



SWS 2021 Annual Meeting

Tuesday, Jun 01

08:00 AM - 08:35 AM

P1: A global treaty for wetlands exists since 50 years. What's in it for humanity's current challenges and for scientists?

Martha Rojas Urrego

Secretary General, Convention on Wetlands

2021 marks the 50th anniversary of the adoption of the 'Convention on Wetlands' in the city of Ramsar, on 2 February 1971. The treaty covers all water-related ecosystems, from upstream glaciers and freshwater sources to coastal marine areas, including rivers and lakes, mangroves and peatlands, marshes and reefs. The 1960s marked a turning point, when early results of modern wetland research started to gain attention by policy-makers and finally led to the adoption of the Convention. There was an initial focus on migratory waterbirds, useful biodiversity indicators and appreciated game. However, the Wetland Convention gradually developed and implemented its much ...

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S1: Working in Wetlands I - Leveraging Non-traditional Experiences as a Student & Early Careers in Private Sector, GIS & Academia (Co-Sponsored by South Central Chapter and Student Section)

The South Central Chapter, Education Section and Student Section of the Society of Wetland Scientists (SWS) would like to co-host its third multi-sectional symposium, entitled Working in Wetlands. This year, invited presenters will include a combination of professionals, recent graduates, and students working in the wetland science field. The symposium will consist of three, 100-minute blocks, with four speakers in each block and the target audience will be wetland professionals currently in the work force, students, and recent graduates. The first 5 minutes of each block will be used as an introduction by the moderator. Each speaker will give a ...

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S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States I

The main goal of these sessions is to revisit, discuss, and integrate current science and federal and state policies and management perspectives concerning regulation of activities that occur in waters/wetlands in headwater landscape settings. In this election year, either there will be great turnover or not in the leadership of key U.S. Federal agencies charged with managing and protecting our waters. In response to the resolution of the U.S. Federal regulatory structure in 2021, States, Conservation organizations, and scientists will respond accordingly - either significantly changing current approaches or staying the present course. Either direction will have direct consequences on ...

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Introduction S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States I

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S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research I

Coastal wetland environments, where terrestrial and aquatic ecosystems converge, represent unique habitats facilitating complex interactions of climate, hydrology, species and human management. They provide countless ecosystem services, significant carbon storage, and shoreline protection from erosion and flooding. The structure, function, and critical ecosystem services of coastal wetlands are extremely sensitive to changing environmental conditions resulting from climate-induced disturbances (e.g. storms, sea-level rise, eutrophication, invasive species, etc), resulting in a critical need for coastal scientists to understand how these systems will adapt to these environmental changes. This symposium aims to facilitate discussion of coastal science in a changing world across an ...

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Introduction S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research I

Amy Borde
Earth System Scientist, Earth Scientist

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S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands I

Climate and land-use change are two major drivers that are known to impact the abiotic and biotic processes of prairie-pothole wetland ecosystems. Many decades of long-term monitoring of prairie-pothole wetlands has led to the development of statistical and mechanistic models used to explore how these ecosystems are impacted by climate and land-use change at various spatial and temporal scales. The bulk of the current research has focused on the responses of prairie-pothole wetlands to changes in either climate or land use while hypothesizing synergistic interactions among the drivers on ecosystem processes. The objective of this symposium is to bring together ...

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Introduction S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands I

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Understanding the response of coastal forest carbon cycling to changing salinity and moisture content: a soil transplant experiment

Anya Hopple

Postdoctoral Research Associate, Pacific Northwest National Lab

Anya Hopple, Ben Bond-Lamberty, Edward Brzostek, Nanette Raczka, Nicholas Ward, Patrick Megonigal, Stephanie Pennington, Vanessa Bailey Coastal terrestrial-aquatic interface ecosystems may exhibit particular sensitivity to changes in climate and sea level, but how changes in water availability and salinity may affect soil and ecosystem carbon cycling is poorly understood. As a part of a broader effort to understand coastal ecosystem resilience and responses to future change, this experiment took advantage of a natural salinity gradient in a tidal creek at the Smithsonian Environmental Research Center (SERC) in eastern Maryland, U.S.A., to examine how soil processes and structure may change under novel ...

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Using process-based modeling to quantify relative impacts of climate shifts and consolidation drainage on prairie-pothole wetlands

Owen McKenna

Research Ecologist, USGS Northern Prairie Wildlife Research Center

Owen McKenna, David Mushet, Samuel Kucia Prairie-pothole wetlands provide critical habitat necessary for supporting North American migratory waterfowl populations. However, climate and land-use change threaten the sustainability of these wetland ecosystems. Very few experiments and analyses have been designed to investigate the relative impacts of climate and land-use change drivers as well as the antagonistic or synergistic interactions among these drivers on ecosystem processes. Prairie-pothole wetland water budgets are highly dependent on atmospheric inputs and especially surface runoff, which makes them especially susceptible to changes in climate and land use. Here, we present the history of prairie-pothole climate and land-use change ...

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Bridging the Gaps: Building a peer-mentoring and leadership network for students in SWS

Steffanie Munguia

PhD Student, Florida International University

Scientific societies like the Society of Wetland Scientists are critical to building and maintaining robust professional networks, especially for students. Yet they often fall short on delivering on a key component of this: opportunities for leadership. Academic juniors are invited into these spaces to learn the dominant culture, a process of academic assimilation, with little consideration for the bidirectional nature of relationships. This leads to vast disparity in the demographic makeup of leadership and can contribute to organizational stagnation. One opportunity to bridge these gaps is through peer-mentoring of students to develop deeper organizational knowledge and leadership capacities. In 2020, ...

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Working with Tribes to Build Wetland Program Capacity and a Nationwide Framework for Advancement

Marla Stelk

Executive Director, Association of State Wetland Managers

Marla Stelk, Andrew RobertsonThe Association of State Wetlands Managers (ASWM), through partnership with Geospatial Services (GSS) at Saint Mary's University of Minnesota and U.S. EPA Region 10, has been performing outreach to tribal wetland program staff across the nation to better understand their unique wetland program development needs. This effort has led to the development of a series of tribally specific wetland program webinars (with the help of an advisory group from the Pacific Northwest Tribal Wetland Working Group, aka "TWIG") and a project proposal by ASWM and GSS to increase the capacity of tribes to protect, restore and mitigate ...

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Clear as Mud: Navigate Private Sector Career Opportunities and Unlock the Hidden Job Market

Laura Duffie

Environmental Scientist, HDR

Many university degree plans funnel environmental students toward traditional academic or government career paths. As a result, new professionals face heightened competition when they utilize the same job boards and apply for the same positions as their peers. If your job hunting methods have proven ineffective, then you may need to update your approach. Consider the numerous, diverse career paths available within the private sector. Geared toward students and new professionals, this presentation provides the framework needed to accelerate your career development. Learn how to navigate private sector environmental career opportunities by unlocking the hidden job market! What are private ...

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Simulating catchment response to climate and land use change using catchment classification and virtual basin modelling

Christopher Spence

Environment and Climate Change Canada

Christopher Spence, Balew Mekonnen, Colin Whitfield, Jared Wolfe, John Pomeroy, Kevin Shook, Zihua HeHistoric and projected climate change in addition to constantly evolving agricultural practices make it difficult to disentangle the influence of climate and land use decisions on Canadian Prairie streamflow regimes and water availability. This paper aims to describe the development and application of a basin classification-based virtual model platform that can be used to enhance understanding of how climate and wetland drainage each control Prairie basin hydrology. Each 100 km² basin in the Canadian Prairie ecozone was classified into one of seven types using a hierarchical clustering ...

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Tribal Wetland Programs and Capacity Building to protect, restore, and manage wetland and aquatic ecosystems.

