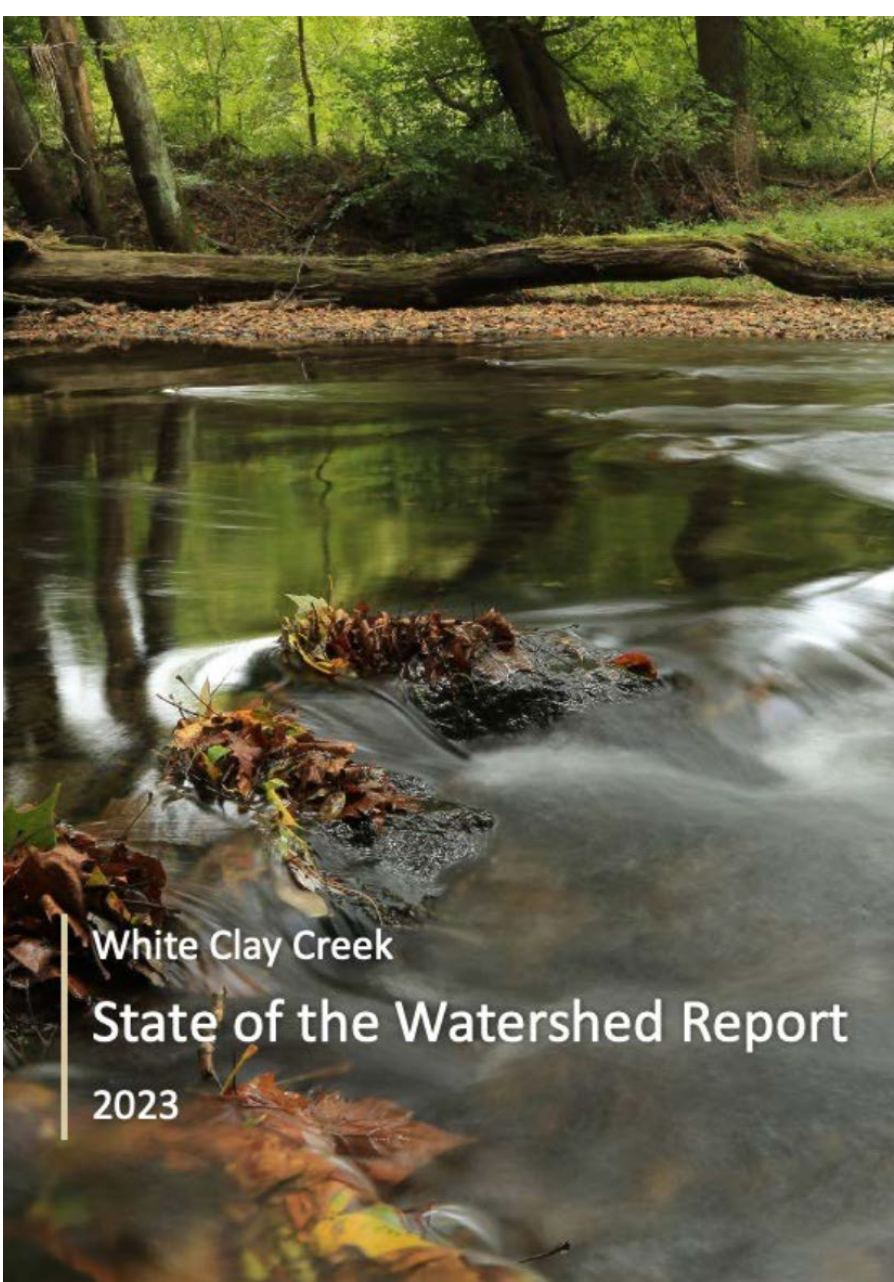


Nicole Minni (center) prepares for DEGIS 2022 with Miriam Pomilio (L) and Laurel Sullivan (R).

Highlights from the first day included popular workshops, where participants learned about field mapping techniques, open-source GIS options, database processing with GIS organizations. The second day of the conference saw many presentations by a plenary featuring John Nelson of Esri, the global leader in GIS and the WRC's role in it by UDWR director Dr. Jerry Kauffman.







White Clay Creek  
State of the Watershed Report  
2023

## WHITE CLAY CREEK STATE OF THE WATERSHED

Technical report of the assessment of the White Clay Creek Wild and Scenic  
Watershed in Delaware and Pennsylvania

March 2023

PREPARED BY

Stroud Water Research Center

University of Delaware Water Resources Center

White Clay Wild & Scenic River Program



EDITING AND DESIGN SUPPORT PROVIDED BY

Brandywine Conservancy



# Economic Value of New Jersey Tributaries to the Delaware River

January 2024

*Prepared by*  
Water Resources Center  
Institute for Public Administration  
Biden School of Public Policy & Administration  
University of Delaware

*Prepared for*  
Environment New Jersey  
Musconetcong Watershed Association



UNIVERSITY OF DELAWARE  
BIDEN SCHOOL OF PUBLIC  
POLICY & ADMINISTRATION

## Executive Summary

The water, natural resources, and ecosystems in the New Jersey tributary watersheds to the Delaware River contribute an economic value of **\$1.8 to \$2.3 billion** annually to the regional economy in Mercer, Hunterdon, Morris, Warren, and Sussex Counties. This report examines that economic value in three different ways:

1. **Economic value directly related to the New Jersey tributary water resources and habitat.** The New Jersey tributary watersheds contribute over **\$1.8 billion** in annual economic activity from water quality, water supply, fish and wildlife, recreation, agriculture, forests, and public parks benefits.
2. **Value of goods and services provided by the New Jersey tributary watershed ecosystems.** Using natural capital as a measure of value, habitat in the New Jersey tributary watersheds provides **\$2.3 billion** annually in ecosystem goods and services in 2020 dollars, with a net present value (NPV) of **\$74.9 billion** calculated over a 100-year period. The annual ecosystem services value of the New Jersey tributary watersheds is **\$59 million** in Mercer County, **\$354 million** in Hunterdon County, **\$104 million** in Morris County, **\$858 million** in Warren County, and **\$920 million** in Sussex County.
3. **Employment related to the New Jersey tributary watersheds resources and habitats.** Using employment as a measure, natural resources within the New Jersey tributary watersheds directly and indirectly support over **40,000 jobs** with over **\$2 billion** in annual wages.

Estimates for the three methods are based on values from the literature, applied to the New Jersey tributary watersheds using ecological economics and benefits-transfer techniques. Values are converted to 2020 dollars based on the mean annual change in the Northeast Region Consumer Price Index (CPI), which is 3% annually.

Additionally, a survey-based investigation was conducted to measure the direct monetary contribution of recreational visitors to the economy of the study area. In-person surveys were conducted at recreational locations along the Musconetcong River, focused on four types of recreational activity: fishing, general recreation (hiking, biking, picnicking, etc.), boating, and hunting. The estimated total annual spending on these recreational activities ranges from a low of more than **\$133 million** to a high of nearly **\$352 million**.

Finally, to assess the impact on real estate values of proximity to clean water, house values at various distances to Lake Musconetcong were analyzed. It was found that housing values increase by 6.7% (27.1% on a per-acre basis) for lakeside properties versus those at 1000 feet from the lake, and 10.0% (23.5% per acre) at 2000 feet. Overall, it is estimated that the lake adds an additional **\$14.7 million** to residential retail value.

These estimates demonstrate that the New Jersey tributary watersheds provide significant economic benefits to the regional five county economy in northwest New Jersey and are worthy of investment to protect and preserve the valuable watershed resources.







# NIWR

The Network of Water Resources Research Institutes





## Water-Resources Research in the Federal Government

Physical, biological, engineering, and social sciences can help solve a problem of growing dimensions.

Roger Revelle

Water is the most abundant substance in the part of our planet that is accessible to man. Nearly all our planet's water is salty, and this is perfectly satisfactory for the creatures that live in the sea. But land plants and animals must have fresh water. They can live only because the sun continually distills pure water from the ocean and some of this distillate is carried in the air as vapor until it condenses and drops on the land. The flux of water from the ocean into the air, onto the land, and back to the sea, is called the hydrologic cycle.

Although the hydrologic cycle is exceedingly complex in detail, in general we can think of the water particles as following one of three paths. (i) The larger part of the water that falls on the land surface passes back to the air, either directly by evaporation or through the bodies of plants in transpiration. It may recondense and fall

again on the land, or it may fall in the ocean. (ii) A smaller part of the water that reaches the land surface remains in liquid form and either sinks into the ground or stays on the surface. This liquid water runs downhill or flows underground until it is gathered by rivers that carry it back to the sea. (iii) A very small fraction is taken up in the bodies of plants and animals. Some of this fraction is broken down by plants, which use its hydrogen in forming their tissues. The hydrogen is later recombined with oxygen in animal and plant respiration, and the water thus produced is returned to the air.

The time required for water particles to travel through the hydrologic cycle varies widely. A particle evaporated from the ocean near shore may fall as rain in a coastal region, evaporate again almost immediately, and return to the ocean as rain within a few hours. Water falling as snow in the mountains may remain for months (or, in glaciers, for centuries) before it melts and runs off. Water that sinks into the ground may remain there a few years or many millennia before reappearing on the surface to complete its journey to the sea. Thus, enormous quantities of fresh water are stored underground. In the United States the volume of underground fresh water is probably at least 10 times the average annual precipitation of 30 inches.

The amount of water evaporated each year from the oceans would be sufficient, if it were carried to the continents and uniformly distributed, to cover all the land with more than 100 inches of rain and snow. This is three times the potential annual evaporation from land surfaces. The fact is, however, that the average depth of rainfall over the oceans is much greater than the average over the continents. On about a third of the land areas of the earth the annual precipitation is less than the potential evaporation. Life is possible in these arid regions only because water is carried to them from nearby mountains, where rain and snow exceed evaporation, and because precipitation in the arid lands occurs sporadically, so that some of the water can be caught and stored by plants, or in the ground, before it can evaporate. Even in humid regions the hydrologic cycle slows down and speeds up from time to time, causing periods of drought to alternate with floods. If we can think of the hydrologic cycle as nature's plumbing system, it must be admitted that from man's point of view the pipes are erratically arranged and the valves capriciously managed. Man is slowly becoming more skillful at forecasting fluctuations in this system; someday he may be able to improve the arrangements.

### Water Supply of the United States

The United States, exclusive of Alaska and Hawaii, has a surface area of about 2 billion acres. On the average, nearly 5 billion acre-feet of water per year falls on this area (1). Seventy-one percent of this water evaporates or is transpired back to the air near the place where it falls. The remaining 29 percent runs off or sinks into the ground and is eventually gathered by streams. A quantity equivalent to about one-fourth the streamflow (345 million acre-feet, 7 percent of the total annual precipitation) is diverted from rivers or pumped from wells for human use. Something less than half the water with-

The development of economical methods of reducing erosion in small upstream watersheds must be based on research into the relationships of precipitation, topography, kinds of soil, plant cover, and runoff, and on the mechanisms of suspension and transport of soil particles by running water. Similarly, the lives of storage reservoirs could be lengthened, and the number of unwanted changes in river channels reduced, if we had greater understanding of sediment transport in rivers. Comparative studies of river ecology and of the sequence of biological changes produced by different pollutants are needed to establish realistic standards for pollution control and to lessen pollution damage.

