2026 Fall Art & Science Poster Session

ABSTRACT BOOK

Memorial Union | University of Wisconsin - Madison

Welcome to the Water@UW-Madison Fall Art & Science Poster Session!

This abstract book showcases the breadth of water-related research, community engagement, and creative projects taking place across the University of Wisconsin–Madison campus and partner institutions.

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ART & CREATIVE PROJECTS

1 | Common Water - A Community Art Project

Presenting Author: Ian Vierck
Affiliation: Working with Sea Grant and Discovery Building
Authors: Ian Vierck

Common Water is a community art project connecting us to Wisconsin lakes and the people who look after them. For almost forty years volunteers have measured our lakes'clarity with a simple black-and-white disk and recorded each lake's color. Here, you can join them: pick your lake, find its color category, and answer a few quick questions. Your tile becomes part of a shared artwork, unveiled next spring at the Wisconsin Institute for Discovery.

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2 | Print Your Watershed

Presenting Author: Water@UW-Madison Student Group
Affiliation: Water@UW-Madison

This interactive display invites attendees to get their hands wet and make a collaborative, on-site piece. Participants can pick from six pre-carved linoleum blocks that might represent what water means to them or write their own reflection. Then, they'll ink them and make their very own block print to hang up or take home. We hope that collectively making art together can spur conversations about collectively caring for the watershed we all share.

CONTAMINANTS & ECOTOXICOLOGY

3 | Aquatic Chemistry at UW-Madison: Fate and transformation of organic contaminants

Presenting Author: Zhao Yang
Affiliation: Department of Civil and Environmental Engineering
Authors: Alissia M. Milani, Adriana A. Agosta, Samantha G. Summerfield, Benjamin Fry, Zihang Wang, Christina K. Remucal

The Remucal research group investigates processes that degrade organic contaminants in natural and engineered systems. Organic contaminants, such as pesticides, pharmaceuticals, and industrial chemicals, enter the environment through runoff and wastewater effluent. These contaminants can have negative impacts on the environment and can be harmful to human health if found in drinking water sources. These compounds may degrade in the environment via photochemical reactions (reaction with sunlight), microbial processes, or oxidation via naturally occurring minerals. Certain compounds like PFAS (per- and polyfluoroalkyl substances) do not have any known natural degradation pathways, and therefore pose a serious concern to human and environmental health. In engineered systems, processes are designed to

remove certain organic contaminants. In the Remucal research group, we study how these organic contaminants behave in the environment and their potential treatment processes.

4 | Identifying the reactivity of photochemically produced reactive intermediates with dissolved organic matter

Presenting Author: Samantha Summerfield
Affiliation: Civil and Environmental Engineering Department
Authors: Samantha Summerfield, Edward Kostelnik, and Christina K. Remucal

Photooxidation of dissolved organic matter (DOM) plays a critical role in the carbon cycle in surface waters by altering the composition of DOM (i.e., partial photooxidation) and by releasing carbon dioxide (i.e., complete photooxidation). Photooxidation can happen through direct photolysis, in which light is directly absorbed by DOM, and through indirect photolysis, in which photochemically produced reactive intermediates (PPRI) transform DOM. However, the relative contributions of direct and indirect photolysis to DOM transformation, as well as the roles of individual PPRI, are unclear. To investigate these processes, we conducted photolysis experiments with a series of quenchers to selectively remove specific PPRI including furfuryl alcohol (singlet oxygen; $^1O_2$), sorbic acid (triplet state DOM; ^3DOM), and isopropyl alcohol (hydroxyl radical; ·OH), as well as a combination of all three quenchers to investigate direct photolysis. Samples were collected from eleven lakes with differing trophic status to investigate the influence of DOM composition on PPRI reactivity. These samples were analyzed at the molecular level using Fourier transform-ion cyclotron resonance mass spectrometry (FT-ICR MS) before and after irradiation. Changes in DOM composition indicated that both direct photolysis and all three studied PPRI contributed to DOM partial photooxidation, although the relative importance of each mechanism varied depending on the initial DOM composition. For example, indirect photolysis produced more reduced and aliphatic DOM, with hydroxyl radical is primarily responsible in dystrophic Trout Bog. Overall, these results give insight into the complex mechanisms of DOM photooxidation in inland lakes.