Linda Storm

Wetland and Aquatic Ecologist, U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency Region 10 works with tribal partners to support their development of Wetland Programs with grant funding and technical assistance. Tribal Wetland Program Plans (WPP) often include and address tribal cultural values and traditional ecological knowledge to achieve tribal program goals and objectives. Core elements of WPPs, such as monitoring and assessment, voluntary restoration and protection, regulatory program development, and in some cases development of water quality standards, are all potential elements of a wetland program. Additional elements may also be incorporated into plans, such as educational curriculum, elder and youth knowledge and practice exchanges, and ...

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Formation of a Mid-Atlantic Ghost Forest

Keryn Gedan

Assistant Professor, George Washington University

Keryn Gedan, Matthew Kirwan, Sergio Fagherazzi When sea level rise and saltwater intrusion kill trees at the coastal interface, creating a ghost forest. In the Mid-Atlantic, ghost forests are rapidly expanding to become a substantial part of the coastal landscape, and more information is needed on the ecological and hydrological changes that occur during forest retreat and marsh migration to inform conservation and predictive efforts for both habitats. This study used a space-for-time substitution to understand the turnover of plant species during ghost forest formation at the Virginia Coast Reserve, a Long-Term Ecological Research site. We surveyed vegetation in eight large ...

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Beginning a Career in Ecological Restoration and Planning: Perspectives From an Entry-Level Environmental Scientist

Joe Garner

Environmental Scientist, GreenVest

When I learned in college that you could make a career out of designing and restoring ecosystems, I was hooked. While I was in school, I accepted a position with a restoration construction company that allowed me to get my hands dirty and learn the basics about ecological restoration. This led to a career in construction oversight and GIS on a multitude of restoration projects as an environmental scientist. I have a passion for restoring degraded ecosystems and love working in an industry that is so innovative and relevant in environmental stewardship. This presentation focuses on my experiences as an ...

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Development of a Tribal Wetlands Monitoring and Assessment Program

Jessica Lewis

Environmental Scientist, MS Band of Choctaw Indians - Office of Environmental Protection

The Mississippi Band of Choctaw Indians received an EPA Wetlands Program Development Grant in 2018. The work plan focused on Core Element 1- Monitoring and Assessment and included creating a tribal wetlands inventory, collection of data utilizing drone-based remote sensing, and selecting monitoring and assessment goals. This presentation will provide an overview of the successes, lessons learned, and goals for the development of a Rapid Assessment Method that merges Western Science with Traditional Ecological Knowledge.

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Using WETLANDSCAPE to simulate recent climate trends in the Prairie Pothole Region

Brett Werner

Associate Professor of Environmental Studies, Centre College

Brett Werner, Bruce Millett, Carter Johnson, John Tracy, Richard Voldseth WETLANDSCAPE (WLS) has been developed over 30 years of peer-reviewed scholarship to investigate the role of climate change and agricultural land use (both land cover and agricultural drainage) in prairie wetlands, specifically those in the Prairie Pothole Region of North America. This presentation will demonstrate the power of WLS as a research tool, and the insights into landscape-scale wetland dynamics for the purposes of wetland management and restoration. The system dynamics model currently runs in Stella Architect (ISEE, 2020) and incorporates both surface water and groundwater dynamics using climate data and ...

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Mortality mechanisms for woody plants under changing seawater exposure

Nate McDowell

Dr, Pacific Northwest National Laboratory

There are increasing observations of widespread loss of woody plants from coastal ecosystems due to changes in sea level and storm surges. While research on salinity effects on plants per se are well studied, there is a striking paucity of research on the causes of plant loss from seawater exposure. Here we review the evidence for mechanisms of woody plant mortality under seawater exposure, with a focus on two case studies: one from the Pacific Northwest and another from the Chesapeake Bay. Mortality mechanisms occur both below and above ground, with ion toxicity causing reductions in root survival and photosynthetic ...

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A Collaborative Science Approach to Filling Pacific Northwest Blue Carbon Data Gaps

Craig Cornu

Institute for Applied Ecology

Since the completion of the Verified Carbon Standard's "Methodology for Tidal Wetland and Seagrass Restoration" in 2015, the Pacific Northwest (PNW) Blue Carbon Working Group has been working collaboratively to fill blue carbon data gaps for PNW tidal wetland habitats and associated land uses. The Working Group is a partnership of blue carbon information users comprising biophysical scientists, coastal policy makers and planners, land managers, restoration scientists and practitioners, and others from state and federal agencies, academic institutions, consulting firms, and non-profit organizations primarily, but not exclusively, based on the US West Coast. Several regionally scaled Working Group research projects ...

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3-D hydrologic modeling of the dynamics of wetland habitat networks in the Northern Great Plains

Ganming Liu

Assistant Professor, Bowling Green State University

Links between climatic forcing and wetland habitats can be conceptualized using a graph-theoretical approach, which treats open-water wetlands as nodes to map habitat connectivity and wetland networks for ecological analysis. The first and most crucial step in creating such networks, however, is to characterize the dynamic behaviors of the nodes, i.e., the occurrence of wetlands with ponded water. This study applied a 3-D, fully integrated surface and subsurface flow model, HydroGeoSphere (HGS), to simulate the hydrologic dynamics of wetlands in the northern Great Plains (NGP) and to characterize the resulting habitat networks as responses to climatic variability. Results show HGS ...

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Pyramid Lake Paiute Tribe Wetlands Program: Efforts to preserve and protect the wetlands on the Reservation

Robyn Mercer

Wetlands/Environmental Specialist, Pyramid Lake Paiute Tribe

The Pyramid Lake Paiute Tribe (PLPT) is located 35 miles northeast of Reno, NV, at the bottom of the Truckee River Watershed, where the Truckee River empties into the desert-terminal Pyramid Lake. With approximately 477,000 acres of land, the Reservation has a wide range of habitats, wetland types and natural resources. Within the PLPT Natural Resources Department there are various programs that support and work towards the protection of natural resources on the Reservation. The Wetlands Program, within the Water Quality Program, continues its efforts of preserving wetlands and wetland resources on the Reservation, through innovative restoration, monitoring and outreach ...

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Transitioning from student to professor: dispatches from the front

Cory Shoemaker

Assistant Professor, Slippery Rock University

Many students in wetland science have traditionally aspired to 1) gain a tenure-track faculty position at 2) a university in an area where they want to live and to 3) be able to conduct research that better increases our ability to reclaim, restore, and rewild wetlands. The pathway to this goal is deceptively simple: Go to graduate school, do good research, get an offer, is in reality anything but simple. Extrinsic and intrinsic obstacles such a tight job market, declining college enrollment and concurrent tightening of university budgets, and reaching a work/life balance in a competitive environment face the aspiring ...

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Using strategic science to build a conservation constituency for addressing large-scale stressors on wetlands

Michael Anteau

Research Wildlife Biologist, U.S. Geological Survey

Michael Anteau, Max Post van der Burg, Owen Mckenna Wetland conservation in the Prairie Pothole Region is primarily motivated by waterfowl conservation goals and interests and is largely accomplished with conservation easements and fee title purchases funded by waterfowl hunters. Even with these tools and an engaged user group, wetlands of the Prairie Pothole Region face a myriad of threats due to interacting pressures from climate and land-use practices. Land-use stressors such as sedimentation, runoff, and agricultural drainage, coupled with climate changes, have likely altered dynamics of the Prairie-Pothole ecosystem and increased issues with invasive species. There is mounting evidence that ...