### Role of the Federal Government

Under the Constitution, by tradition, and because of the national interest, the federal government has many responsibilities for water resources. As manager of the national forests and all other federal and Indian lands, it conserves and develops the water resources of these lands for livestock grazing, timber production, outdoor recreation, fish and wildlife conservation, hydroelectric power, and irrigation agriculture, and maintains them as the principal watersheds for adjoining regions. It protects these lands, which cover about a quarter of the entire area of the country, from erosion, floods, and other water damage.

The federal government has responsibility for safety of navigation in inland waters, including related non-navigable river reaches and tributaries. It has joint control, through treaties with Canada and Mexico, over the development and use of international streams. Public works for the development of these waters are large items in the federal budget. They include projects for flood control, navigational improvements in rivers and coastal waterways, and watershed and shoreline protection, as well as hydroelectric power, drainage, conservation storage of industrial and domestic water supplies, pollution abatement, maintenance of recreation areas, and other aspects of river-basin development.

The government delivers much of the water for irrigation agriculture in the 17 western states. Federal water investments in this largely arid region include projects for storage, transpor-

tation, distribution, and drainage of agricultural waters, for hydroelectric power generation, for flood control, and for other purposes.

Because many river basins cross state lines, the government has had to assume growing responsibility, as water supplies have become scarcer, for participation in river-basin planning. The pollution of interstate river waters is becoming increasingly serious in many regions, and the government has begun to take vigorous control measures.

In cooperation with the states, the federal government surveys the nation's water resources, including the water carried in rivers and available from underground. It measures and forecasts precipitation, snowmelt, evaporation, runoff, river flows, floods, and storm surges.

To conserve and augment the nation's fish and wildlife population the government acquires wetlands, establishes refuges, maintains hatcheries, and constructs waterways for fish migration. It attempts to keep the effects of water pollutants on fishes, birds, and mammals to a minimum.

The government is virtually the sole producer of one of the most potentially dangerous of water pollutants—radioactive wastes—and it maintains a careful surveillance over the behavior of these materials in rivers, aquifers, and coastal waters.

To carry out these responsibilities efficiently and economically, the federal government must undertake a wide range of investigations and research. Nearly all aspects of its research activities are financed by the federal government throughout the country. Consequently, the government has long supported and conducted water-resources investigations for the benefit of all levels of government, and of private industry in many sectors of the economy. A Task Group on Coordinated Water-Resources Research was established in 1962 by the Federal Council for Science and Technology, to find ways of improving this research program (6). The following is a condensation of its conclusions and recommendations.

### Task Group Conclusions and Recommendations

In the short period of its existence, the task group was not able to develop a satisfactory basis for evaluating or

comparing research projects in different fields, or even in the same field. For the present, we must depend on the judgment of the responsible agencies. With adequate staff resources, a future water-resources research coordinating committee should, in time, be able to develop criteria for evaluating the components of the national program.

The task group did arrive at general conclusions in four areas: program deficiencies and opportunities; manpower needs; coordinating mechanisms; and legislation.

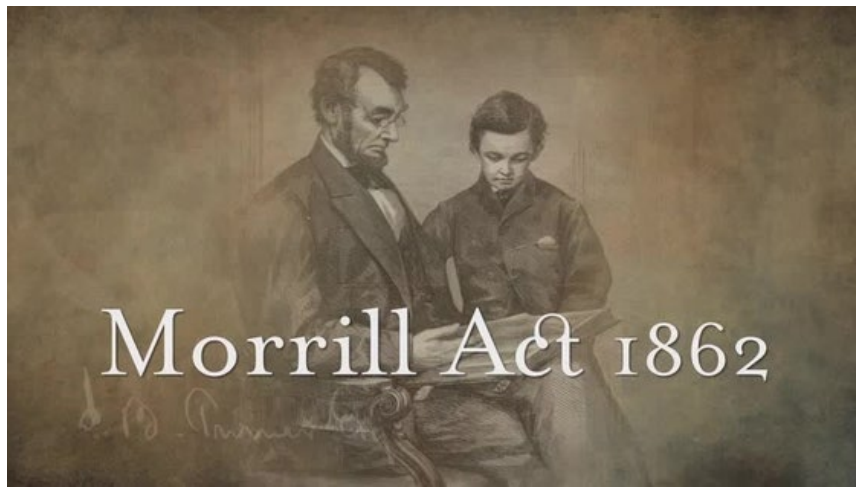
*Program deficiencies and opportunities.* Deficiencies in intramural and extramural education and training, in research on ground water (including the infiltration processes and soil-plant-water relationships), and in socioeconomic research are so evident that we can immediately recognize the need for increased effort in these fields. Similarly, the opportunities for water-quality research, for research on the effects of water resources on the environment, and on the level of sustained effort should be sharply raised.

*Manpower needs.* Shortages of qualified personnel now exist in many areas of water-resources research. Steps will have to be taken to increase the number of people qualified to carry on the research programs. The scientific fields involved are much broader than physical hydrology and include many of the physical and biological sciences as well as social sciences and engineering. The universities need help in attracting graduate students to research and training in water-resources research. The government should make grants to or contracts with universities so that they can strengthen their graduate research and training programs. The following steps should be taken.

(1) The federal agencies engaged in water-resources research should be authorized and given funds to use a variety of educational-assistance measures to strengthen the training and research capabilities of the universities in the disciplines bearing on water resources, and to attract increasing numbers of graduate students. Such measures to promote training at the graduate level include training grants, facilities grants, research fellowships, and institutional grants. For example, the Department of Agriculture does not have specific statutory authority to award fellowships, training grants, or grants for educational facilities, except

The author is university dean of research at the University of California, Berkeley, and director of the university's Scripps Institution of Oceanography, La Jolla. This article is an abbreviated version of a report of the Task Group on Coordinated Water-Resources Research of the Federal Council for Science and Technology. The members of the task group were Roger Revelle, then Science Adviser to the Secretary of the Interior, chairman; John A. Baker, Assistant Secretary of Agriculture; Francis W. Reichelderfer, Chief of the Weather Bureau, Department of Commerce; Donald P. Marlineau, Department of Defense; James M. Quigley, Assistant Secretary of Health, Education and Welfare; Eugene D. Eaton, Department of the Interior; and Richard G. Ray, National Science Foundation.





## 42 U.S. Code § 10303 - Water resources research and technology institutes

U.S. Code [Notes](#)

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### Editorial Notes

### REFERENCES IN TEXT

This chapter, referred to in subsecs. (a) and (h), was in the original "this Act", meaning [Pub. L. 98-242](#), Mar. 22, 1984, [98 Stat. 97](#), known as the [Water Resources Research Act of 1984](#), which is classified principally to this chapter. For complete classification of this Act to the Code, see Short Title note set out under [section 10301](#) of this title and Tables.

Act approved July 2, 1862, referred to in subsec. (a), is act July 2, 1862, ch. 130, [12 Stat. 503](#), popularly known as the "Morrill Act" and also as the "[First Morrill Act](#)", which is classified generally to subchapter I (§ 301 et seq.) of chapter 13 of Title 7, Agriculture. For complete classification of this Act to the Code, see Short Title note set out under [section 301](#) of Title 7 and Tables.

### CODIFICATION

In subsec. (h)(1)(C), "section 6101 of title 41" substituted for "section 3709 of the Revised Statutes (41 U.S.C. 5)" on authority of [Pub. L. 111-350](#), § 6(c), Jan. 4, 2011, [124 Stat. 3854](#), which act enacted Title 41, Public Contracts.



## Ronald Reagan signs 1984 WRRRA Amendments



## JFK signs 1961 DRBC Compact



### LYNDON B. JOHNSON

XXXVI President of the United States: 1963-1969

#### 461 - Statement by the President Upon Signing the Water Resources Research Act.

July 17, 1964

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THE Water Resources Research Act of 1964, which I have approved today, fills a vital need.

Abundant, good water is essential to continued economic growth and progress. The Congress has found that we have entered a period in which acute water shortages are hampering our industries, our agriculture, our recreation, and our individual health and happiness.

Assuming a continuation of current practices, by the year 2000 there will not be enough usable water to meet the water requirements of parts of the States of Arizona, California, Colorado, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Texas, Utah, Wisconsin, and Wyoming.

This legislation will help us solve this problem. It will create local centers of water research. It will enlist the intellectual power of universities and research institutes in a nationwide effort to conserve and utilize our water resources for the common benefit. The new centers will be concerned with municipal and regional, as well as with national water problems. Their ready accessibility to State and local officials will permit each problem to be attacked on an individual basis, the only way in which the complex characteristics of each water deficiency can be resolved. The bill contemplates a high degree of interstate cooperation, and I urge that this be encouraged.

In large measure, this legislation is a tribute to the vision and wisdom of Senator Clinton P. Anderson of New Mexico. He has long recognized the problems. He developed the program. He guided it through Congress. He has been in the forefront of the effort to see that adequate supplies of water are available in all parts of the Nation.

COLLECTION:  
*Public Papers  
of the Presidents*



Lyndon B. Johnson  
1963-64: Book II

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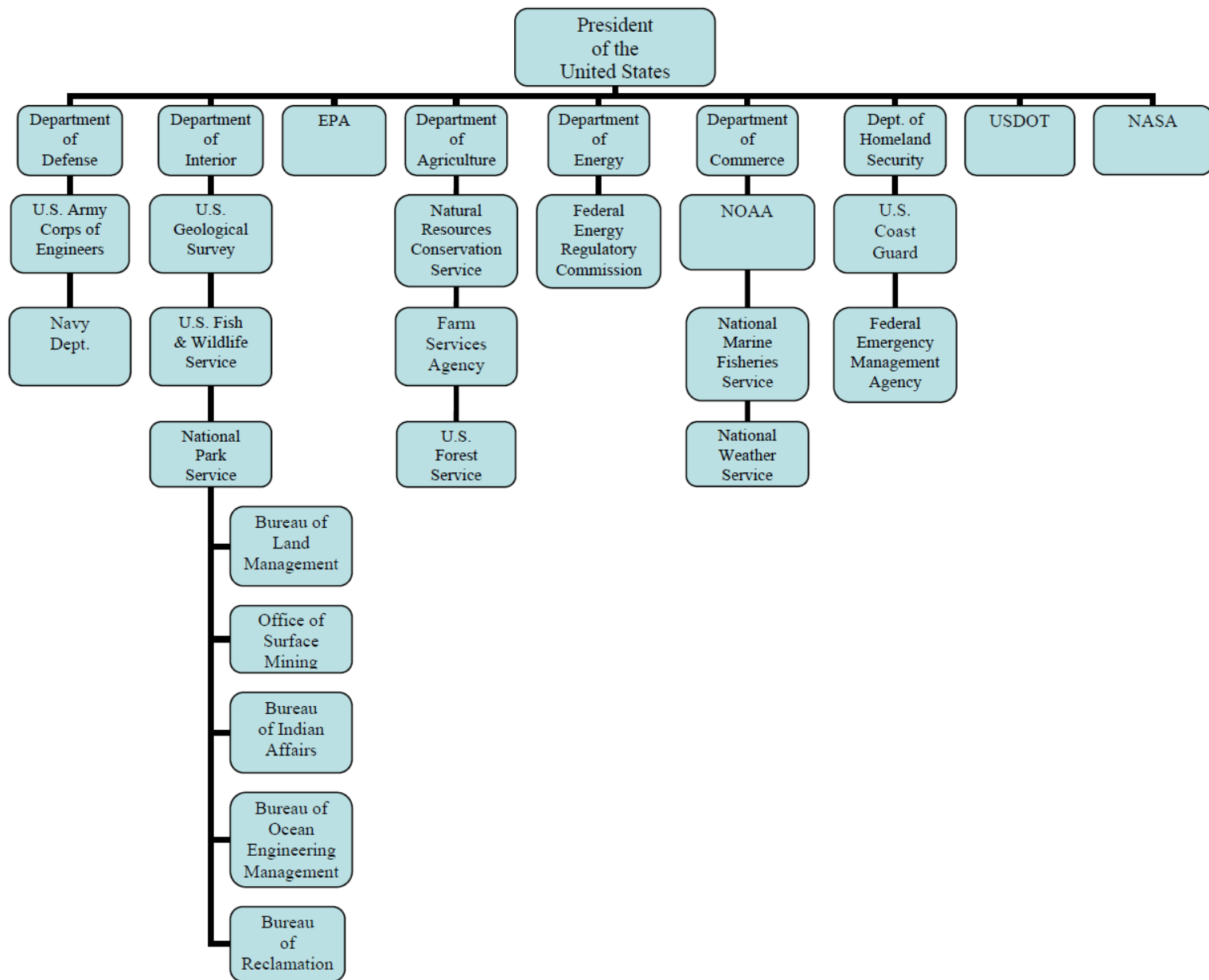
## LBJ signs 1964 Water Resources Research Act





The University of Delaware Water Resources Center, est. on campus in 1965 at the 8<sup>th</sup> oldest institution of higher learning in the nation (est. 1743), is a research center in the IPA within the Joseph R. Biden School of Public Policy & Administration.