5 | PFOS in Surface Water Predicts PFOS Concentrations in Fillets of Freshwater Fish

Presenting Author: Patrick Gorski
Affiliation: WI DNR
Authors: Meghan Williams, Michael Shupryt, Patrick Gorski, Summer Streets

Perfluorooctane sulfonate (PFOS), a member of the per- and polyfluoroalkyl substances family, is highly bioaccumulative and remains a persistent public health concern for consumers of wild freshwater fish. However, testing fish tissue for PFOS is time-consuming, costly, and requires fish mortality. To reduce these costs by furthering the understanding of controls on PFOS bioaccumulation, we analyzed 3,831 paired fish tissue and surface water grab samples collected between 2006-2023 from 185 sites in Colorado, Minnesota, and Wisconsin. We found that surface water samples reliably predict PFOS concentrations in fish fillets. Species-averaged tissue PFOS scales log-linearly with water PFOS (R^2 = 0.57). Adding fish taxonomy modestly improves fit (R^2 = 0.70) while fish length, feeding guilds, and habitat preferences contribute little compared with water concentration. Decision tests tied to common fish consumption advisory targets (5.3-200 ng/g) yield surface water thresholds of ~2.3-26.2 ng/L and strong classification

abilities (AUC 0.85-0.97). We posit that surface water PFOS is a practical, defensible proxy for fish PFOS that can accelerate protection while improving efficiency. Regulatory agencies could adopt a tiered framework using surface water PFOS concentrations to triage waterbodies for fish sampling, thus reducing costs, limiting fish mortality, and enabling timely, consistent advisories.

6 | Exploration of 6PPD and Metabolic Derivatives: Projected Toxicity in Human ABL1

Presenting Author: Trisha Tewari
Affiliation: University of Wisconsin - Madison
Authors: Ryan Evers, Michaela Frye, Richard Le, Naomi Meng, Trisha Tewari, Kyoungtae Kim

N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) is an organic chemical that has been utilized as an antidegradant since the 1970s, specifically use in vehicle tires and industrial rubbers. Within recent years, it has been shown that the runoff of 6PPD's downstream oxidation-related product, 6PPDQ, can be detrimental to aquatic life and mainline ecosystems. This discovery has led to several developments regarding 6PPDQ's impact on the environment. However, the universal contamination of 6PPD in human-populated regions demands that its impact on humans be adequately addressed as well. We aimed to identify toxicity within human systems alongside the mechanisms of these interactions. To do this, we gathered accurate models of 6PPD, 6PPDQ, and four other notable metabolites based on insights from Song et al. (2024). Web-based services were utilized to highlight pathways and cellular networks at risk. AutoDock Vina analysis revealed that ABL1, a tyrosine kinase protein, exhibited a strong binding affinity to our chemicals. We tested three separate PDB models of ABL1 in GROMACS with differing conformations. From these simulations, we conducted kinetic analysis and reconstructed the binding mechanisms that our complexes showcased. Our data demonstrates that many of the toxicants were able to act as putative type I ATP-competitive, type II ATP-competitive, and allosteric inhibitors depending on the conformation of the structures. Many of the binding modes were found to resemble known synthetic inhibitors such as dasatinib, imatinib, and PD180970. However, bulky derivatives were found to be able to exhibit unique yet effective binding pathways that are dissimilar to current synthetic inhibitors. The effects shown of 6PPD and its derived products into ABL1 along with their mechanisms for toxicity are significant for understanding how they may affect cellular pathways in the environment. It is essential to note that other similarly structured proteins may experience comparable inhibition due to the universal nature of these toxicants' binding pathways. Over-expressive cells, such as stem and cancer cells, are discussed regarding predicted toxicity and application. To validate the findings of our computational molecular dynamics (MD) simulations, we plan to conduct future in vitro experiments with 6PPD and its derivatives.