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Pre-Recorded Q&A S1: Working in Wetlands I - Leveraging Non-traditional Experiences as a Student & Early Careers in Private Sector, GIS & Academia (Co-Sponsored by South Central Chapter and Student Section)

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Pre-Recorded Q&A S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands I

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Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

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S1: Working in Wetlands II - How to Transition Your Career into Non-Traditional Wetland Work through Mentorship, Drones, Advocacy and Ecopreneurship (Co-Sponsored by South Central Chapter and Student Section)

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S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States II

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S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research II

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Introduction S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research II

Jianqiu Zheng

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S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands II

Climate and land-use change are two major drivers that are known to impact the abiotic and biotic processes of prairie-pothole wetland ecosystems. Many decades of long-term monitoring of prairie-pothole wetlands has led to the development of statistical and mechanistic models used to explore how these ecosystems are impacted by climate and land-use change at various spatial and temporal scales. The bulk of the current research has focused on the responses of prairie-pothole wetlands to changes in either climate or land use while hypothesizing synergistic interactions among the drivers on ecosystem processes. The objective of this symposium is to bring together ...

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Historical change in Pacific Northwest estuaries: What does it mean for salmon, people, and climate?

Laura Brophy

Director, Estuary Technical Group, Institute for Applied Ecology

In a recent study, we used accurate elevation-based estuary mapping methods to document the historical extent, current extent, and losses of tidal forested wetlands on the Oregon coast, compared to emergent tidal marsh and tidal scrub-shrub wetlands. We found that historically, forested and scrub-shrub tidal wetlands (collectively called "tidal swamp") formed a majority (57.8%) of the Oregon coast's tidal wetland area, with forested wetlands strongly predominating (54.4%). Emergent tidal wetlands ("tidal marsh") occupied a smaller area (42.2%). However, diking and vegetation conversion have resulted in the loss of 95% of historical tidal forested wetlands and 96% of historical scrub-shrub tidal ...

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Novel approaches in wetland restoration: Throwing everything at the wall

Shawn DeKeyser

Dr., North Dakota State University

Nearly all wetland restoration efforts are met with certain successes and failures. Determining success or failure is dependent on the goals set and the level of effort put into the restoration, and constrained by the ecological realities of the site. We restored a wetland/upland area of approximately 19 hectares in southeastern North Dakota, with a goal of restoring a highly diverse native plant community that is functionally similar to intact "natural" wetland plant communities of the ecoregion. Since 2013, the restoration process has involved continuous monitoring, interdisciplinary collaboration, prompt adaptive management in response to emerging challenges, and patience. To date, ...

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My 3-D Trajectory: How to Leverage your Drive, Development, and Dream across the Wetland Sciences

David Riera

Doctoral Fellow, Florida International University

Students of all ages locally and internationally have experienced inequities and diminishing justice across their trajectories to graduate with a degree or to move up the hierarchy of their fields, disciplines, or institutions. Many caught in this wave turn to family, friends, or other professionals as a support network where they build a safe space and place to develop comprehension, efficacy, and agency in order to overcome the sometimes insidious social, economical, and environmental injustices which prevent the individual from developing and growing into a professional with a career and not just a job. Through this account, we will illustrate ...

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Wetlands by Design: Elements of Success for Wetland Program Planning in Tribal Communities

Andrew Robertson

Executive Director, Saint Mary's University of Minnesota

Drawing on examples from a variety of tribal communities, this presentation focuses on the elements of success for Wetland Program Plan design and implementation. Designing a successful wetland plan is a thoughtful and deliberate process that relies on communication, cooperation, applied science, technology and community support. The integration of community goals and objectives and the recognition that partnerships and education are key components are important elements that cannot be understated. Understanding the role that wetlands have traditionally played in tribal culture as well as the importance of wetlands for both current community needs and future goals provides consistency and continuity ...

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New insights on the role of wetlands in conferring watershed hydrologic resistance

Irena Creed

Professor, University of Saskatchewan

Irena Creed, Aleksey Paltsev, Ali Ameli, Charles Lane, Heather Golden, Scott Leibowitz Hydrologic resistance is a watershed's ability to absorb or contend with disturbances while maintaining or quickly recovering hydrologic functional traits. Here, we explore the importance of vulnerable waters – such as wetlands – in conferring a watershed's hydrologic resistance at national scales. We used a framework that quantifies and compares the hydrologic values of wetlands of different types (surface/subsurface), locations (far or near to stream), and connectivity (low versus high connectivity) to explore the relationships between wetlands and hydrologic resistance in relatively undisturbed catchments throughout the conterminous United States. ...

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Wetlands, Drones, and GIS: Combining Your Passions in the Private Sector

Ryan Gay

Environmental Scientist, Whitenton Group

While traveling around the world and serving in the United States Navy, I discovered my first passion and appreciation for diverse ecosystems. Through my travels, I received a firsthand experience of our planet's beauty and majesty and the need to conserve and protect the natural world while ensuring sustainable forward progress. These experiences ultimately led to a career as an environmental consultant. Over the course of my educational career at Texas A&M University at Galveston, I discovered specific areas of interest I became passionate about. I was fascinated by wetlands. Remote sensing became my wetland assessment tool, and GIS helped ...

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Using New Technologies to Meet Tribal Wetland Program Needs

Ferin Davis Anderson

Lead Environmental Scientist, Shakopee Mdewakanton Sioux Community

The Shakopee Mdewakanton Sioux Community (SMSC), located 30 miles southwest of Minneapolis, MN, was awarded an Environmental Protection Agency (EPA) Tribal Wetland Program Development Grant in 2019. The proposal was developed with the intent to advance and refine the SMSC's existing wetland program by focusing on an EPA core element involving monitoring and assessment. SMSC plans to incorporate LiDAR (light detection and ranging) data to examine the location of current and potentially historic wetlands. They will be using a drone (UAV) mounted LiDAR system that collects derivatives based on hydrologic, surface, terrain and landform features with accuracy in the range ...

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Developing a redox network for coastal saltmarsh systems in PFLOTRAN

Teri O'Meara

Smithsonian Environmental Research Center

The Energy Exascale Earth System Model (E3SM) simulates fully coupled processes and interactions between water, energy, carbon and nutrient cycles. However, E3SM connects terrestrial and open ocean ecosystems using a single unidirectional transport term, ignoring coastal dynamics. As a first step to incorporating estuarine habitats, we modified the land component of E3SM (ELM) to mimic both vegetation dynamics and coastal hydrology and updated biogeochemical representations. Biogeochemical reactions currently represented via the coupled ELM-PFLOTRAN interface are limited to carbon and nitrogen cycling. However, PFLOTRAN is an open-source, massively parallel, subsurface, reactive flow and transport model which can be used to incorporate ...

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Tracking Changes in Wetlands within the Lake Winnipeg Watershed over the Last Three Decades (1984-2020)

Forough Fendereski

University of Saskatchewan

Forough Fendereski, Irena Creed, Sassan Mohammady, Shizhou Ma Current wetland management strategies are based on individual wetland's roles at local scales, overlooking their landscape-scale functions. The result is the exclusion of many small, low order, and geographically-isolated wetlands from management practices despite their invaluable functions in controlling nutrients loading to downgradient waters. Landscape-scale wetland management is now possible with the advancements in data acquisition, -analysis, and -processing in cloud-computing platforms, allowing us to track wetland gain and loss over broad spatial and temporal scales. For our study, we applied the U.S. Geological Survey's Dynamic Surface Water Extent algorithm on Landsat data ...

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Starting and Sustaining a Tribal Wetland Program

Mike Jones

Wetland Specialist, Stockbridge-Munsee Community

Many tribes have benefited from the development of a formal wetland program. A stand-alone program allows for a more targeted approach that incorporates wetland-specific activities to effectively manage these valuable resources. Once a program has been developed, sustaining the program becomes a major and ongoing challenge in the face of funding, staffing, and time constraints. No two tribes or tribal wetland programs are the same, but programs can be run successfully and sustainably through careful planning, strategic thinking, communication, and creativity. This presentation will cover tips, strategies, challenges, and lessons learned to help guide any tribe that is considering starting ...