**Figure 3.** Federal water and climate agencies



## Water Resources Research Act Program



HOME

CURRENT BUDGET

JUSTIFICATION

PRIOR BUDGET

## Authorizations

Water Resources Research Act Program (WRRAP) activities are conducted under the authority of various pieces of authorizing legislation. Many of the primary authorizations that allow the USGS and WRRAP to serve the American people are listed below, along with descriptions of either how the authorization relates to USGS or what WRRAP activities are performed under a particular authorization.

CHAPTER 109—WATER RESOURCES  
RESEARCH

Page 2441

§ 10303

- Sec.  
10301. Congressional findings and declarations.  
10302. Congressional declaration of purpose.  
10303. Water resources research and technology institutes.  
10304. Research concerning water resource-related problems deemed to be in national interest.  
10305. Development of water-related technology.  
10306. Administrative costs.  
10307. Types of research and development.  
10308. Patent policy.  
10309. New spending authority; amounts provided in advance.

## § 10301. Congressional findings and declarations

The Congress finds and declares that—

(1) the existence of an adequate supply of water of good quality for the production of materials and energy for the Nation's needs and for the efficient use of the Nation's energy and water resources is essential to national economic stability and growth and to the well-being of the Nation;

(2) the management of water resources is closely related to maintaining environmental quality, productivity of natural resources and agricultural systems, and social well-being;

(3) there is an increasing threat of impairment to the quantity and quality of surface and groundwater resources;

(4) the Nation's capabilities for technological assessment and planning and for policy formulation for water resources must be strengthened at the Federal, State, and local governmental levels;

(5) there should be a continuing national investment in water and related research and technology commensurate with growing national needs;

(6) it is necessary to provide for the research and development of technology for the conversion of saline and other impaired waters to a quality suitable for municipal, industrial, agricultural, recreational, and other beneficial uses;

(7) the Nation must provide programs to strengthen research and associated graduate education because the pool of scientists, engineers, and technicians trained in fields related to water resources constitutes an invaluable natural resource which should be increased, fully utilized, and regularly replenished; and<sup>1</sup>

(8) long-term planning and policy development are essential to ensure the availability

of product water, considering the amortization of all components of the demonstration plant and ancillary facilities. Such report shall be accompanied by a proposed contract (or cooperative agreement) between the Secretary and a duly authorized non-Federal entity, in which such entity shall agree to provide not less than 15 per centum and not more than 35 per centum of the total cost of the demonstration; such cost to include, without being limited to, necessary water rights, water supplies, rights-of-way, power source interconnections, brine disposal facilities, land, construction, ancillary facilities, and the operation and maintenance costs for a period of four years following final acceptance of the construction of the plant from the plant contractor. The contributions of the non-Federal entity under such proposed contract may be in-kind. During the participation by the Secretary in the construction and the operation and maintenance of such demonstration, access to the demonstration and its operating data will not be denied to the Secretary or his representatives. The period of participation by the Secretary in the operation and maintenance of any such demonstration shall be four years. The Secretary is authorized to include in the proposed contract a provision for conveying, as appropriate, and in such amounts as are appropriate, rights, title, and interest of the Federal Government in the demonstration project to the non-Federal public entity.

(c) There is authorized to be appropriated, to remain available until expended, for fiscal year ending September 30, 1984, and for each fiscal year thereafter, such sums as may be necessary to carry out the demonstration plants authorized by this section; such cost to include, without being limited to, necessary water rights, water supplies, rights-of-way, power source interconnections, brine disposal facilities, land, construction, ancillary facilities, and the operation and maintenance costs for the four-year period of Federal participation in such costs.

(d) When appropriations have been made for the commencement or continuation of design, construction, or operation and maintenance of any demonstration plant authorized under this Act (this note), the Secretary may, in connection with such design, construction, or operation and maintenance, enter into contracts and cooperative agreements for miscellaneous services, for materials and supplies, as well as for construction, which may cover such periods of time as the Secretary may consider necessary but in which the liability of the United States shall be contingent upon appropriations being made therefor.

[For termination of Trust Territory of the Pacific Islands, see note set out preceding section 1681 of Title 48, Territories and Insular Possessions.]

## § 10302. Congressional declaration of purpose

It is the purpose of this chapter to assist the Nation and the States in augmenting their water resources science and technology as a way to—

(1) assure supplies of water sufficient in quantity and quality to meet the Nation's expanding needs for the production of food, materials, and energy;

(2) discover practical solutions to the Nation's water and water resources related problems, particularly those problems related to impaired water quality;

(3) assure the protection and enhancement of environmental and social values in connection with water resources management and utilization;

(4) promote the interest of State and local governments as well as private industry in research and the development of technology that will reclaim waste water and to convert saline and other impaired waters to water

suitable for municipal, industrial, agricultural, recreational, and other beneficial uses;

(5) promote more effective coordination of the Nation's water resources research program;

(6) promote the development of a cadre of trained research scientists, engineers, and technicians for future water resources problems; and

(7) encourage long-term planning and research to meet future water management, quality, and supply challenges.

(Pub. L. 98-242, title I, § 103, Mar. 22, 1984, 98 Stat. 97; Pub. L. 101-397, § 1(a), Sept. 28, 1990, 104 Stat. 852; Pub. L. 104-147, § 2, May 24, 1996, 110 Stat. 1375.)

## REFERENCES IN TEXT

This chapter, referred to in text, was in the original "this Act", meaning Pub. L. 98-242, Mar. 22, 1984, 98 Stat. 97, known as the Water Resources Research Act of 1984. For complete classification of this Act to the Code, see Short Title note set out under section 10301 of this title and Tables.

## AMENDMENTS

1984—Pub. (a) P. L. 101-147, § 2(1) struck out "to" before "the Secretary" and inserted "the Secretary or his representatives".

1990—Par. (7), Pub. L. 104-147, § 2(3), added par. (7).

1996—Par. (5), Pub. L. 101-397 substituted "to promote more effective coordination of" for "coordinate more effectively".

## § 10303. Water resources research and technology

## (a) Establishment; designation of site by State legislature or Governor

Subject to the approval of the Secretary of the Interior (hereafter in this chapter referred to as the "Secretary") under this section, one water resources research and technology institute, center, or equivalent agency (hereafter in this chapter referred to as the "institute") may be established in each State (as used in this chapter, the term "State" includes the Commonwealth of Puerto Rico, the District of Columbia, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Mariana Islands and the Federated States of Micronesia) at a college or university which was established in accordance with the Act approved July 2, 1862 (12 Stat. 503) [7 U.S.C. 301 et seq.], or at some other institution designated by act of the legislature of the State concerned. If there is more than one such college or university in a State established in accordance with such Act of July 2, 1862, the institute in such State shall, in the absence of a designation to the contrary by act of the legislature of the State, be established at the one such college or university designated by the Governor of the State. Two or more States may cooperate in the establishment of a single institute or regional institute, in which event the same otherwise allocated to institutes in each of the cooperating States shall be paid to such single or regional institute.

## (b) Scope of research; other activities; cooperation and coordination

Each institute shall—

## Water resources research and technology institute





## United States Department of the Interior

U.S. GEOLOGICAL SURVEY  
Reston, Virginia 20192

13 March 2024

Dr. Gerald J. Kauffman, Director  
Water Resources Center  
University of Delaware  
DGS Annex-261 Academy Street  
Newark, Delaware 19716  
jerryk@udel.edu

Dear Dr. Kauffman:

The Water Resources Center at the University of Delaware receives an annual matching grant from the Water Resources Research Act Program administered by the U.S. Geological Survey (USGS) under the provisions of section 104 of the Water Resources Research Act of 1984, as amended. The Act requires that the Center be evaluated periodically to determine its eligibility for continued support under the Act. The determination is based on its effectiveness in the use of its Federal grant and required matching funds in meeting the mandates of the Act.

I am pleased to inform you that the Delaware Water Resources Center demonstrated acceptable performance during 2016 – 2020 with respect to the criteria set forth by the Act. This decision is based on a recent evaluation report and recommendation by a panel convened in February 2024 to evaluate the activities of the 54 Institutes/Centers authorized by the Act during Fiscal Years 2016 – 2020.

The Panel's specific findings follow:

- The research program is relevant and addresses unique Delaware research priorities as a State located entirely on a peninsula and having >33% wetlands cover. Research priorities are focused on associated challenges: climate change and sea-level rise and associated extreme coastal flooding responses, and fresh water and saltwater wetlands and their ecosystems. The Institute has at least 3 doi-journal publications and at least 12 Institute Reports focusing on accomplishments for the above topics and overall water quality assessment.
- A diverse state-wide research advisory committee ensures the program is addressing water issues of the State. Large numbers of awards from small communities are noted along with 2 large grant awards illustrating the relevance

## USGS says...we passed!

of the Institute. The program has excellent ties to USGS through the internship program.

- Supporting data indicates 70 data releases, which makes the program seem fairly data-collection oriented. An increase in peer reviewed publications is recommended, and this might be more easily achieved with a broader number of PI's (only 2), and perhaps with input from other academic institutions, even if from adjoining States and also from the Delaware Sea Grant Program.
- There is strong support for students with direct funding by the Institute and student fellowships used to increase student support on numerous 104b base grant projects. There are moderate numbers of graduate students but considerable numbers of undergrad students (60), but lesser graduate students (Ph.D., 4; MSc, 8; non-federal, 21). There are 4 completed MSc or Ph.D. theses.
- There is strong host institution support for this program.
- Public outreach is focused on attendance at large events and festivals and K-12 school children. The annual local conference is organized in coordination with the Delaware Sea Grant Program. However, outreach seems undersold given all the student and intern involvement. Is a stronger social media and public outreach presence than is reported?

Please share these results with your staff and other interested individuals at your University. The USGS and Water Resources Research Act Program looks forward to an active and mutually beneficial partnership with the Delaware Water Resources Center in the future.