7 | Assessing the Vulnerability of a Native Great Lakes Fish: Nanoplastic Toxicity in Embryonic Walleye (Sander vitreus)

Presenting Author: Jack Conto
Affiliation: Molecular and Environmental Toxicology
Authors: Jack Conto, Haoran Wei, Mohan Qin, Sarah Janssen, Gavin K. Dehnert

Microplastic (MP) pollution is a ubiquitous environmental challenge, yet research often overlooks nano- and low-micrometer microplastics (NLMMPs, <100 Âµm) in freshwater ecosystems like the Laurentian Great

Lakes. While previous fish toxicology studies primarily focus on adult life stages and larger particle sizes, the critical embryonic stage and smaller particles pose unique physiological risks that remain under-investigated in native species. To understand the impacts on Midwest U.S. ecosystems, this study investigated the size- and concentration-dependent impacts of fluorescent polystyrene (PS) nanoplastics on embryonic Walleye (Sander vitreus), a native Wisconsin freshwater fish. Directly after fertilization until shortly before hatch (~9 days), Walleye embryos (n = 720) were exposed to two PS particle sizes (25 nm and 1000 nm) at nominal concentrations of 0, 1.0, 10.0, and 100.0 mg PS L-1 H2O. Using a static renewal exposure design, we evaluated multiple toxicological endpoints: survival, hatch success, deformities, respiration rates (MO2), and corrected total cell fluorescence (CTCF). We hypothesized that toxicity would be size-dependent due to the size-selective filtering role of the protective chorionic membrane. Preliminary findings suggest that while acute mortality was minimal across groups, exposure to the smaller 25 nm particles significantly altered respiration rates and led to higher tissue accumulation compared to the 1000 nm particles. These results indicate that smaller nanoplastics can bypass embryonic defenses, posing a unique threat to early development in native fish species. This study provides the first toxicological baseline for nanoplastic exposure in this ecologically and economically vital species.

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8 | Evaluating the health impacts of PFAS exposure on Tree Swallows, House Sparrows, and House Wrens in the Yahara Lake Chain

Presenting Author: Liem Nguyen-Rivers
Affiliation: UW Madison Genetics Department
Authors: Liem Nguyen-Rivers, Eve Milusich, Gavin Dehnert

Per and polyfluoroalkyl substances (PFAS) are a group of highly stable and persistent compounds, commonly known as forever chemicals. High levels of PFAS exposure can negatively impact the immune system, organ function, and cause reproductive damage. PFAS are found in the groundwater, surface water, soil, and air across the world and can accumulate in animals through drinking water and food consumption. Therefore, to further understand how PFAS moves throughout a semi aquatic food web, we surveyed the nests of three different bird species (Tachycineta bicolor, Troglodytes aedon, and Passer domesticus) with differing diets (e.g., aquatic insectivores, terrestrial insectivore, and omnivore) and collected nestlings and eggs. For each species, we measured morphological endpoints of the nestlings and tested the blood and eggs for 40 PFAS using EPA1633a method. Additionally, we conducted blood smears to measure Total white blood cells and individual cell type counts to understand potential impacts on the innate immune system. We found that tree swallows and house wrens differed significantly in total white blood cell count, and that birds from lakes with high PFAS levels tended to have lower total white blood cell counts. Additional research and more data could aid in determining if these immune differences are related to individual PFAS or groups of PFAS, which could help us better understand how PFAS moves through the freshwater food webs and impacts wildlife.

SENSING & DETECTION TECHNOLOGIES

9 | Engineering Novel Janus Gold Nanorods as a Platform for Smartphone-Based Lead Detection

Presenting Author: John Gorman
Affiliation: Environmental Chemistry & Technology Program (Civil and Environmental Engineering)
Authors: John Gorman, Ben Hein, Haoran Wei

While there is no safe limit for lead in water, the EPA sets an action level at 10 ppb1. Unfortunately, exceedances are common in states with a high number of remaining lead service lines. While at-home lead tests exist, they are often unreliable, highly subjective, or have poor limits of detection. The goal of this project is to develop an inexpensive and simple smartphone-based lead sensor based on thiosulfate leaching of novel gold Janus nanorods (AuJNR). AuJNR hold many unique optical properties stemming from their delocalized electron cloud, size, and shape, including an unusually strong absorbance peak at around 850 nm. The exact absorbance wavelength and intensity shift linearly with a change in the length of the AuJNR; the length, in turn, can be controlled via chemical leaching using combination of thiosulfate and 2-mercaptoethanol. Critically, lead predictably catalyzes this reaction, meaning it can be used to quantify the concentration of lead in water. Initial testing indicates that this technique can quantify lead down to the 2.5 ppb level, well below the EPA's action level for remediation. Moreover, low-cost smartphone apps already exist to monitor absorbance spectra and when used in combination with this AuJNR sensor, can provide a far superior at-home analysis compared to test strips at a similarly low cost. Such studies can both serve to enrich the scientific community by providing long-term data on water quality changes while also supporting community water monitoring efforts in the short term and bolstering support for regulatory change to keep people safe.