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How to build a fulfilling career outside Academia

Shilpa Sen

Environmental Scientist, HDR

Wetlands are unique so are the professionals who find joy working there. Wetland science has attracted researchers for a long time, and since the 1980s, its popularity has increased in universities, government agencies, and consulting firms. However, the researchers who pursue higher studies often get stuck in academia. Research shows that less than 1% of STEM PhDs will end up as tenured professors, while the rest of these STEM PhDs will have careers outside scientific research. Despite this harsh reality, the academic environment does not prepare these early career researchers to navigate a new career landscape. With ever-increasing risks of ...

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Experimental, Modeling, and Observational Approaches to Assessing Sea-level Rise Impacts to Tidal Wetlands along the Pacific Coast

Christopher Janousek

Assistant Professor (Senior Research), Oregon State University

Christopher Janousek, Amy Borde, Brandon Drucker, Bruce Dugger, Craig Cornu, Heida Diefenderfer, Karen Thorne, Kevin Buffington, Scott Bridgham Climate change is likely to alter estuarine ecosystems through sea-level rise (SLR) and changes to other ecosystem drivers. Predicting SLR impacts to tidal wetlands in estuaries requires an understanding of how key wetland processes change along gradients of increasing inundation and salinity. We provide an overview of two NOAA-funded SLR projects on the west coast of the US designed to characterize and model the effects of SLR on tidal wetland structure and function. In the San Francisco Bay-Delta Estuary, we conducted manipulative field ...

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Modelling the Coastal Wetlands Response to climate change in the Great Lakes

Dominic Theriault

Geospatial data scientist, Hydrodynamic and Ecohydraulic Section, Environment Climate Change Canada

Dominic Thériault, Antoine Maranda, Caroline Sévigny, Jean Morin, Marianne Bachand, Mathieu Roy, Rémi Gosselin, Sandrine Hogue-Hugron The coastal wetlands of the Great Lakes are of major importance, as they provide critical ecological and societal services such as water filtration, nutrient assimilation and habitats for a large number of species. Coastal wetland classes (e.g. emergent vegetation, meadow marsh, ect.) are generally structured along a topographical gradient, as they bear a decreasing level of tolerance to prolonged submersion with increasing elevation relative to average lake level. Coastal wetlands might be particularly vulnerable to climate change, given that changes in net basin supply might ...

Tuesday, Jun 01

11:45 AM - 12:00 PM

Mapping Fort Berthold's Wetlands: A Geographical Approach to Protecting Our Water and Our History

Mary Iorio, Joshua Cunningham The Mandan, Hidatsa and Arikara Nation's relationship with water is historically unique, from its cultural connection to aquatic plants and animals to the formation of Lake Sakakawea in the 1950's. Even today, with significant oil production activities occurring on the Fort Berthold Reservation, including the use of hydraulic fracturing, the Three Affiliated Tribes' complex relationship with water continues. Since 2018, the Three Affiliated Tribes Environmental Division has been developing a Wetland Program Plan to construct an administrative, legal and regulatory framework to facilitate the assessment, monitoring and protection of Fort Berthold's wetland resources. In collaboration with St. ...

Tuesday, Jun 01

11:45 AM - 12:00 PM

One wetland is not enough - an interdisciplinary evaluation of prairie wetlands

Sara Vacek

Wildlife Biologist, US Fish and Wildlife Service

Sara Vacek, Jennifer Gruetzman, Josh EashThe Prairie Pothole Region (PPR) holds the most productive waterfowl habitat in North America. The US Fish and Wildlife Service puts forth resources to protect wetlands and grasslands in this region, providing key habitat for breeding and migrating waterfowl. Ducks use a variety of wetland types throughout their life cycle; temporary and seasonal wetlands provide key pair-bonding habitat, while semi-permanent wetlands are important for brood rearing. Often, wetland evaluations focus on individual basins. However, in the PPR the wetland complex is seen as the functional ecological unit. Recognizing the paucity of long-term wetland monitoring in ...

Tuesday, Jun 01

11:45 AM - 12:00 PM

Exploring the ecotone of wetland science & entrepreneurship

Jeremy Schewe

CSO, Ecobot Inc.

My favorite places on the planet are ecotones. I love edge places where “worlds” cross and exchange takes place. In navigating the pathways through life as a wetland scientist, biologist, ecologist, or natural resources manager, one often may find themselves on a clearly defined path that leads them into academia, conservation planning, consulting, policy, or activism. And sometimes, especially for those of you who have spent ample time in the field, getting from location “A” to “B” through a swamp is not always a direct path. Come explore the ecotone of wetland science and entrepreneurship with a seasoned wetland scientist ...

Tuesday, Jun 01

12:00 PM - 12:45 PM

Pre-Recorded Q&A S1: Working in Wetlands II - How to Transition Your Career into Non-Traditional Wetland Work through Mentorship, Drones, Advocacy and Ecopreneurship (Co-Sponsored by South Central Chapter and Student Section)

Tuesday, Jun 01

12:00 PM - 12:45 PM

Pre-Recorded Q&A S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States II

Tuesday, Jun 01

12:15 PM - 12:45 PM

Pre-Recorded Q&A S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research II

Tuesday, Jun 01

12:15 PM - 12:45 PM

Pre-Recorded Q&A S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands II

Tuesday, Jun 01

12:45 PM - 01:15 PM

Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

Tuesday, Jun 01

01:15 PM - 01:20 PM

Introduction SI: Working in Wetlands III - Pearls of Wisdom from Recent Post-Doc's, Hiring Managers, and Seasoned Professionals (Co-Sponsored by South Central Chapter and Student Section)

Tuesday, Jun 01

01:15 PM - 03:05 PM

S1: Working in Wetlands III - Pearls of Wisdom from Recent Post-Doc's, Hiring Managers, and Seasoned Professionals (Co-Sponsored by South Central Chapter and Student Section)

The South Central Chapter, Education Section and Student Section of the Society of Wetland Scientists (SWS) would like to co-host its third multi-sectional symposium, entitled Working in Wetlands. This year, invited presenters will include a combination of professionals, recent graduates, and students working in the wetland science field. The symposium will consist of three, 100-minute blocks, with four speakers in each block and the target audience will be wetland professionals currently in the work force, students, and recent graduates. The first 5 minutes of each block will be used as an introduction by the moderator. Each speaker will give a ...

Tuesday, Jun 01

01:15 PM - 03:05 PM

S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States III

The main goal of these sessions is to revisit, discuss, and integrate current science and federal and state policies and management perspectives concerning regulation of activities that occur in waters/wetlands in headwater landscape settings. In this election year, either there will be great turnover or not in the leadership of key U.S. Federal agencies charged with managing and protecting our waters. In response to the resolution of the U.S. Federal regulatory structure in 2021, States, Conservation organizations, and scientists will respond accordingly - either significantly changing current approaches or staying the present course. Either direction will have direct consequences on ...

Tuesday, Jun 01

01:15 PM - 01:20 PM

Introduction S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States III

Tuesday, Jun 01

01:15 PM - 03:05 PM

S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research III

Coastal wetland environments, where terrestrial and aquatic ecosystems converge, represent unique habitats facilitating complex interactions of climate, hydrology, species and human management. They provide countless ecosystem services, significant carbon storage, and shoreline protection from erosion and flooding. The structure, function, and critical ecosystem services of coastal wetlands are extremely sensitive to changing environmental conditions resulting from climate-induced disturbances (e.g. storms, sea-level rise, eutrophication, invasive species, etc), resulting in a critical need for coastal scientists to understand how these systems will adapt to these environmental changes. This symposium aims to facilitate discussion of coastal science in a changing world across an ...