Sincerely yours,

GREGORY WETHERBEE

Digitally signed by GREGORY  
WETHERBEE  
Date: 2024.03.13 11:28:20 -06'00'

Gregory A. Wetherbee  
Water Resources Research Act Program Manager, Acting





2024 Annual NIWR Meeting  
February 4-7, 2024  
800 Maine Avenue, Southwest in Washington, D.C, penthouse floor

**SUNDAY, February 4, 2024**

4:00 pm	Board Meeting	800 Maine Ave., Suite 800 Washington Conf. Room
6:00 pm	Board Meeting Adjourns	
6:30 pm	Dinner for Board Only	Kirwan's on the Wharf 749 Wharf Street NW

**MONDAY, February 5, 2024**

8:00 am	Registration Desk Open Coffee, beverages, and light snacks available	Penthouse lobby
	New Director's Coffee Host: NIWR President Jeff Peterson (MN)	8 <sup>th</sup> Floor Washington Conf. Room
8:45 am	Welcome, Meeting Overview, and Introductions NIWR President-elect Gerald Kauffman (DE)	
9:15 am	NIWR Update NIWR President Jeff Peterson (MN)	
9:30 am	Legislative Updates and Guidance for Hill Visits Leslee Gilbert (Van Scoyoc Associates)	
10:00 am	Coffee Break	Penthouse Lobby
10:15 am	Mr. Michael Brain, U.S. Department of the Interior Principal Deputy Assistant Secretary for Water and Science	
11:00 am	Representative Melanie Stansbury (NM)	
11:45 am	Lunch on your own	
1:30 pm	How to be a NIWR Center Director (Small/Large Institutes) T. Jarvis (OR), M. Dietz (CT), C. Obropta (NJ), G. Kauffman (DE)	
2:15 pm	NIWR/USGS Research Priorities II (NIWR Board)	
3:00 pm	Coffee Break	Penthouse Lobby
3:15 pm	Communications Kevin Wagner (OK) NIWR Staff Network Amy Weckle (IL), Danielle Kalisek (TX) UCOWR Update Kevin Wagner (OK)	

4:15 pm	Wrap-up and Adjourn	
6:00 pm	Evening Reception Hors d'oeuvres and beverages provided	800 Maine Ave. SW, 8 <sup>th</sup> Floor (202) 638-1950
7:30 pm	Reception Ends	

**TUESDAY, February 6, 2024**

8:00 am	Registration Desk Open Coffee, beverages, and light snacks available	Penthouse lobby
8:30 am	Household Water Insecurity Experiences (HWISE) Wendy Jepson (Texas A&M)	
9:15 am	NIWR Hot Topics Gerald Kauffman (DE)	
10:00 am	Coffee Break	Penthouse Lobby
10:15 am	WRRRA Program Bob Joseph (USGS WRRRA) Next Generation Water Observing System Brian Pellerin (USGS)	
11:00 am	WRRRA-USGS Research Grant Efficiency Gerald Kauffman (DE), John Schwartz (TN), Linda Weavers (OH)	
11:45 am	NIWR Regional Meetings (Buffet lunch)	Penthouse Lobby
1:30 pm	Reports from Regional Meetings (NIWR Board)	
2:00 pm	History of WRRRA and NIWR (1964-2024) Gerald Kauffman (DE)	
2:45 pm	International Water Chair: Sharon B. Megdal (AZ) William Cunningham (USGS), Will Logan (USACE)	
3:15 pm	Coffee Break	Penthouse Lobby
3:30 pm	NIWR Business Meeting President Jeff Peterson (MN)	
4:30 pm	Wrap-up and Reminders	
4:45 pm	Annual Meeting Adjourns	
5:15 pm	Board Meeting and Dinner	8 <sup>th</sup> Floor Conf. Room

**WEDNESDAY, February 7, 2024**

Capitol Hill Visits (Scheduled individually)	
8:00 am – 12:00 pm	Penthouse Floor Meeting room available for workspace or meetings
Optional field trips	Washington Monument 9:30 (12 passes) National Museum of African American History 11:45 (25 passes), 2:45 (25 passes) U.S. Capitol Tour 1:00 (30 passes)



Delegates and Alternate Delegates of the National Institutes for Water Resources				
Member	Location	Delegate	Alternate Delegate	
Water and Environmental Research Center, Univ. of Alaska Fairbanks	AK	Nicole Misarti		
Water Resources Center, Auburn University	AL	Eve Brantley		
Water Resources Research Center, University of Arizona	AZ	Sharon Megdal		
Arkansas Water Resources Center	AR	Brian Haggard	Erin Grantz	
California Institute for Water Resources	CA	Erik Porse	Rachel Shellabarger	
Colorado Water Center	CO	Karen Schlatter	John Tracy	
Connecticut Institute of Water Resources	CT	Michael Dietz		
Water Resources Center, University of Delaware	DE	Gerald Kauffman	Martha Narvaez	
Water Resources Research Institute, Univ. of the District of Columbia	DC	Tolessa Deksissa		
Florida Water Resources Research Center	FL	Mark Newman		
Georgia Water Resources Institute	GA	Aris P. Georgakakos	Husayn El Sharif	
Water and Environmental Research Institute of the Western Pacific	GU	Yuming Wen	Nathan Habana	
Water Resources Research Center, University of Hawaii	HI	Tao Yan		
Idaho Water Resources Research Institute	ID	Bradley Ritts	Andrew Fields	
Illinois Water Resources Center	IL	Yu-Feng Forrest Lin	Amy L. Weckle	
Indiana Water Resources Research Center	IN	Keith Cherkauer		
Iowa Water Center	IA	Rick Cruse	Laura Frescoln	
Kansas Water Resources Institute	KS	Susan Metzger	Jonathan Aguilar	
Kentucky Water Resources Institute	KY	Jason Unrine	Steven Evans	
Louisiana Water Resources Research Institute	LA	Frank Tsai		
Maine Water Resources Research Institute	ME	David Hart		
Maryland Water Resources Research Center	MD	Kaye Brubaker		
Massachusetts Water Resources Research Center	MA	Timothy Randhir	Olga Tsvetkova	
Institute of Water Research, Michigan State University	MI	Dana Infante		
Water Resources Center, University of Minnesota	MN	Jeffrey Peterson	Joel Larson	
Mississippi Water Resources Research Institute	MS	L. Jason Krutz	Jason Barrett	
Missouri Water Center	MO	Baolin Deng		
Montana Water Center	MT	Stephanie Ewing	Whitney Lonsdale	
Nebraska Water Center	NE	Chittaranjan Ray	Karina Schoengold	
Nevada Water Resources Research Institute	NV	Matt Bromley	Suzanne Hudson	
New Hampshire Water Resources Research Center	NH	William H. McDowe	Michelle Shattuck	
New Jersey Water Resources Research Institute	NJ	Christopher C. Obro	Lisa Galloway Evrard	
New Mexico Water Resources Research Institute	NM	Sam Fernald	Bob Sabie	
New York State Water Resources Institute	NY	Brian Rahm	Kristen Hychka	
North Carolina Water Resources Research Institute	NC	Susan White	John Fear	
North Dakota Water Resources Research Institute	ND	Xinhua Jia		
Ohio Water Resources Center	OH	Linda Weavers	John Lenhart	
Oklahoma Water Resources Center	OK	Kevin Wagner		
Institute for Water & Watersheds, Oregon State University	OR	Todd Jarvis	Lisa Gaines	
Pennsylvania Water Resources Research Center	PA	Andrew Warner		
Puerto Rico Water Resources and Environmental Research Institute	PR	Walter F. Silva		
Rhode Island Water Resources Center	RI	Vinka Craver		
South Carolina Water Resources Center	SC	Thomas Walker		
South Dakota Water Resources Institute	SD	John McMaine	John Maursetter	
Tennessee Water Resources Research Center	TN	John Schwartz	Tim Gangaware	
Texas Water Resources Institute	TX	Allen Berthold		
Utah Center For Water Resources Research	UT	David Tarboton		
Vermont Water Resources and Lake Studies Center	VT	Anne Jefferson	Julianna White	
Virginia Water Resources Research Center	VA	Kevin McGuire	Daniel McLaughlin	
Virgin Islands Water Resources Research Institute	VI	Kristin Grimes		
State of Washington Water Research Center	WA	Jonathan Yoder		
West Virginia Water Research Institute	WV	Paul Ziemkiewicz	Melissa O'Neal	
Wisconsin Water Resources Institute	WI	Christina Remucal	Jennifer Hauxwell	
Office of Water Programs, University of Wyoming	WY	Greg Kerr		



## 2024-25 NIWR Board Members

Name	Email	Affiliation/Institute	Board Position	Term	Regional Association
Gerald Kauffman	<a href="mailto:jerryk@udel.edu">jerryk@udel.edu</a>	Delaware	President	2023-26	
Jeff Peterson	<a href="mailto:jmpeter@umn.edu">jmpeter@umn.edu</a>	Minnesota	Past President	2022-25	
Yu-Feng Lin	<a href="mailto:yflin@illinois.edu">yflin@illinois.edu</a>	Illinois	President-Elect	2024-27	
Vacant			Treasurer		
Linda Weavers	<a href="mailto:weavers.1@osu.edu">weavers.1@osu.edu</a>	Ohio	At-Large Representative	2023-26	
Keith Cherkauer	<a href="mailto:cherkaue@purdue.edu">cherkaue@purdue.edu</a>	Indiana	Regional Representative	2024-27	Great Lakes
Stephanie Ewing	<a href="mailto:stephanie.ewing@montana.edu">stephanie.ewing@montana.edu</a>	Montana	Regional Representative	2023-26	Great Plains
Brian Rahm	<a href="mailto:bgr4@cornell.edu">bgr4@cornell.edu</a>	New York	Regional Representative	2024-27	Mid-Atlantic
Tao Yan	<a href="mailto:taoyan@hawaii.edu">taoyan@hawaii.edu</a>	Hawaii	Regional Representative	2024-26	Oceania and Islands
Michael Dietz	<a href="mailto:michael.dietz@uconn.edu">michael.dietz@uconn.edu</a>	Connecticut	Regional Representative	2023-26	New England
Jon Yoder/Nicole Misar	<a href="mailto:yoder@wsu.edu">yoder@wsu.edu</a> / <a href="mailto:nmisarti@alaska.edu">nmisarti@alaska.edu</a>	Washington / Alaska	Regional Representative	2024-27	Pacific Northwest
Karen Schlatter	<a href="mailto:karen.schlatter@colostate.edu">karen.schlatter@colostate.edu</a>	Colorado	Regional Representative	2023-26	Powell Consortium
John Schwartz	<a href="mailto:jschwartz@utk.edu">jschwartz@utk.edu</a>	Mississippi	Regional Representative	2024-26	South Atlantic-Gulf

## Regular Guests to NIWR Board Meetings

Name	Email	Affiliation	Role
Leslee Gilbert	<a href="mailto:lgilbert@vsadc.com">lgilbert@vsadc.com</a>	Van Scoyoc Associates	Lobbyist
Laurie Katz	<a href="mailto:lkatz@vsadc.com">lkatz@vsadc.com</a>	Van Scoyoc Associates	Lobbyist
Christian Schmidt	<a href="mailto:cgschmidt@usgs.gov">cgschmidt@usgs.gov</a>	USGS	WRRP Program
Robert Joseph	<a href="mailto:rjoseph@usgs.gov">rjoseph@usgs.gov</a>	USGS	WRRP Program



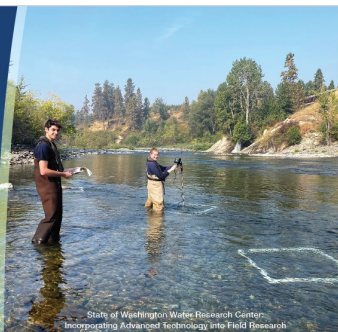
**NIWR By The Numbers**  
FY 2023

  
**\$10.75M**  
in federal funds  
(104b: 4.8M | 104g: 5.9M)

  
**\$10.4M**  
in matching funds  
(104b: 4.6M | 104g: 5.8M)

  
**250**  
sponsored research projects  
(104b: 227 | 104g: 23)

  
**348**  
students supported  
(104b: 239 | 104g: 49)



State of Washington Water Research Center:  
Incorporating Advanced Technology into Field Research

**Success from the ground up  
in water-related practices  
and policies**

The National Institutes for Water Resources (NIWR) plays a major role in addressing water-related concerns by providing a platform for research, training, and collaboration at the state level.