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10 | Detection of Neonicotinoid Pesticides in Environmental Water Matrices Using Machine Learning-Assisted Surface-enhanced Raman Spectroscopy

Presenting Author: Alex Taylor
Affiliation: Department of Civil & Environmental Engineering
Authors: Alex Taylor, Devano Bethel, Shiqing Cai, Haoran Wei

Neonicotinoids are a widely used class of water-soluble insecticides that can persist in the environment. In 2025, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) detected these contaminants in our water supply, highlighting a concern for environmental pollution and public health. This necessitates the need for a form of rapid detection of neonicotinoids and their metabolites. Research on utilizing surface-enhanced Raman spectroscopy (SERS) for neonicotinoid detection serves as a relatively inexpensive and faster alternative to liquid chromatography tandem-mass spectrometry (LC-MS/MS), a primary analytical method of detection. However, SERS data can be voluminous and complex, making analysis less reliable in practical settings. Our study therefore aims to mitigate these challenges of SERS by utilizing machine learning (ML) in tandem to further develop a standardized procedure of detection. We collected SERS spectra of thiamethoxam-desmethyl at concentrations ranging from 10 ÂµM to 1 nM in three different water matrices: deionized water, tap water, and groundwater. Samples were prepared using the corresponding water matrix, potassium sulfate, and citrate-coated gold nanoparticles. A random forest regression model was developed to quantify thiamethoxam-desmethyl across the concentration ranges, resulting in an R2 of 0.82 and an RMSE of 0.66 ÂµM across the different water matrices. Our model

demonstrates consistent performance across matrices, suggesting the potential of combining ML with SERS for reliable neonicotinoid detection in varying environmental water samples. This approach helps to standardize the complex data analysis of SERS which further establishes it as a practical form of neonicotinoid detection.

11 | Light Work: A two-pronged approach to the photo-enabled detection of low-affinity pesticides using surface-enhanced Raman spectroscopy

Presenting Author: Keni Bai
Affiliation: Water Science and Engineering Laboratory
Authors: Keni Bai, John Gorman, Ben Hein, Haoran Wei

Surface-enhanced Raman spectroscopy (SERS) can support water quality monitoring, but detecting compounds with low affinity for nanoparticle surfaces remains challenging. This study explores light-assisted detection of the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) using gold nanoparticles (AuNPs), peroxydisulfate (PDS), and photochemical transformation. AuNP suspensions containing 2,4-D or candidate transformation products, 2,4-dichlorophenol and 2-chloro-1,4-benzoquinone, were examined under dark and simulated sunlight conditions, with and without PDS. SERS spectra collected at different reaction times revealed compound-specific responses to irradiation and PDS addition. The 2,4-D spectra evolved over time, while 2,4-dichlorophenol showed pronounced time-dependent changes with PDS. Shared features between irradiated 2,4-D and the benzoquinone reference system suggest possible transformation-related contributions to the spectra. Product identity requires confirmation using independent analytical methods. These findings highlight the importance of controlling reaction conditions for reliable detection. Future work will investigate how polymerization and phototransformation jointly influence SERS signals and evaluate their relationship with initial 2,4-D concentration.