Tuesday, Jun 01

01:15 PM - 01:20 PM

Introduction S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research III

Allison Myers-Pigg

Dr, Pacific Northwest National Laboratory

Allison Myers-Pigg

Pacific Northwest National Laboratory Marine and Coastal Research Laboratory

Tuesday, Jun 01

01:15 PM - 03:05 PM

S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands III

Climate and land-use change are two major drivers that are known to impact the abiotic and biotic processes of prairie-pothole wetland ecosystems. Many decades of long-term monitoring of prairie-pothole wetlands has led to the development of statistical and mechanistic models used to explore how these ecosystems are impacted by climate and land-use change at various spatial and temporal scales. The bulk of the current research has focused on the responses of prairie-pothole wetlands to changes in either climate or land use while hypothesizing synergistic interactions among the drivers on ecosystem processes. The objective of this symposium is to bring together ...

Tuesday, Jun 01

01:15 PM - 01:20 PM

Introduction S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands III

Tuesday, Jun 01

01:20 PM - 01:35 PM

The Pacific Northwest Tribal Wetlands Working Group: Supporting EPA R10 Tribes In Protecting Wetlands and their Cultural Uses

Kelsey Taylor

Matt Baerwalde

Environmental Policy Analyst, Snoqualmie Indian Tribe

Self-governance, tribal heritage, and cultural identity are directly dependent upon high water quality and associated Traditional resources, as guaranteed by treaty. However, the geographic isolation of Tribal wetland and aquatic resource management professionals hampers the cohesiveness of an important professional support network. For the past 11 years, TWIG has facilitated collaborative, science-based decision making while encouraging peer relationships and creating opportunities that facilitate natural resource management policies and methods consistent with Tribal values. This presentation will provide an overview of the TWIG, discuss recent successes, and highlight future opportunities for the group as well as for interested PNW Tribal wetland ...

Tuesday, Jun 01

01:20 PM - 01:35 PM

Using optical and synthetic aperture radar (SAR) satellite data to monitor prairie wetland inundation dynamics

Ben Devries

Assistant Professor, University of Guelph

Wetlands play an important role in hydrological regulation across landscapes. The seasonal inundation "signature" of these wetlands is an important indicator of wetland function and the resilience of wetland-dominated landscapes to environmental change. The Prairie Pothole Region (PPR) is characterized by myriad small, depressional wetlands, many of which exhibit inundation dynamics on short timescales. While image data from optical satellite sensors like Landsat and MODIS have been playing a critical role in characterizing the long-term inundation dynamics in the PPR, limitations in the spatial and temporal resolution of these datasets present a barrier to the detailed understanding of seasonal and ...

Tuesday, Jun 01

01:20 PM - 01:35 PM

Beyond Ramen: Budgeting During the Graduate and Early Career Years

Derek Faust

Faculty Instructor, Clover Park Technical College

Jessica Brumley

Derek Faust, Jessica Brumley Within the scientific community, it is well known that the financial situation of most graduate students is constrained. Graduate students are typically paid a stipend intended to cover living expenses, but it may not even be sufficient to cover those expenses. Even after earning a graduate degree(s) and landing a better paying job, early career scientists may still be taxed by student loan debts and less pay than expected. Given financial constraints, graduate students and even some early career scientists must decide between taking on more student loan debt or utilizing budgeting techniques to adapt to their ...

Tuesday, Jun 01

01:20 PM - 01:35 PM

Fate of mangrove-derived dissolved organic matter in coastal waters: a microcosm approach

Elise Morrison

Assistant Professor, University of Florida

Elise Morrison, Albert Rivers-Ubach, Michael Shields, Nicholas Ward, Thomas Bianchi, Todd Osborne, Yina Liu Coastal systems, such as marshes, mangroves, and seagrasses, serve as critical reservoirs of blue carbon. These systems are vulnerable to numerous stressors, including higher temperatures, extreme storms, ecological regime shifts, sea level rise, eutrophication, and land use change. These vulnerable systems frequently export dissolved organic matter (DOM) into coastal waters, which plays an important role in global carbon cycling and coastal biogeochemistry. However, it is still unclear whether this DOM is susceptible to aquatic priming effects when exported to coastal waters. Priming, or the non-additive effects on ...

Tuesday, Jun 01

01:35 PM - 01:50 PM

Adapting a Functional Assessment Tool and Incorporating a Cultural Component to Assess Wetlands on the Nez Perce Tribe's Reservation

Rue Hewett Hoover

Wetland Specialist, Nez Perce Tribe

The 770,470-acre Nez Perce Reservation is located in the Columbia-Snake River Plateau in North Central Idaho. Over 300 wetlands are found on the reservation in the headwaters and riparian zones of streams and rivers and in depressions in farmland. The Nez Perce people (Nimiipuu) have traditionally derived much of their food, fiber, and medicines from wetland plants making wetlands a great importance to the Tribe. While most of the wetlands have been delineated and assessed, what the Nez Perce Tribe (NPT) needed was a functional assessment tool to evaluate the functions and benefit values of each wetland, one that included ...

Tuesday, Jun 01

01:35 PM - 01:50 PM

Identifying structural shifts in area-perimeter relations of prairie wetlands using remote sensing

Christopher Krapu

Research Associate, Oak Ridge National Laboratory

Christopher Krapu, Mark Borsuk, Mukesh Kumar Artificial drainage of wetlands is commonly employed to manipulate the number and size of wetlands for agricultural purposes. Within the context of the North American Great Plains, ongoing shifts in crop types and associated agricultural practices have the potential to lead to drastic alterations to the region's wetlands. Using long-term remote sensing analysis of the entire USA state of North Dakota via Landsat data products, we identify a strong signature of change to wetland ponded size / area distributions manifested in a dimensionless ratio of area to shoreline. Extensive hydrologic simulations show that this quantity ...

Tuesday, Jun 01

01:35 PM - 01:50 PM

Getting a Foot in the Door: Opportunities

Matt Schweisberg

Principal, SPWS, Wetland Strategies and Solutions, LLC

Matt Schweisberg, Robbyn Myers, Yvonne Vallett It can be difficult for college graduates to find an initial position in any field that can develop into a promising and enjoyable career. To find a position in the field of wetland science or a related line of environmental work can be especially challenging. Competition can be particularly intense in the area of wetland science and related professions. Distinguishing yourself and standing out from others should be a goal in this endeavor. However, once you are confident that you do stand out, how do you develop or expand contacts, find solid opportunities, "open doors," ...

Tuesday, Jun 01

01:35 PM - 01:50 PM

How do tidal restriction legacies affect soil organic matter signatures in a southern New England salt marsh?

Madeleine Meadows-McDonnell

Graduate Assistant, University of Connecticut

Madeleine Meadows-McDonnell, Beth Lawrence, Michael HrenSalt marshes are blue carbon ecosystems threatened by coastal development (i.e., bridges, roadways) that restricts tidal flow, reducing inundation frequency and salinity, which leads to shifts in plant species dominance. Tidal restoration reverses these shifts, but it is unclear how tidal marsh management alters soil organic matter (SOM) persistence. Leveraging the isotopic ($\delta^{13}C$) signatures of dominant salt marsh species (C3 *Phragmites australis* vs. C4 *Spartina alterniflora*), we are quantifying carbon legacies of plant community shifts associated with tidal restrictions over the last century in a tidally restored marsh in Stonington, Connecticut (USA). We measured monthly ...

Tuesday, Jun 01

01:50 PM - 02:05 PM

You Got the Job Interview, You Got the Job Offer...Now What?