Housed in the nation's land-grant universities, the 54 NIWR member institutes leverage university expertise in research, education, and outreach to find solutions for the water management challenges we face.

**University of Nebraska  
The Nebraska Water Center**

**Know Your Well Program**

- Partners with UNL Water Sciences Laboratory to compare results from classroom test kits to standard laboratory testing.
- Trains high school students to sample and test domestic well water quality and evaluate factors leading to groundwater contamination.
- Engages with high school students to foster water sciences as a career and develop the workforce pipeline.
- Includes students and teachers from 23 schools across Nebraska who sampled 250 wells.



The Nebraska Water Center  
Know Your Well Program

**Montana State University  
Montana Water Center**

**Indigenous Water Research Fellowship**

- Designed to support Native American graduate students pursuing studies in water resources. One Fellow per year.

Madisan Chavez (Fellow) conducted PFAS research in and around the Little Big Horn River (LBHR) that flows through the Crow (Apsaalooke) Reservation:

- Worked with tribal elders to identify abandoned waste disposal sites (potential sources of PFAS contamination in the LBHR).
- Tested groundwater at sites within and outside of the LBHR floodplain to assess PFAS contamination and transport in these areas. Her research will complement the PFAS work already being conducted on the Crow Reservation.
- Partnered with USGS Environmental Health Program scientists for PFAS sampling of sediment and fish on the Crow Reservation.



Montana Water Center  
Indigenous Water Research Fellowship



Kansas Biological Survey  
and Center for Ecological Research:  
Regional Solutions to Mitigate Harmful Algal Blooms

**Research for  
Resilience**

**Enabling Innovative Ideas and  
Individuals to Grow**

The following  
the many WF  
having an im  
practical app

**Fresh water has long been  
identified as fundamental to the  
habitability of our planet and life  
on Earth.**

Availability of and access to safe, adequate freshwater supplies are critical to our Nation's prosperity and quality of life. Socioeconomics, geopolitical stressors, population growth, and climate variability, among other factors, provide challenges for management of water resources.

For more than 50 years, the WRRP has invested in local, State, and regionally focused water-related research; information and technology transfer; and workforce development through student training and professional internships. A true Federal- State partnership, the Water Resources Research Act Program is administered in the Office of Planning and Programming of the USGS Water Resources Mission Area.



Montana Water Center: Indigenous Water Research Fellowship

**University of Kansas  
Kansas Biological Survey and Center for Ecological  
Research**

**Regional Solutions to Mitigate  
Harmful Algal Blooms**

- Some blue-green algae can form harmful blooms that contain cyanobacteria that can harm swimmers, pets, livestock, or wildlife coming into contact with infected waters.
- Harmful algal blooms (HABs) have occurred in more than 100 public waterbodies in Kansas in the last decade.
- Researchers tested the ability of three native aquatic plants to control harmful algal blooms in a large experimental setting at the KU Biological Field Station.
- Preliminary results show lower concentrations of HABs in tanks with arrow leaf and water primrose.
- The experiment will continue to follow through with more water samples, testing and rigorous statistical analyses.

**Washington State University  
State of Washington Water Research Center**

**Incorporating Advanced Technology  
into Field Research**

Accurately measuring salmon stocks is critical to the Pacific Northwest economy. This project:

- Advanced three drone-based methods and integrated them into a simple model to predict Pacific salmon spawning habitat.

In FY 2023, the **Water Resources Research Act (WRRP)** provided \$10.75 million in funding towards cutting-edge research on the nation's most pressing water issues. This funding was met by a 1:1 match from local public and private sector entities, doubling the funding the WRRP provides.

**Annual Base Grants**

104(b) grants are awarded annually to NIWR member institutes and help plan and conduct applied and peer-reviewed research, education, and outreach activities on water. In FY2023 \$4.7 million was awarded in 104b.

**National Competitive Grants**

The 104(g) National Competitive Grants program funds research in water issues that are of a regional or interstate nature. In FY 2023 almost \$6 million was awarded for general grants.

*All images were provided by and are used with permission of the institutes.*

**NIWR Board Officers**

**President:** Dr. Jeffrey Peterson  
University of Minnesota  
jmpeter@umn.edu

**Secretary-Treasurer:** Dr. Todd Jarvis  
Oregon State University  
todd.jarvis@oregonstate.edu

**President Elect:** Dr. Gerald Kauffman  
University of Delaware  
jerryk@udel.edu

**Past President:** Dr. Nicole Misarti  
University of Alaska  
nmimsarti@alaska.edu



## Water Resources Research Act Program—Current Status, Development Opportunities, and Priorities for 2020–30



Circular 1488

U.S. Department of the Interior  
U.S. Geological Survey

# FUTURE WATER PRIORITIES FOR THE NATION

Directions for the U.S. Geological  
Survey Water Mission Area

Committee on Future Water Resource Needs for the Nation:  
Water Science and Research at the U.S. Geological Survey

Water Science and Technology Board

Division on Earth and Life Studies

A Consensus Study Report of  
*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

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Washington, DC  
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## Seven focus areas as thematic framework to organize priorities and goals.

1. **Water Scarcity and Availability** —Drivers and outcomes of water availability and demand are understood and addressed to sustain human and environmental needs. **Goals:**
  - Quantify agricultural water needs and opportunities for conservation and efficiency.
  - Improve understanding of groundwater resources, including recharge, management and governance.
  - Provide solutions, resources, and tools to mitigate competing uses for variable surface water supplies.
  - Develop knowledge to manage drought risk and effects of climate variability.
  - Advance science, outreach, and education to meet water, energy, and food needs.
2. **Water-Related Hazards and Climate Variability** —Extreme hydrologic events and the effects of climate variability are understood and addressed to enhance community preparedness and resilience. **Goals:**
  - Increase engagement to underserved/vulnerable populations, preparedness/recovery extreme events.
  - Mobilize scientific expertise of USGS NIWR network to respond to hazards at local, State, territorial levels.
  - Understand infrastructure relations to acute and chronic hazards.
  - Protect water security by ensuring water availability and sanitation.
3. **Water Quality** -High-quality water safe and accessible ensured to sustain humans and ecosystems. **Goals:**
  - Decrease incidence and severity of waterborne pathogens including harmful algal bloom events.
  - Minimize human and environmental health risks from legacy and emerging water contaminants.
4. **Water Policy, Planning, and Socioeconomics** —Policy, planning, and socioeconomics are integrated and applied toward the comprehensive management and governance of water resources. **Goals:**
  - Enhance understanding and ramifications of the valuation of water.
  - Investigate the human dimensions of water resources.
  - Public policy through evidence-based contributions, outreach, effective science communications.
  - Enhance effectiveness and robustness of water-related infrastructure planning.
  - Complete informative, integrated water resource models.
  - Increase transdisciplinary approaches incorporating economics in water-related issues.
  - Assess the economic value of USGS water science and data.
5. **Ecosystem and Drainage Basin Functions** —Ecosystem and drainage basin functions are conserved to support and revitalize ecosystem services. **Goals:**
  - Contribute to the development of a robust and informative National Water Model.
  - Advance science, outreach, education improve drainage basin functions, provision ecosystem services.
6. **Water Technology and Innovation** —State-of-the-art water technology and innovation are advanced to meet societal and ecosystem needs. **Goals:**
  - Provide innovative educational and entrepreneurial programs.
  - Advance research and development on water innovation, including innovation for urban areas.
  - Advance water technology innovation to meet energy, food, and water needs.
  - Transfer innovative water technology research to stakeholders.
  - Explore industrial ecology to meet water-related needs.
7. **Workforce Development and Water Literacy** —A diverse workforce equipped to address our Nation's need for water resources is achieved with greater public understanding of water resources. **Goals:**
  - Increase experiential education opportunities for students and underrepresented/underserved groups.
  - Increase capacity and opportunities to share and translate research results with stakeholders.
  - Cultivate and nurture an institutional culture that embraces diversity, equity, and inclusion.
  - Enhance programmatic capacity in science communications.



# 4. DOI/USGS WRRRA FY24 Budget Request

## WATER RESEARCH GRANTS

The state water resources research institutes authorized by section 104 of the [Water Resources Research Act of 1984](#) are organized as the National Institutes for Water Resources. The NIWR cooperates with the U.S. Geological Survey to support, coordinate and facilitate research through the Annual Base Grants, National Competitive Grants, Coordination Grants, and in operating the [NIWR-USGS Student Internship Program](#). The Annual Base Grants, 104(b), and National Competitive Grants, 104(g), make up the backbone of the USGS 104 program. Below is a brief explanation of these two similar, but different grants.



### State Water Research Grants - USGS 104(b) Program

These grants provide competitive seed grant funding opportunities for faculty members or affiliates at institutions of higher education. Applications must be submitted through your State Water Research Institute or Center. The Institutes or Centers may only consider project proposals from faculty members or affiliates at institutions of higher education in its State. To find out where your state's Institute or Center is located visit the Institutes webpage [here](#) and click on your state.

Unique characteristics of this program include:

- Research priorities are set by each institute in consultation with its state advisory board.
- Research focuses on state and regional water resources problems that can be addressed by researchers at academic institutions in states with common problems.
- All federal funds must be matched by at least two non-federal dollars for each federal dollar.

For more information on the USGS 104 program visit the USGS Water Resources Research Institutes website [here](#).



### National Water Research Grants - USGS 104(g) Program

The goals of the National Competitive Grants program are to promote collaboration between the USGS and university scientists in research on significant national and regional water resources issues; promote the dissemination and results of the research funded under this program; and to assist in the training of scientists in water resources. The USGS 104(g) Program provides the major mechanism to meet the growing needs not filled by state or federal research programs.

Unique characteristics of this program include:

- Research priorities are set jointly by the National Institutes for Water Resources and the U.S. Geological Survey.
- The program focuses on regional and interstate water resources problems beyond those of concern only to a single state.
- All federal funds must be matched by at least one non-federal dollar for each federal dollar.

For more information on the USGS 104 program visit the USGS Water Resources Research Institutes website [here](#).



United States Geological Survey

WATER RESOURCES RESEARCH ACT PROGRAM ANNUAL BASE GRANTS FISCAL  
YEAR 2024

<https://water.usgs.gov/wrri/>



Notice of Funding Opportunity - Fiscal Year 2024  
Funding Opportunity Number (FON) G24AS00537

Closing Date: 05/22/2024

(3) "cooperate closely with other institutes and other organizations in the region to increase the effectiveness of the institutes and for the purpose of promoting regional coordination."