12 | Design and Characterization of Oscillating Grid Turbulence Tank for Plastic-Microbes Interactions in Large Water Bodies

Presenting Author: Saurabh K Gupta
Affiliation: University of Wisconsin Madison, Mechanical Engineering
Authors: Saurabh K Gupta, James Rice, Fuad Shatara, Nimish Pujara, Erica Majumdar

Isotropic stationary turbulence is the simplest case of turbulence with unique characteristics and has been widely used in theoretical analysis of turbulent flows. Water-or wind-tunnel oscillating grid turbulence (OGT) is another method used to generate isotropic stationary turbulence by a planar grid/mesh vibrating perpendicularly to its plane as shown in figure 1. Recent studies have shown that OGT-based experiments can be designed to replicate the turbulent conditions seen in large bodies of water. Similar experiments can be used to study the interaction between turbulence and microplastics distributed in large bodies of water. The Great Pacific Garbage Patch is one such collection of marine debris in the North Pacific Ocean. These patches are formed by non-degradable plastic and can be found in any large water bodies viz. Lake Superior, Lake Erie. These plastics remain on the surface, decompose into microplastics, and cause algal growth below the surface which is dangerous for marine life. This study aims to replicate lake-type turbulence using a benchtop turbulence tank with an oscillating grid and analyze the flow using 2D- planer particle image velocimetry (PIV) for a homogeneous, isotropic turbulence field in the motor-on case and

decaying velocity and turbulence fields with the motor off.

HYDROLOGY, WATERSHEDS & ECOSYSTEM RESTORATION

13 | Targeting Fertilizer Management Hotspots Accelerates Nitrogen-Load Reductions Across the Mississippi-Atchafalaya River Basin

Presenting Author: Hai Huang
Affiliation: Department of Soil and Environmental Sciences
Authors: Hai Huang; Chaoqun Lu

Nitrogen losses from agricultural land in the Mississippi-Atchafalaya River Basin contribute to low-oxygen conditions in the Gulf of Mexico. Improving fertilizer management can reduce these losses, but where should management efforts be focused to deliver the greatest downstream benefits? We combined county-level, crop-specific nitrogen budgets with indicators of leaching potential and downstream transport to identify priority areas for fertilizer management. We then used the Dynamic Land Ecosystem Model (DLEM) to evaluate changes in fertilizer rates and application timing, comparing basin-wide implementation with management focused on priority areas. Model performance was evaluated against river discharge records, nitrogen-load estimates, and corn and soybean yield data. Our simulations suggest that matching fertilizer rates to agronomic recommendations and improving application timing could reduce nitrogen delivery to the Gulf by approximately 14% on average under basin-wide implementation. Targeting priority areas covering just 15% of the basin could achieve roughly half of that potential benefit. These findings highlight the importance of connecting farm management decisions with downstream water quality. Financial and technical support for farmers in priority areas, including payments to offset potential yield losses, could help translate improved fertilizer practices into cleaner rivers and a healthier Gulf.

14 | Water, Ecosystems, and People at UW-Madison

Presenting Author: Carolyn Voter
Affiliation: Department of Civil and Environmental Engineering
Authors: Dannielle Pratt, Rachel Zobel, Omowumi Erukubami, Austin Farnum, Emma Ruggiero, Mira Potter, Emily Berger, Catherine Hunt, Aaron Alexander, Carolyn Voter

Across the world, urban areas are expanding, agricultural demand is intensifying, and natural hazards pose an ever-present threat. In the Water, Ecosystems, and People research group at UW-Madison, we characterize these challenges and potential solutions by quantifying and predicting how water moves through our environment, interacting with ecosystems, communities, and built infrastructure. We do this using hydrologic models, data, and stakeholder engagement. Here, we showcase examples of recent and current projects.

15 | Automating Forest Road Extraction in the Driftless Area

Presenting Author: Leah Beltran
Affiliation: Eric Booth Lab, WEI, Nelson Institute for Environmental Studies
Authors: Eric Booth, Leah Beltran

Forest roads can increase runoff which can impact water quality both in streams and lakes by increasing sediment load and nutrients, which can lead to excessive nutrients in nearby water bodies leading to algal blooms. Despite the impact of forest roads on water quality and the landscape, there are limited automation methods of extracting forest roads. Previously extracting forest roads was done by hand or semi automation methods. Advances in LiDAR have improved the ability to use digital elevation models to look at the landscape. By exploring and expanding on previous semi- automation and combining with deep learning tools in ArcGIS the objective of this study is to fully automate the road extraction workflow roads. This study aims to use publicly available LiDAR and machine learning to automate forest roads and extract them from La Crosse county. The model was cross trained with a previous machine learning model and used digitized roads from La Crosse as training material. The model is moderately successful at extracting and identifying roads. The overall classification accuracy was 97.4%, however when predicting roads the users accuracy was 58.7% while predicting non roads the model had an users accuracy of 99.2 %. These results suggest that the model did successfully identify most road pixels and it also often misclassified non-roads as roads. These findings demonstrate the potential of automation using machine learning and LiDAR data allowing for larger scale road assessments to inform best management practices across different watersheds.