Scott Jecker

President, Whitenon Group, Inc. Environmental Consultants

The Interview Ok. So you have landed a job interview with one or more companies. Now it's time to prepare for the interview as much as possible. You need to know about the company that you are interviewing with and understand the job description/responsibilities. If possible, you need to know about the hiring managers that will be conducting the interview. This presentation will cover how to approach your first professional interview. Does your resume reflect or at least somewhat align with the job description you are being interviewed for? How will you make yourself stand out from the other applicants? ...

Tuesday, Jun 01

01:50 PM - 02:05 PM

Developing a Wetland Protection Program within the Quinault Indian Reservation

Janice Martin

Wetland Specialist, Quinault Indian Nation

Janice Martin, Greg EideResearch problem and objectives [Developing and implementing tribal wetland programs, including wetland program plans that address various core elements (Monitoring and Assessment, Volunteer Restoration and Protection, Regulatory and Wetland Water Quality Standards)] Abstract Summary (Quinault Indian Nation) The Quinault Indian Nation (QIN) strives to protect wetland ecosystems within and beyond the reservation boundaries. The QIN Division of Natural Resources (QDNR) employs staff knowledgeable on the subject of wetlands, reviewing internal and external project proposals. Staff provide technical assistance by interpreting tribal and federal regulations to protect aquatic resources. QIN supports and participates in the Timber, Fish and ...

Tuesday, Jun 01

01:50 PM - 02:05 PM

Automatic mapping of wetland inundation dynamics in the Prairie Pothole Region using Google Earth Engine

Qiusheng Wu

Assistant Professor, University of Tennessee, Knoxville

The Prairie Pothole Region of North America is characterized by millions of depressional wetlands, which provide critical habitats for globally significant populations of migratory waterfowl and other wildlife species. Due to their relatively small size and shallow depth, these wetlands are highly sensitive to climate variability and anthropogenic changes, exhibiting inter- and intra-annual inundation dynamics. Moderate-resolution satellite imagery (e.g., Landsat, Sentinel) alone cannot be used to effectively delineate these small depressional wetlands. By integrating multi-temporal (2009-2018) NAIP aerial imagery and ancillary geospatial datasets, a fully automated approach was developed to delineate wetland inundation extent at watershed scales using Google Earth ...

Tuesday, Jun 01

01:50 PM - 02:05 PM

Ecological, hydrological, and biogeochemical interactions in coastal floodplains

Nicholas Ward

Nicholas Ward, Aditi Sengupta, Allison Myers-Pigg, Ben Bond-Lamberty, Matthew Norwood, Nate McDowell, Patrick Megonigal, Peter Regier, Stephanie Pennington, Steve Yabusaki, Vanessa Bailey, Wenzhi Wang Hydrologic flows drive terrestrial plant productivity and the transport and transformation of biogeochemical components through the terrestrial landscape and along the terrestrial-aquatic continuum. These dynamics become increasingly complex along the coast, where two-way exchange of water brings with it a diversity of geochemical constituents and biological communities. The aim of this presentation is to discuss how coupled plant, soil, and aquatic processes modulate the cycling of carbon along the terrestrial-aquatic continuum of coastal watersheds. Observational, experimental, ...

Tuesday, Jun 01

02:05 PM - 02:20 PM

Realizing a Rewarding Career in Wetlands – Balancing Education, Work and Personal Life

Kimberli Ponzio

Environmental Scientist IV, St. Johns River Water Management District

While the career paths for wetland scientists may be circuitous, the twists and turns we take on that path helps to foster the immense diversity of people who work in wetlands. But once we've made the decision that slogging around in the marsh or swamp is our passion, what do we do? How do we navigate from college, to our first job, to our "dream" job, and finally to retirement? And how do we balance all the other dreams and aspirations we have in life? By relating my personal story, I hope to inspire future wetland scientists to reflect on ...

Tuesday, Jun 01

02:05 PM - 02:20 PM

Soil redox and metabolomic signatures of a freshwater wetland

Taniya RoyChowdhury

Research Soil Scientist, Crop Genetics and Plant Pathology Unit, ARS-USDA

Taniya RoyChowdhury, Chaevian Clendinen, David Hoyt, Nora Hamovit, Stephanie Yarwood Wetland restoration efforts are critical to enhance carbon sequestration in biomass and reestablish ecosystem vitality and functions. The success of such restoration efforts are frequently assessed in terms of microbial processes like slow decomposition of soil organic matter, and development of chemically reduced soil environment resulting in iron reduction and methane production. The mechanistic understanding of how the complex dynamics of microbial community development, metabolic expression and activity co-occur or compete in their local redox environment can greatly impact our predictive understanding of these processes, generally in submerged environments, and specifically ...

Tuesday, Jun 01

02:05 PM - 02:20 PM

Tracking patterns of inundation extent, seasonality, and duration across the Upper Midwest and Prairie Pothole Region using Sentinel-1

Melanie Vanderhoof

Research Geographer, U.S. Geological Survey

Melanie Vanderhoof, Jay Christensen, Laurie Alexander Wetland and river hydrology across the Prairie Pothole Region depend on not just patterns of precipitation but also surface storage capacity and the agricultural re-directing of water through tile drainage and ditching, among other drivers. A critical precursor to analyzing the relative role of climate and land use on wetland hydrology is a robust dataset representing inundation dynamics at a spatial and temporal scale relevant to a landscape dominated by small, dynamic wetlands. We present preliminary results of inundation frequency and duration across the Prairie Pothole Region derived from time series analysis of Sentinel-1 image ...

Tuesday, Jun 01

02:20 PM - 02:35 PM

Understanding Land Change in Wetland Landscapes

Jennifer Rover

Research Geographer, USGS EROS

The US Geological Survey recently released a suite of remotely sensed land change products for the conterminous United States. The Land Change Monitoring, Assessment, and Projection (LCMAP) initiative developed ten science products by modeling and classifying Landsat analysis ready data. The ten annual products start in 1985 and describe various land cover and land change attributes. The products are complimentary, inform one another, and can be leveraged to develop a multitude of derivatives. The release of this product suite offers an opportunity to investigate changes occurring within wetlands and their uplands at a temporal frequency not previously available. In the ...

Tuesday, Jun 01

02:20 PM - 03:05 PM

Pre-recorded Q&A S1: Working in Wetlands III - Pearls of Wisdom from Recent Post-Doc's, Hiring Managers, and Seasoned Professionals (Co-Sponsored by South Central Chapter and Student Section)

Tuesday, Jun 01

02:20 PM - 03:05 PM

Pre-Recorded Q&A S2: Building Tribal Wetland Program Capacity and a National Framework for Advancement within the United States III

Tuesday, Jun 01

02:35 PM - 03:05 PM

Pre-recorded Q&A S3: Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research III

Tuesday, Jun 01

02:35 PM - 03:05 PM

Pre-Recorded Q&A S4: Novel approaches to quantifying synergistic interactions between climate and land-use change on prairie-pothole wetlands III

Tuesday, Jun 01

03:05 PM - 05:05 PM

Student Section Panel and Happy Hour

Description: Join the Student Section for a panel discussion on leveraging social media platforms for science communication. More and more science communicators are adopting the role of content creators and having critical conversations about how to engage social media audiences in healthy and effective ways. This panel will feature student and career professional science communicators to talk about how to fit scicomm and social media engagement into your life at various career stages while maintaining a healthy work-life balance. We'll also discuss how to get started in building a scicomm social media platform and strategies for deciding on an approach ...