Applications submitted under this Announcement are to be in furtherance of these objectives and promote the national mission and objectives of the U.S. Geological Survey which are focused on providing water-quality and -quantity information, understanding water availability, addressing the influence of climate on water resources, and responding to water-related emerging needs. Specific areas of emphasis are at the discretion of the individual Institute or Center Directors.

**Funding Opportunity Goals**

Research for water resources in each State or Territory served by the Water Resources Research Institutes under the Water Resources Research Act.

## B. Federal Award Information

### B1. Total Funding

**Estimated Total Funding**

\$8,373,000

### B2. Award Amount

**Maximum Award**

\$440,685

**Minimum Award**

\$146,895

The amount available to each Institute or Center in FY 2024 will be \$146,895. A total of \$440,685 will be available to the regional Institute in Guam, which serves Guam, the Federated States of Micronesia and the Commonwealth of the Northern Mariana Islands. A total of \$293,790 will be available to the regional Institute in Hawaii, which serves Hawaii and American Samoa. The Government's obligation under this program is contingent upon the availability of appropriated funds.

### B3. Anticipated Award Funding and Dates

**Anticipated Award Date**

September 01, 2024

### B4. Number of Awards

**Expected Number of Awards**



United States Geological Survey

WATER RESOURCES RESEARCH ACT PROGRAM NATIONAL COMPETITIVE  
GRANTS FY2024 (104g General)

<https://water.usgs.gov/wri/>



Notice of Funding Opportunity - Fiscal Year 2024  
Funding Opportunity Number (FON) G24AS00536

Closing Date: 05/30/2024

**Model advancement:** Explore methods to develop new hydrologic models in a geographic area and provide information on promising modeling approaches to inform science questions specific to a region. Examples include:

- Natural language processing methods to assimilate and identify succinct hydrologic science issues in an area of interest, and additional AI/ML to provide a modeling pathway based on attributes of hydrologic model capacities.)
- Rapid model development methods to quickly provide information regarding potential high-value data collection and guide further model development in a given geographic area.

Funding Opportunity Goals

Research for water resources in each State or Territory served by the Water Resources Research Institutes under the Water Resources Research Act.

## B. Federal Award Information

### B1. Total Funding

**Estimated Total Funding**

\$1,860,000

### B2. Award Amount

**Maximum Award**

\$310,000

**Minimum Award**

\$0

Applicants shall not request total federal funds exceeding \$310,000 per project.

### B3. Anticipated Award Funding and Dates

**Anticipated Award Date**

December 16, 2024

**FEDERAL FUNDS**

A. The Government's obligation under this program is contingent upon the availability of funds.

B. All successful proposals will be fully funded for the entire duration of the project with FY 2024 funds, if available.



Cost Category		Federal	Non-Federal	Grand Total	
<b>Total Salaries and Wages for:</b>		<b>\$110,719.00</b>	<b>\$52,092.00</b>	<b>\$162,811.00</b>	
Principal Investigator		\$14,000.00	\$21,092.00	\$35,092.00	
Regular Investigators		\$15,519.00	\$19,000.00	\$34,519.00	
Post Docs		\$0.00	\$0.00	\$0.00	
Graduate Students		\$45,200.00	\$0.00	\$45,200.00	
Undergrad Students		\$36,000.00	\$12,000.00	\$48,000.00	
Director		\$0.00	\$0.00	\$0.00	
Admin Assistants		\$0.00	\$0.00	\$0.00	
<b>Total Fringe Benefits for:</b>		<b>\$17,463.00</b>	<b>\$15,676.00</b>	<b>\$33,139.00</b>	
Principal Investigator		\$5,474.00	\$8,247.00	\$13,721.00	
Regular Investigators		\$2,737.00	\$2,737.00	\$5,474.00	
Post Docs		\$0.00	\$0.00	\$0.00	
Graduate Students		\$5,921.00	\$0.00	\$5,921.00	
Undergrad Students		\$0.00	\$0.00	\$0.00	
Director		\$3,331.00	\$4,692.00	\$8,023.00	
Admin Assistants		\$0.00	\$0.00	\$0.00	
<b>Tuition for:</b>		<b>\$14,098.00</b>	<b>\$0.00</b>	<b>\$14,098.00</b>	
Graduate Students		\$14,098.00	\$0.00	\$14,098.00	
Undergrad Students		\$0.00	\$0.00	\$0.00	
Supplies		\$1,560.00		\$1,560.00	
Equipment				\$0.00	
Services or Consultants				\$0.00	
Travel		\$1,500.00		\$1,500.00	
Other Direct Costs		\$1,500.00	\$1,500.00	\$3,000.00	
<b>Total Direct Costs:</b>		<b>\$146,840.00</b>	<b>\$69,268.00</b>	<b>\$216,108.00</b>	
Indirect Costs Federal		XXXX	\$50,973.00	\$50,973.00	
Indirect Costs Non-Federal		XXXX	\$26,599.00	\$26,599.00	
<b>Amount Proposed at Institute University</b>		<b>\$146,840.00</b>	<b>\$146,840.00</b>	<b>\$293,680.00</b>	
<b>Amount Proposed at Other University</b>		<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	
<b>Total Amount Proposed</b>		<b>\$146,840.00</b>	<b>\$146,840.00</b>	<b>\$293,680.00</b>	





184 Graham Hall  
Newark, DE 19716-7380  
Phone: 302-831-1687  
Email: [bidenschool@udel.edu](mailto:bidenschool@udel.edu)

April 7, 2023

Senator Tom Carper  
513 Hart Senate Office Building  
Washington, DC 20510

Re: Water Resources Research Act (WRRA)  
Fiscal Year 2024 Interior, Environment and Related Agencies Appropriations Bill

Dear Senator Carper:

At the University of Delaware Water Resources Center, we wish to thank you for your continuing support of the Water Resources Research Act (WRRA) program and respectfully request your support of the Senate Subcommittee to provide \$18 million for the Water Resources Research Act program in the Fiscal Year 2024 Interior, Environment, and Related Agencies Appropriations Bill.

The Water Resources Research Act, signed by Lyndon Baines Johnson in 1964, establishes the National Institutes for Water Resources (NIWR) at 54 land grant universities (such as the University of Delaware) in the 50 states, Washington D.C., and three island territories of Guam, Puerto Rico, and Virgin Islands. Through the U.S. Geological Survey in the Department of Interior, these institutes provide a Federally supported and state-based network dedicated to solving problems of water supply and quality in partnership with universities, local governments, water industry, and the public. Each state contributes a minimum of a 1:1 match, thus ensuring that local, state, and regional priorities are addressed, and the impact of federal dollars is maximized. The University of Delaware Water Resources Center was established on campus in 1965 and since then we have supported the education, training, and research of thousands of students (many from Delaware high schools) who have focused on the significant water resources issues of the day in Delaware, the Delaware Valley, and the United States.

Please don't hesitate to contact us at [mcrozzi@udel.edu](mailto:mcrozzi@udel.edu) or 302-438-0389 if you have any questions about this important appropriation concerning our state and national water resources.

Respectfully,

  
Gerald J. Kauffman, Jr., Director  
Institute for Public Administration  
Biden School of Public Policy & Administration  
Newark, DE 19716

  
Martha B. Narvaez, Associate Director  
Institute for Public Administration  
Biden School of Public Policy & Administration  
Newark, DE 19716

CC: Amy E. Schwartz, Dean, Biden School of Public Policy & Administration  
Jerome R. Lewis, Director, Institute for Public Administration

**JOSEPH R. BIDEN, JR. SCHOOL OF PUBLIC POLICY & ADMINISTRATION**

[www.bidenschooludel.edu](http://www.bidenschooludel.edu)



184 Graham Hall  
Newark, DE 19716-7380  
Phone: 302-831-1687  
Email: [bidenschool@udel.edu](mailto:bidenschool@udel.edu)

April 7, 2023

Senator Chris Coons  
218 Russell Senate Office Building  
Washington, DC 20510

Re: Water Resources Research Act  
Fiscal Year 2024 Interior, Environment and Related Agencies Appropriations Bill


Dear Senator Coons:

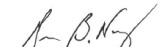
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Please don't hesitate to contact us at [mcrozzi@udel.edu](mailto:mcrozzi@udel.edu) or 302-438-0389 if you have any questions about this important appropriation concerning our state and national water resources.

Respectfully,

  
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184 Graham Hall  
Newark, DE 19716-7380  
Phone: 302-831-1687  
Email: [bidenschool@udel.edu](mailto:bidenschool@udel.edu)

April 7, 2023

Congresswoman Lisa Blunt Rochester  
1724 Longworth House Office Building  
Washington, DC 20515

Re: Water Resources Research Act  
Fiscal Year 2024 Interior, Environment, and Related Agencies Appropriations Bill


Dear Congresswoman Blunt Rochester:

At the University of Delaware Water Resources Center, we respectfully request your support of the House Subcommittee to provide \$18 million for the Water Resources Research Act program in Fiscal Year 2024 Interior, Environment, and Related Agencies Appropriations Bill.

The Water Resources Research Act, signed by Lyndon Baines Johnson in 1964, established the National Institutes for Water Resources (NIWR) at 54 land grant universities (such as the University of Delaware) in the 50 states, Washington D.C., and three island territories of Guam, Puerto Rico, and Virgin Islands. Through the U.S. Geological Survey in the Department of Interior, these institutes provide a Federally supported and state-based network dedicated to solving problems of water supply and quality in partnership with universities, local governments, water industry, and the public. Each state contributes a minimum of a 1:1 match, thus ensuring that local, state, and regional priorities are addressed, and the impact of federal dollars is maximized. The University of Delaware Water Resources Center was established on campus in 1965 and since then we have supported the education, training, and research of thousands of students (many from Delaware high schools) who have focused on solving the significant water resources issues of the day in Delaware, the Delaware Valley, and the United States.

Please don't hesitate to contact us at [mcrozzi@udel.edu](mailto:mcrozzi@udel.edu) or 302-438-0389 if you have any questions about this important appropriation concerning our state and national water resources.

Respectfully,

  
Gerald J. Kauffman, Jr., Director  
Institute for Public Administration  
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Newark, DE 19716

  
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April 7, 2023

Senator Jeff Merkley  
Chairman  
Interior and Environment Subcommittee  
Appropriations Committee  
50-131 Dirksen Senate Office Building  
Washington, DC 20510

Senator Lisa Murkowski  
Ranking Member  
Interior and Environment Subcommittee  
Appropriations Committee  
50-131 Dirksen Senate Office Building  
Washington, DC 20510

Dear Chairman Merkley and Ranking Member Murkowski:

Thank you for the Subcommittee's continuing support for the Water Resources Research Act (WRRA) program. I write to urge your continued support for the WRRA program in FY24 and a request for an FY24 appropriation of \$18 million. The WRRA is a proven and effective program since 1964 and is a vital resource for many constituencies, regional water managers, and local business leaders. The WRRA (32 USC 109 et seq.) established National Institutes for Water Resources (NIWR) at 54 land grant universities in the 50 states, established National Institutes for Water Resources (NIWR) at 54 land grant universities in the 50 states, District of Columbia, and island territories of Guam, Puerto Rico, and Virgin Islands to research water-related phenomena, aid the entry of new research scientists into water resources fields, train future water scientists and engineers, and distribute the results of sponsored research to water managers and the public.