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16 | Quantifying Effects of Watershed-Scale Peatland Restoration on Groundwater Storage Regimes and Hydrologic Exchanges

Presenting Author: Jillian Lukez
Affiliation: Civil & Environmental Engineering
Authors: Jillian Lukez, Steven P. Loheide II

Wetlands, specifically peatlands, provide invaluable carbon sequestration and flood mitigation benefits. Peat accumulated between sand dunes in the Necedah National Wildlife Refuge (NNWR) in central Wisconsin over thousands of years, but degradation was rapid. The construction of incised drainage ditches for agriculture in the early 1900s altered aquifer-floodplain connections. Straightened flow paths result in frequent flooding of low-lying roads, causing an economic burden for nearby townships. Project partners at NNWR are employing restoration techniques to fill the ditches and enhance floodplain connectivity. Historical trends and future predictions indicate that precipitation is likely to increase in south-central Wisconsin, furthering the need for peatland restoration as a nature-based solution. Previous research, primarily in semi-arid regions, broadly agrees that ditch plugging increases groundwater (GW) storage and reduces peak streamflow rates. This study will investigate variations in flow gradients, hydraulic properties, and GW storage to quantify immediate restoration impacts on peatlands in a humid continental climate. Preliminary results from water table depth measurements indicate that peatlands are dynamic systems that respond rapidly to hydrologic events and restoration. Steeper gradients are observed from the floodplain to incised ditches, resulting in shorter flow paths and residence times that increase the risk of downstream flooding. The previously restored site experiences fewer extreme fluctuations and consistently saturated peat. Additionally, soil tests comparing hydraulic conductivity and water retention properties of peat will

quantify changes in water storage capacity. Investigating the hydrogeologic outcomes of peatland restoration will provide a scientific basis for future efforts that enhance ecosystem resilience.

17 | Water-related Research and Outcomes, Wisconsin Geological and Natural History Survey

Presenting Author: Sue Swanson
Affiliation: Wisconsin Geological and Natural History Survey

The Wisconsin Geological and Natural History Survey (WGNHS) conducts earth-science surveys, field studies, and research. We provide objective scientific information about the geology, water resources, and mineral resources of Wisconsin. We collect, interpret, disseminate, and archive natural resource information, and we communicate the results of our activities through publications, technical talks, our website, social media, and responses to inquiries from the public. These activities support informed decision making by government, industry, business, and individual residents of Wisconsin. This poster provides summaries of the variety of baseline datasets developed and curated by WGNHS, as well as statewide, regional, county, and local hydrologic studies conducted by WGNHS scientists.

POLICY, COMMUNITY RESILIENCE & PUBLIC HEALTH

18 | Mapping Irrigation Technologies and Efficiency Across U.S. Agricultural Fields to Support Sustainable Water Management

Presenting Author: Karthik Ramaswamy
Affiliation: Nelson Institute for Environmental Studies
Authors: Karthik Ramaswamy, Tyler Lark, Yanhua Xie, Nazli Uludere Aragon

Irrigation is essential to agricultural production across the United States, but the technologies used to deliver water vary widely across crops, regions, and individual fields. Understanding this variation is important for identifying opportunities to improve irrigation efficiency and support sustainable water management. However, existing irrigation-efficiency information is largely available at aggregated spatial scales, limiting its usefulness for field-specific assessments. We present a spatially explicit framework for estimating irrigation-system types and application efficiency across U.S. irrigated cropland. Our approach integrates U.S. Geological Survey (USGS) hydrologic-unit-level irrigation-efficiency estimates, state- and crop-specific irrigation-system fractions, field-level crop information, and modeled center-pivot irrigation evidence. By combining these datasets, we estimate field-level probabilities of surface, sprinkler, and drip irrigation and derive corresponding probability-weighted application-efficiency estimates. This framework provides a more spatially detailed understanding of irrigation practices and highlights areas where existing technologies may offer opportunities for efficiency improvements. We also explore how these estimates can inform a decision-support framework for evaluating irrigation-system upgrades based on local agricultural and environmental conditions. Our work connects large-scale water-resource assessments with field-level irrigation management, providing a foundation for more targeted and informed agricultural water-management decisions.