Tuesday, Jun 01

03:35 PM - 03:40 PM

Introduction S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making I

Thursday, Jun 03

01:00 PM - 03:00 PM

CASS Panel Discussion

Open to all CASS members! *Separate registration is required. Zoom login will be provided to all registrants*

Thursday, Jun 03

03:00 PM - 03:35 PM

P2: From rivers to the coasts: Assessing wetland functions in altered landscapes improves ecological outcomes

Jacob Berkowitz

Senior Research Soil Scientist, US Army Engineer Research and Development Center

Jacob Berkowitz, David Johnson, Jaybus PriceLandscape-scale alterations impact the extent and function of wetlands in both riverine and coastal settings. For example, levees have disconnected the Mississippi River from up to 70% of its historic floodplain. The remaining constrained floodplain wetlands receive flood pulses that diverge from natural hydro patterns, and this effect will be exacerbated under anticipated climate change scenarios. The remaining floodplain wetlands provide a variety of ecological functions, although alteration has shifted the magnitude of functional outcomes. This represents a wetland functional tradeoff in which alterations can enhance some functions (typically those related to physical processes) while decreasing ...

Thursday, Jun 03

03:35 PM - 04:35 PM

Poster Session

Please use this time to view the ePoster presentations available under 'ePosters' on the left-hand navigation. You can publicly chat with ePoster presenters via the "Public ePoster Chat" on the right-hand side of the ePoster you are viewing. You can also start "Private Chats" with the ePoster presenters to ask your question directly.

Thursday, Jun 03

04:35 PM - 04:55 PM

Regional Genetic Diversity in *Spartina* and *Juncus* with Implications for Future Salt Marsh Restoration Success

Patrick Biber

Associate Professor

The Gulf of Mexico is experiencing a dramatic increase in salt marsh restoration, resulting in unmet demand for nursery plants in Mississippi and Alabama. However, a lack of information on population genetics impedes knowing what is needed to maintain future diversity. This study characterizes genetic diversity, using modern molecular techniques, among *S. alterniflora* (smooth cordgrass) and *J. roemerianus* (black needlerush) populations along the northern Gulf Coast between Lake Pontchartrain, LA and Pensacola, FL. Field collections of 25 discrete plugs of each species were made at 10 stations; these included marshes at 1 site in FL, 2 sites in AL, 6 ...

Thursday, Jun 03

04:35 PM - 04:55 PM

Vegetation affects timing but not necessarily magnitude of methane emissions from wetlands

Olivia Johnson

Biologist, U.S. Geological Survey

Olivia Johnson, Brian Tangen, Jacob Meier, Sheel Bansal, Xiaoyan ZhuCommon assumptions about how vegetation influences wetland methane (CH₄) fluxes include acting as stem conduits for CH₄ release, providing substrate for methanogenic activity, and supplying oxygen to support CH₄ consumption. However, little is known about how hydrology interacts with vegetation to affect CH₄ flux, especially in seasonal wetlands that experience drying and re-wetting during the year. In a mesocosm study, we assessed the impacts of *Typha* on CH₄ fluxes using clear flux-chamber measurements directly over *Typha* ('whole-plant'), adjacent to *Typha* ('plant-adjacent'), and over plant-free soils ('control'). Under flooded conditions, whole-plant mesocosms ...

Thursday, Jun 03

04:35 PM - 06:25 PM

CS1: Vegetation I

Thursday, Jun 03

04:35 PM - 06:25 PM

S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section I

Thursday, Jun 03

04:35 PM - 04:40 PM

Introduction S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section I

Thursday, Jun 03

04:35 PM - 06:25 PM

CS3: Wetland Chemistry

Thursday, Jun 03

04:40 PM - 04:55 PM

Community Engagement to Deliver Effective Wetland Restoration – A Partnership Project on the River Swilgate, UK

Matthew Simpson
Dr, Director

The River Swilgate flows through Tewkesbury in the South West of England. In 2007 severe flooding impacted residents living within the floodplain and subsequent floods have raised the profile of river floodplain and wetland management among a disparate group of stakeholders. Environment Agency assessment of the river identified the flood mechanisms responsible but also indicated that the river was failing to achieve the target of good ecological status, under the European Union's Water Framework Directive, due to physical alterations to the river, diffuse pollution and a loss of floodplain connectivity. This has impacted macroinvertebrate, fish and macrophyte populations and reduced ...

Thursday, Jun 03

04:55 PM - 05:10 PM

Effects of *Iris pseudacorus* on Abiotic Conditions, Plant and Invertebrate Communities in a Southern and Northern California Estuaries

Anita Arenas
California State University of Long Beach

Anita Arenas, Christine WhitcraftWetlands are important ecosystems that provide habitat and human services such as filtering water, providing buffers during storms, and reducing erosion. Despite this recognized importance, about 90% of wetlands have been lost in California. Of the remaining wetlands, many are degraded by human activities, including the spread of invasive species. *Iris pseudacorus* is one such non-native species that has been introduced across a geographical range. Los Peñasquitos Lagoon (LPL), in north County San Diego, and the Delta in northern California are areas that have been invaded with *Iris pseudacorus* across a range of salinities in both of ...

Thursday, Jun 03

04:55 PM - 05:10 PM

Ethical Practices and Ethical Dilemmas: Real World Scenarios from Massachusetts

Gillian Davies

Senior Ecologist and Natural Climate Solutions Specialist and Visiting Scholar, Senior Ecological Scientist

This presentation will present specific real-world scenarios involving ethical dilemmas or ethical challenges that wetland scientists face, including during wetland restoration projects. Ethical challenges can come from a variety of people with whom we interact: employers, clients, engineers who are on our teams, contractors, colleagues, and community members. Examples from each of these groups will be discussed. In addition, emerging ethical practices and thinking will be discussed, including the ethical practice of acknowledging Indigenous Peoples who live or lived on land where a presentation is occurring, and consideration of re-framing our ethical relationship with wetlands and Nature. Could re-framing our ...

Thursday, Jun 03

04:55 PM - 05:10 PM

Effects of plant species on methanogens and methanotrophs

Pamela Weisenhorn

Pamela Weisenhorn, Edward O'Loughlin, Jason Koval, Kelly Skinner, Kenneth Kemner, Marisa Szubryt, Sarah Owens, Stephanie Greenwald Methane emissions are highly variable and differences in plant community composition can explain some of this variability, suggesting an influence of plant species on microbial communities and subsequent methane cycling. Since closely related plant species have similar morphological and biochemical features, we hypothesized that plant evolutionary history is related to differences in microbial community composition. We selected five monoculture-forming wetland plant species based on evolutionary distances among them. We detected significant differences in microbial communities between sample types (unvegetated soil, bulk soil, rhizosphere soil, internal ...

Thursday, Jun 03

05:10 PM - 05:25 PM

Incorporating Community Growth and Wants into Mitigation Design

Leandra Cleveland

HDR

Wetland mitigation is more than compensating for lost functions and values of wetlands and streams. While that is the fundamental premise, the larger landscape setting, future community growth, and stakeholder needs are also important aspects of the design and site selection. A mitigation site located in a natural setting today, may quickly become surrounded by development, thereby making it an isolated feature in the larger landscape setting. Still more challenging is balancing community and stakeholder wants into mitigation design. Why are these non-science based components important when siting and designing a mitigation site? The reason is that applying good science ...

Thursday, Jun 03

05:10 PM - 05:25 PM

Effects of Wetland Management and Associated Abiotic Factors to Rare Plant Communities in a Managed Arid Wetland

Antonio Cantu

Interior Wetlands of Mexico: Status and Issues of Waterbird Habitats, Louisiana State University

Antonio Cantu, Jeffrey Beauchamp, Sammy King Spring-fed wetlands within arid systems host numerous unique species of plants and wildlife, many of which are federally protected due to the vulnerability of these ecosystems. At Bitter Lake National Wildlife Refuge, in southeastern New Mexico, marsh habitats were impounded in the 1940s to provide fishing and hunting opportunities. During the mid-1990s managers switched to moist-soil management to manipulate water levels and promote the growth of native vegetation as foraging habitat for migratory birds. Three rare wetland plants have since established: the Pecos sunflower (*Helianthus paradoxus*, federally Endangered), Leoncita false-foxglove (*Agalinis calycina*, Candidate species), and ...