The U.S. Geological Survey administers the program that provides valuable support for water research critical to local, state, and regional communities. These state programs match federal funds with a 1:1 match that leverages federal support to address regional needs. These funds support long-term water planning and management and foster the next generation of water scientists, managers, and engineers. The WRRA program is responsive to water needs of states and regions, and addresses major national concerns related to drought, harmful algal blooms, flooding, and water contamination. The institutes collaborate with over 150 state agencies, 180 federal offices, and more than 165 local and municipal offices. Each year, federal dollars are leveraged to support over 350 students in training, over 200 research projects, and more than 550 researchers. Such support fosters successful entry into the STEM job market regionally and nationally.

We appreciate the Subcommittee's support for the Water Resources Research Act and request that you continue funding this program in the FY24 Interior, Environment, and Related Agencies bill.

Respectfully,

  
Gerald J. Kauffman, Jr., Director  
Institute for Public Administration  
Biden School of Public Policy & Administration  
Newark, DE 19716

  
Martha B. Narvaez, Associate Director  
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April 7, 2023

Hon. Mike Simpson, Chairman  
Interior, Environment, & Related Agencies Subcommittee  
House Committee on Appropriations  
U.S. House of Representatives  
1016 Longworth House Office Building  
Washington, DC 20515

Hon. Chellie Pingree, Ranking Member  
Interior, Environment, & Related Agencies Subcommittee  
House Committee on Appropriations  
U.S. House of Representatives  
2007 Rayburn House Office Building  
Washington, DC 20515

Dear Chairman Simpson and Ranking Member Pingree:

Thank you for the Subcommittee's continuing support for the Water Resources Research Act (WRRA) program. We write to urge your continued support for the WRRA program in FY24 and a request for an FY24 appropriation of \$18 million. The WRRA is a proven and effective program since 1964 and is a vital resource for many constituencies, including regional water managers and local business leaders. The WRRA (32 USC 109 et seq.) established National Institutes for Water Resources (NIWR) at 54 land grant universities in the 50 states, District of Columbia, and island territories of Guam, Puerto Rico, and Virgin Islands to research water-related phenomena, aid the entry of new research scientists into water resources fields, train future water scientists and engineers, and distribute the results of sponsored research to water managers and the public.

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We appreciate the Subcommittee's support for the Water Resources Research Act and request that you continue funding this program in the FY24 Interior, Environment, and Related Agencies bill.

Respectfully,

  
Gerald J. Kauffman, Jr., Director  
Institute for Public Administration  
Biden School of Public Policy & Administration  
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## DWRC Water Resources Research and Education Priorities

- Water quality (nutrients, pathogens, public health), harmful algal blooms, PFOA contamination
- Storm water runoff (management and control)
- Water supply, demand, and conservation (infrastructure/technology)
- Water policy (governance and economics)
- Climate change, sea level rise, riverine/coastal flooding
- Groundwater (remediation and treatment)
- Watershed management
- Wetlands (protection and restoration)
- Wastewater management (treatment and reuse)
- Water, food, and energy nexus



# 7. Fluctuating Federal/State Fiscal Landscape in Water

## FY 2025 Funding Goal for the Water Resources Research Act Program

Program:	Water Resources Research Act Program
Subcommittee:	Interior and the Environment Appropriations
Account:	Surveys, Investigations, and Research - Water Resources
Agency:	U.S. Geological Survey
FY2024 Funding Level:	Pending- \$16 million in both House and Senate FY24 Interior Appropriations bills
Program Authorization:	The Water Resources Research Act, 42 USC Sec. 1030 3 WRRRA was reauthorized through 2025, as included in the 2022 Bipartisan Infrastructure Law
FY2025 Funding Request	\$18,000,000
<b>Report Language:</b>  <i>Water Resources Research Act—the Committee provides \$18,000,000 for the Water Resources Research Act program at USGS and directs that at least \$14,500,000 fund the 104b annual base grants and the remaining funds to support 104g national grants, including special research topics such as AIS and PFAS.</i>	
Budget Offset, if asked	U.S. Department of Interior, Working Capital Fund

Justification: The water resources research institutes provide vital support to stakeholders, states and federal agencies for long-term water planning, policy development, and resource management. This support takes the forms of research, education, and outreach. In partnership with the U.S. Geological Survey, the water institutes have a 60-year history of rendering assistance to all members of the water- user communities in their states in an efficient and non-duplicative manner. The FY 2025 funding goal for the water resources research institutes program in the U.S. Geological Survey budget is \$18,000,000.

Funding Rationale: As the nation’s water challenges increase, the institutes are poised to grow their partnership with USGS to tackle key problems related to water-related hazards, water quality, and water availability. This funding level ensures that institutes can attract water scientists, develop the USGS-related workforce and expand regional partnerships to leverage multiple stakeholders to address these national water concerns.





# AWRA, UCOWR, NIWR 60th Anniversary Joint Water Resources Conference

September 30-October 2, 2024 | St. Louis, MO | Hyatt Regency St. Louis Arch

## Celebrating the Past and Planning for the Future of Water



**IMPORTANT:** In order to receive important communication from the AWRA/UCOWR/NIWR Team about your conference participation, you must add [events@awra.org](mailto:events@awra.org), [info@awra.org](mailto:info@awra.org), [membership@awra.org](mailto:membership@awra.org), and [ucowr@siu.edu](mailto:ucowr@siu.edu) to your safe sender list.

Conference Details ▾

### Participation Details

Call for Abstracts: Open

Topical Sessions: Closed

Presenter/Moderators

Sponsor & Exhibit

Opening Anniversary Party

### Call for Abstracts & Student Posters Due: May 13

READ THESE INSTRUCTIONS ENTIRELY BEFORE SUBMITTING YOUR ABSTRACT AT THE END OF THE PAGE.

**Troubleshooting:** Before you submit an abstract, please do the following first:

1. Clear your cache and cookies in the web browser and restart your computer.
2. If the above does not work, please use a different web browser and consider using a nonwork computer. Often work computers have privacy settings that conflict with AWRA's submission system.

The American Water Resources Association, the Universities Council on Water Resources, and the National Institutes for Water Resources are bringing together a professional community of 60 years. Join us as we "celebrate the past and plan for the future" at this one-of-a-kind conference on the banks of the Mighty Mississippi River. Attendees from each organization will have a unique opportunity to



### 3. 2023-2024 DWRC Undergraduate and Graduate Research Interns

Name	School	Major	Research Project
Aaron Balmer	UD	Wildlife Ecology	Wilmington Lead Service Line Inventory Project
Sasha Altman	UD	Environmental Studies and Public Policy	PFAS Contamination in Delaware Water Bodies
Ambre Crawford	UD	Marine Science	GIS Use in Diamond Back Terrapin Conservation in the Inland Bays, Delaware
Cooper Feeny	UD	Economics and Public Policy	Wilmington Lead Service Line Inventory Project
Caroline Gilliard	UD	Environmental Engineering	Hydrologic and hydraulic modeling along the Brandywine River floodplain in Delaware and Pennsylvania
Catherine Gilman	UD	Energy and Environmental Policy	Evaluating the Effectiveness of Reimplementing a Bottle Bill for Cleaner Waterways in Delaware
Nicole Gutkowski	UD	Marine Science	PFAS Assessment of Delaware Raw and Treated Drinking Water Supplies
Elizabeth Manning	UD	Environmental Engineering	Water Quality Trends in the Brandywine-Christina Watershed at the state line in Delaware
Summer Moals	DSU	Agriculture	Comparing the Efficacy of Floating Wetland ( <i>Pontederia cordata</i> ) and Submerged Wetland ( <i>Sagittaria subulata</i> ) Treatments for Excess Nitrogen and Phosphorus Removal from Aquaculture Water
Cole Palmer	DSU	Fisheries Management	Consolidation of Delaware's Tier 1 Insects of Greatest Conservation Need and Association's with Non-Tidal Freshwater Wetlands
Brayden Rochester	UD	Environmental Engineering	Produced Water Remediation through Advanced Evaporative Treatment Technologies
Jordan Rosales	UD	Geological Sciences	Evaluating the Feasibility of Using UIC Class I Injection Wells in Delaware
Dmitriy Rybin	UD	Civil Engineering	Wilmington Lead Service Line Inventory Project
Lydia Franks	UD	Master of Water Science & Policy	Changes in Shoreline Conditions along the Delaware Inland Bays, 2012-2022
Jhaney Hamlett	UD	Master of Public Administration	City of Wilmington Green Jobs Program Impact Study
Megan Wassil	UD	Master of Water Science & Policy	PFAS Assessment of Delaware Raw and Treated Drinking Water Supplies



# Delaware Water Resources Center at the University of Delaware DWRC

## Undergraduate Internships In Water Resources 2015



UNIVERSITY OF  
DELAWARE  
College of Agriculture  
& Natural Resources

Delaware Water Resources Center (DWRC) Undergraduate Internships in Water Resources provide a unique opportunity for undergraduate students and faculty to become directly involved in research and education projects addressing water resource related issues of critical importance to Delaware and the Mid-Atlantic region.

### Eligibility

All undergraduate students enrolled at an institution of higher learning in Delaware may apply, except for those graduating at the end of the spring semester. All students must have the active support of a faculty advisor and a minimum GPA of 3.0. (If a student applies for any other UD-sponsored summer research experience s/he must indicate this on the DWRC application. The DWRC intends to award internships to only those students who have not been awarded another internship within a calendar year.)

### Program Details and Deadline

The DWRC provides \$3500 in financial support for each undergraduate intern. Students typically work ten weeks full-time during the summer and additional hours during the fall and winter. Interns must submit a written report on their project and participate in a poster session at the UD spring undergraduate research conference. The application deadline for 2015 DWRC internships is March 27, 2015. See second page for more information. For details on past projects, current faculty advisors, application materials to submit, and requirements for reports and posters, visit the DWRC website: <http://ag.udel.edu/dwrc/>

### Delaware Water Resources Center (DWRC) interns

experience a complete research or education project. Students, in cooperation with faculty advisors, identify a topic of interest, develop

### The DWRC Internship Program

All DWRC interns conduct a project consistent with the DWRC's research and educational interests (listed below in the green box) with the support of a faculty advisor from one of our co-sponsor organizations. Internships may be available in sponsorship with the following:

**University of Delaware (UD) Water Resources Agency** (<http://www.ipa.udel.edu/wra/>): Internships are supported which focus on water resource policy and management.

**UD College of Agriculture and Natural Resources** (<http://canr.udel.edu/>): Projects are supported to work with faculty in the departments of Animal and Food Sciences, Entomology and Wildlife Ecology, Applied Economics and Statistics, or Plant and Soil Sciences. For example, an internship in the Department of Plant and Soil Sciences could relate soils, plants, and land management to water use and quality.

**UD College of Arts and Sciences** (<http://www.cas.udel.edu/>): Students can conduct internship projects in Biological Sciences, Chemistry, Political Science, Public Policy, or other subjects closely related to water resources.

**UD College of Earth, Ocean, and Environment** (<http://www.ceoe.udel.edu/>): Internships are supported in the areas of Geography, Geology, Marine Biology and Biochemistry, Marine Policy, Oceanography, or Physical Ocean Science and Engineering.

**UD College of Engineering** (<http://www.engr.udel.edu/>): Projects can be developed in areas such as Chemical Engineering, Civil and Environmental Engineering, or Mechanical Engineering.

**Delaware Geological Survey** (<http://www.dgs.udel.edu/>): Researchers offer internships focusing on hydrogeology, ground water supply, and water quality.

**Delaware State University** (<http://cars.desu.edu/>): Faculty support internships in the areas of agriculture, natural resources, aquaculture, and aquatic ecology.