19 | Beyond Great Lakes Shoreline Protection: Rethinking Public Use in Nature Based Solutions

Presenting Author: Xiaoyue Wang
Affiliation: Smithgroup

Nature based shoreline approaches are increasingly used to address erosion, flooding, and ecological degradation, yet many shorelines also function as public landscapes. This study compares selected shoreline classification frameworks from academic literature, public agencies, and Great Lakes guidance, examining both their underlying classification logic and how they account for public use. Each framework is coded for what it classifies, the basis of its categories, and whether public use is absent, treated as a constraint, framed as a co-benefit, or used to distinguish types. Building on the review, the study explores how public use considerations can complement protective and ecological objectives in the planning and design of multifunctional resilience infrastructure along Great Lakes shorelines.

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20 | Watershed Resilience and a Community-Based Approach for Monitoring Chloride in Starkweather Creek, Madison

Presenting Author: Matt Noone
Affiliation: State Cartographer's Office
Authors: Matt Noone, Melissa Michaud, Liz Levy, Mike Hasinoff, Howard Veregin, Cory Rich, Lance Green, Phil Gaebler, Collin Roland, Nicolas Buer, Anna Bierbrauer, Peter Jaeger, Sam Blackburn, Kyle Minks

This poster highlights a chloride-monitoring program in Starkweather Creek on Madison's east side. The program is supported by a partnership of government, non-profit and academic partners. A network of continuously operating conductivity meters have been in the creek for several years, which clearly document the temporal variations in the creek's chloride levels. Our longer-term goals focus on building watershed resilience, improving the health of the creek and educating the next generation of environmental stewards.

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21 | Preliminary Results of Systematic Map of Climate Mitigation Water Health Impacts

Presenting Author: Jennifer Bratburd
Affiliation: SAGE
Authors: Jennifer Bratburd, Jonathan Patz

Climate change increases many risks to public health, and many climate mitigation actions can have major non-climate related health benefits, including impacting water-related challenges. While air pollution, nutrition, and physical fitness are most well-known climate mitigation co-benefits, water-related health effects remain an important and less explored in the context of health and climate mitigation. To identify key gaps in the decarbonization benefits literature, we systematically mapped the abundance of published evidence on health-relevant climate mitigation water co-benefits. From an initial search with over 4,000 hits, we screened published, peer-reviewed articles for climate mitigation policies, description of water co-benefits and health co-benefits. The greatest abundance of evidence was centered around agriculture,

especially on mitigation of GHG emissions via dietary shifts from meat-based diets to plant-based diets. Other agricultural shifts included shifting water management practices, shifting from synthetic fertilizers, and other land use practices. Other sectors with linked water benefits included energy, land use, built environment, waste management, and industry. While some studies linked water availability and water quality with health outcomes, most focused on other health benefits (nutrition, air pollution), often leaving health benefits of water unquantified. Addressing data and tools gaps to enable easier quantification of health benefits from water quantity and quality could help optimize climate mitigation strategies that effectively address water issues. These benefits could also help motivate decision-makers to take actions that simultaneously address water and climate mitigation.

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22 | Community Engagement Conversation Café

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The benefits of community-engaged research (CER) are manifold in today's world, including building trust in science and its outcomes, and increasing the uptake and application of scientific findings by centering community priorities. And yet in a world where time and resources are increasingly constrained, this type of research can feel out of reach for many. This interactive poster welcomes conversation with anyone who is interested to learn more about how they can initiate research that is better aligned and responsive to community needs. Have questions on how to get started in community partnership? Want to know more about the process or best practices? Attendees are also welcome to share stories based on their own experiences with community engagement.