**Delaware Department of Natural Resources and Environmental Control** (<http://www.dnrec.delaware.gov/>): Staff in DNREC offices related to water resources occasionally offer internships on topics such as soil and water conservation, water quality, and climate change.

### Topics in water resources research and education of interest to the DWRC:

- Water pollutants - their sources, fate, cycling, and transport
- Water supply, demand, and conservation
- Groundwater identification and protection
- Nutrient management and water quality
- Management and control of storm water runoff

### How to Apply for a DWRC Internship

**Select your topic:** DWRC internships are for students from a wide variety of backgrounds and research interests. Titles of past projects can be found at <http://ag.udel.edu/dwrc/interns.html> and <http://ag.udel.edu/dwrc/publications/DWRCInternshipSpotlight2009.pdf> and include: White Clay Creek Shad Restoration Project (Water Resources Agency); Developing Scientifically-Based Food Safety Metrics for Water Management and Irrigation Methods (Animal and Food Sciences); The Returns to Best Management Practices: Evidence from Early Proposals for Nutrient Trading in the Chesapeake Bay Watershed (Applied Economics and Statistics); Water Quality Management in Urban Ecosystems (Plant and Soil Sciences); The Impacts of Redefining Navigable Waters under the Clean Water Act (Political Science); Sediment Transport through Historic Mill Dams of the Christina River Basin (Geology); Characterization of Viral Diversity within the Mantle Fluid of the Eastern Oyster, *Crassostrea virginica* (Marine Biology); Preventing Formation of Toxic Chlorination Byproducts in Water Using Zerovalent Iron (Civil and Environmental Engineering); Hydraulic Properties of the Columbia Aquifer (Delaware Geological Survey); and Aquatic Health near Wastewater Discharge in Delaware Inland Bays Tidal Canal (Delaware State University).

**Find a Faculty Advisor and Apply to the DWRC:** Faculty contacts and their research interests are also listed on the DWRC website, under "Faculty and Staff". Contact the DWRC program coordinator, Maria Pauler ([mpauler@udel.edu](mailto:mpauler@udel.edu); 302-831-0847), to say that you are interested. Students should contact potential faculty advisors to discuss and identify a project topic of mutual interest and then submit their application to the DWRC by the deadline **March 27, 2015**. Faculty may not advise more than two interns concurrently and must provide matching funds consistent with DWRC guidelines, usually by committing a percentage of their time to the intern's project.



### Delaware Water Resources Center

Gerald J. Kauffman, Ph.D., Director  
DGS Annex 261 Academy Street  
Newark, DE 19716  
Phone: 302-831-4929  
E-mail: [jerryk@udel.edu](mailto:jerryk@udel.edu)



## NIWR & USGS A Model Partnership

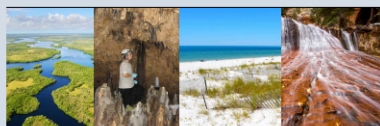
NIWR  
THE NATIONAL INSTITUTES  
FOR WATER RESOURCES

USGS  
science for a changing world

us by Danielle Quigley

### PARTNERSHIP WITH USGS

- The National Institutes for Water Resources (NIWR) partners with the U.S. Geological Survey (USGS) through the provisions of the Water Resources Research Act (WRRRA) to address water-related concerns by providing a national platform for research, training and collaboration.
- USGS provides each institute with a grant to target local priorities, recruit researchers and leverage federal funds with state money and private funding.
- 54 NIWR member institutes are housed in the country's land-grant universities in all 50 states, three U.S. territories and the District of Columbia.
- NIWR is the only federally mandated research program that focuses on applied water resource research, education, training and outreach.



Housed in the nation's leading research universities, NIWR

### MAXIMIZING FEDERAL IMPACT

NIWR's ability to attract and match non-federal funds to USGS grant-sponsored research multiplies the federal investment in local water projects. The NIWR-USGS partnership also strengthens USGS's own funding model, as NIWR institutes often allow funds to pass through the institutes to USGS State Water Science Centers. The NIWR institutes open doors for the USGS at the state-level to other funding sources that may require non-federal matching funds. In recent years, the USGS State Water Science Centers have benefitted from funds that have flowed through NIWR institutes from external sources for technical assistance and scientific expertise on large-scale, multi-partner projects that address emerging water research needs.

### WANTED: INTERNS

The USGS is encouraging NIWR institutes to take advantage of its nationwide internship program, details of which follow:

- The interns are hired by the NIWR institute but work with USGS Water Science Center researchers.

### IMPACT & COLLABORATION

- NIWR member institutes assist public and private sector groups in their mission to protect human health, environmental resources and economic sustainability.
- Last year, NIWR member institutes sponsored more than 1,200 groundbreaking research projects.
- Grants from USGS and other sponsors are awarded through a competitive, peer-reviewed process.
- NIWR member institutes collaborated on projects with over 200 universities, 150 state agencies, 180 federal agencies, departments and divisions, and more than 165 local and municipal offices.





## 5. 2024-2025 DWRC Undergraduate and Graduate Research Proposals

Name	School	Major	Research Advisor	Proposed Research
<b>Undergraduate Water Research Interns</b>				
Jillian Abramson	UD	Environmental and Resource Economics	Dr. Gerald Kauffman	Delaware River Basin and Economics
Aaron Balmer	UD	Wildlife Ecology	Martha Narvaez	Wilmington Lead Project
Abigail Britz	UD	Environmental Engineering	Dr. Gerald Kauffman	
Amelia English	UD	Environmental Studies/Public Policy	Dr. Gerald Kauffman	Assessing the Impacts of Dam Removals on Flood Risk and Water Quality in the Brandywine and White Clay Creek Watersheds
Cooper Feeny	UD	Economics and Public Policy	Martha Narvaez	Wilmington Lead Project
Cai Foster	UD	Environmental Studies	Dr. Gerald Kauffman	Wetlands and Infrastructure in the Brandywine Creek Relating to Storm Surges Study
Lianna Greenstein	UD	Environmental Engineering	Dr. Gerald Kauffman	Wastewater Management, Wetlands, Water Pollutants, and Stormwater
Isabelle Kornas	UD	Energy and Environmental Policy	Dr. Gerald Kauffman	Sea Level Rise and Coastal Flooding in Delaware
Kayla Price	UD	Environmental Engineering	Dr. Paul Imhoff	Remediating Texas Soils Contaminated by Accidental Spills of Fracking Fluids and Produced Water
Dmitriy Rybin	UD	Civil Engineering	Martha Narvaez	Wilmington Lead Project
Silvie Sandeen	UD	Environmental Science	Dr. Gerald Kauffman	Water Policy Governance in Delaware
Avid Mendiola-Trujillo	UD	Chemical Engineering	Dr. Gerald Kauffman	
<b>Graduate Student Assistantships</b>				
Jhaney Hamlett	UD	Masters of Public Administration	Martha Narvaez	
Megan Wassil	UD	MS Water Science & Policy	Dr. Gerald Kauffman	
Nicole Re	UD	Masters of Energy and Environmental Policy	Dr. Gerald Kauffman	



# 6. 2024 DWRC Advisory Panel

<b>Ms. Stefanie Baxter</b> Associate Scientist Delaware Geological Survey University of Delaware	<b>Ms. Shane Morgan</b> Management Plan Coordinator White Clay Creek Wild and Scenic River Program	<b>Mr. John Harrod</b> Engagement Director Partnership for the Delaware Estuary
<b>Dr. Asia Dowtin</b> Assistant Professor Department of Forestry Michigan State University	<b>Dr. Mi-Ling Li</b> Assistant Professor School of Marine Science & Policy University of Delaware	<b>Mr. Kash Srinivasan</b> Principal KS Group, LLC
<b>Dr. Dewayne Fox</b> Professor College of Agriculture and Related Sciences Delaware State University	<b>Ms. Chris Oh</b> Water Division Director Department of Public Works City of Wilmington	<b>Ms. Kristen Travers</b> Director of Conservation Delaware Nature Society
<b>Mr. Christian Hauser</b> Associate Director Delaware Sea Grant Program University of Delaware	<b>Ms. Betzaida (Betzy) Reyes</b> Physical Scientist U.S. Geological Survey	<b>Dr. Carolyn Voter</b> Assistant Professor Civil and Environmental Engineering University of Delaware
<b>Ms. Stacy McNatt</b> Chief of Construction Support Department of Special Services New Castle County	<b>Mr. Ethan Robinson</b> Deputy Director Department of Public Works & Water Resources City of Newark	<b>Mr. Steve Williams</b> Environmental Program Administrator Division of Watershed Stewardship Delaware DNREC





184 Graham Hall  
Newark, DE 19716-7380  
Phone: 302-831-1687  
Email: [bidenschool@udel.edu](mailto:bidenschool@udel.edu)

Dr. Asia Dowtin  
Department of Forestry, Natural Resources Building  
Michigan State University  
480 Wilson Rd, East Lansing, MI 48824

February 22, 2023

Dear Asia:

As Director and Associate Director of the University of Delaware Water Resources Center, we are pleased to invite you to serve on the UDWRC Advisory Panel for a two-year term through January 1, 2025 based on your expertise in water issues of importance to Delaware and the Mid-Atlantic region. Established on campus in 1965, the UDWRC is one of the 54 National Institutes for Water Resources (NIWR) supported by the U.S. Geological Survey at land grant universities in the 50 states, District of Columbia, and three island territories of Guam, Puerto Rico, and U.S. Virgin Islands. Responsibilities of the UDWRC in the NIWR include: (1) innovative research that fosters entry of new research scientists into water resources fields, training of future water scientists and engineers, exploration of new ideas that address water issues, dissemination of research to water managers and the public and (2) cooperate with other colleges to develop a statewide program designed to resolve state/regional water problems.

We are proud of the water research program begun by our predecessor Deputy Dean Dr. Tom Sims that has supported over 350 undergraduate interns and graduate research fellowships since 2000. In accordance with the Water Resources Research Act of 1964 and as amended in 1984, the UDWRC Director appoints an advisory panel to assist in the review and ranking of research projects and establish priorities for center activities. We meet annually in May where our research students present the results of their research projects. In your role as an advisory panel member, you would have responsibilities to: (1) provide input to the Director regarding the successful mission of the UDWRC, (2) assist in review of UDWRC graduate fellowship and undergraduate internship applications, and (3) help promote interaction of the UDWRC with other organizations in the state, region, and nation.

Please let us know if you wish to serve on the UDWRC Advisory Panel and don't hesitate to contact us at 302-893-1571 or at [jerryk@udel.edu](mailto:jerryk@udel.edu) and [mcorrozi@udel.edu](mailto:mcorrozi@udel.edu). Thank you for considering.

Warmly,

Gerald J. Kauffman, Director  
University of Delaware  
Water Resources Center  
Newark, DE 19716

Martha B. Narvaez, Associate Director  
University of Delaware  
Water Resources Center  
Newark, DE 19716





Come to Bratfest!

Institute for Public Administration Water Resources Center  
DGS Annex | 261 Academy St.



## 24th ANNUAL BRAT FEST

PLEASE JOIN US ON

Friday, May 10, 2024

12:30 p.m.



Regular and Vegan Brats, Hot Dogs, Kraut, Picnic Salads

Featuring food from The Mexican Post



Come See Peanut and Special Guest!





# University of Delaware Excellence in Water Resources Scholarship Medal (2024)







Future University of Delaware Water Resources Center Building



# 8. Luncheon