Thursday, Jun 03

05:10 PM - 05:25 PM

Diurnal Variation in Wetland Methane Fluxes: Global patterns

Sheel Bansal

Research Ecologist, USGS

Sheel Bansal, Alex Valach, Gavin McNicol Methane emissions from wetlands is the largest source of uncertainty in the global methane budget. The high level of uncertainty is due, in part, to high temporal variability in methane flux rates over diurnal time scales. A better understanding of how methane flux rates change throughout diel cycles could help elucidate short-term, mechanistic drivers of flux, improve methane flux estimates from wetlands, and improve prediction of how future conditions could affect methane flux dynamics. However, developing generalized theories of diurnal variation in wetland methane fluxes is challenging due to the suite of interacting mechanisms and ...

Thursday, Jun 03

05:25 PM - 05:40 PM

Nutrient recovery across time and space within restored riparian wetlands

Justin Murdock

Associate Professor, Tennessee Tech University

Justin Murdock, Alfred Kalyanapu, Morgan Michael, Robert Brown, Shrijana Duwadi, Spencer Womble Agricultural watersheds contribute a substantial proportion of nutrients exported by rivers in the Lower Mississippi River Basin (LMRB). Several anthropogenic factors in LMRB watersheds contribute to increased nutrient export, including channelization and levee construction that disconnects the river and its floodplain, and the conversion of riparian floodplain wetlands into agricultural production. The USDA Natural Resources Conservation Service established the Wetlands Reserve Program (WRP) more than 20 years ago to restore marginal agricultural land back to functional wetland ecosystems. The goal of our research is to quantify these restoration outcomes ...

Thursday, Jun 03

05:25 PM - 05:40 PM

Impacts of fire and canopy thinning on *Helonias bullata*, a Federally threatened wetland species

Hope Brooks

Helonias bullata, swamp pink, is a federally threatened obligate wetland, evergreen, perennial herb with a historic distribution spanning the eastern U.S. Principle habitats include acidic sandy swamps, bogs, seeps, and areas within headwater drainages that are not subject to prolonged periods of inundation. The focus on this study has been to determine the impacts of man-made and spontaneous fires on *Helonias* populations at Fort A.P Hill, located near Bowling Green (VA) where there are about 50 unique occurrences (AKA "colonies"). As a Federally threatened species, the Fort A.P. Hill administration manages the species to assure long-term survival and implements management ...

Thursday, Jun 03

05:25 PM - 05:40 PM

Successful wetland restoration through a Public-Private Partnership

Thomas Slowinski

Technical Director, Wetlands & Ecology, V3 Companies

V3 Companies has been involved in two successful wetland restoration/mitigation banking projects through a Public-Private Partnership with Campton Township, located in Kane County, Illinois. The Township purchased the Blackberry Creek Headwaters Conservation area in 2003 as part of their open space program and they felt that wetland mitigation banking would be an effective vehicle to fund ecological restoration of the property. V3 entered into a Design/Build/Manage Private-Public Partnership with Campton Township, where the Township provides the property and V3 funds the design, permitting, construction and required ecological monitoring, management and reporting. Mitigation bank credit sales funds the work and long ...

Thursday, Jun 03

05:40 PM - 05:55 PM

Developing a Framework for Monitoring Coastal Wetlands with High Resolution Satellite Imagery in 4D

Laura Bourgeau-Chavez

Dr., Michigan Tech Research Institute

A binational team is working on developing a framework for monitoring coastal wetlands of the Great Lakes in 4D using high resolution Digital Globe optical and Radarsat-2 synthetic aperture radar (SAR) satellite imagery. Five institutions are working together to acquire the data, develop automated algorithms, process the big data and serve up products. Acquisitions of Radarsat-2 occur every 24 days (May-Oct) and WorldView2 as frequently as cloud cover permits. Product development began with a focus on four study sites in 2016 with expansion to 12 sites in 2017-21. Semi-automated algorithms developed for Radarsat-2 allow monitoring changes in surface water extent ...

Thursday, Jun 03

05:40 PM - 05:55 PM

The role of Professional Wetland Scientists on wetland projects under global change scenarios

Ben Lepage

Professor, National Taiwan University and Academy of Natural Sciences

All living organisms need fresh clean water to survive and we've forgotten that water is life and anthropogenic impacts contribute to the to the naturally-occurring processes that impact our planet, ecosystems, and the services they provide. Climate and global change are real and if we are to prevail as a species, we then need to use our resources much more wisely, adapt to the changing conditions, and be much more sustainably and environmentally innovative. Society has become numb to hearing about global change and expects science to resolve the issues to maintain our standard of life. Although the science is ...

Thursday, Jun 03

05:55 PM - 06:25 PM

Pre-Recorded Q&A CS1: Vegetation I

Thursday, Jun 03

05:55 PM - 06:25 PM

Pre-Recorded Q&A S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section I

Thursday, Jun 03

05:55 PM - 06:25 PM

Pre-Recorded Q&A CS3: Wetland Chemistry

Thursday, Jun 03

06:25 PM - 06:55 PM

Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

Thursday, Jun 03

06:55 PM - 07:15 PM

Assessing the feasibility of red listing coastal swamp forest habitats of South Africa

Heidi Van Deventer

Dr, CSIR

Heidi Van Deventer, Bruce Kelbe, Debbie Jewitt, Fiona MacKay, Francois Durand, Janine Adams, Jeanne Nel, Lara van Niekerk, Laven Naidoo, Lulu Pretorius, Piet-Louis Grundling, Retief Grobler, Susan Janse van Rensburg, Taryn RiddenSouth Africa's coastal swamp forests are range-restricted, transitional forested wetlands, facing threats of climate and anthropogenic pressures. To improve the understanding of their range and habitat loss to date, we have integrated available spatial data, back casted it to the epoch 2000 and assessed changes in these systems for the epochs 2005, 2008, 2011 and 2017. The resultant layer totalled 120 km², with two distinct regions between the uMtamvuna ...

Thursday, Jun 03

06:55 PM - 07:15 PM

Spatial structure in species composition within the Everglades ridge and slough landscape: Present condition and restoration challenges

Jay Sah

Research Associate Professor, Florida International University

Jay Sah, Ewan Isherwood, James Heffernan, Michael RossIn a spatially structured landscape, large scale patterns in plant species composition usually result from environmental processes acting at different spatial scales and their feedbacks on community assembly. In the Everglades, where one of world's largest wetland restoration projects is underway, the ridge and slough (R&S) landscape has historically contained spatially structured vegetation patterning that appears to have mostly been lost due to management-induced changes in hydrologic regimes. Our study describes spatial structure in species composition within the R&S landscape, and relates the derived structural measures to landscape condition. We sampled species composition ...

Thursday, Jun 03

06:55 PM - 07:15 PM

Assessment of Carbon Storage Potential of Forested Wetland Soils as Affected by Urbanization Degree in Two Physiographic Provinces of Virginia, USA

Kathryn Ledford

Graduate Student, George Mason University

Kathryn Ledford, Changwoo Ahn, Stephanie SchmidtThis study assessed carbon storage potential in terms of total carbon (TC) and total carbon stocks (TC stocks) in soils of four forested wetlands in Northern Virginia along with associated soil physicochemistry [e.g., soil pH, bulk density (Db), and gravimetric soil moisture (GSM)]. The study sites were selected across two vastly different degrees of urbanization (urban [U]; non-urban [N]) and the two main physiographic provinces of the region (Piedmont; Coastal Plain). Soils were sampled and analyzed at three depth intervals (0-10cm; 10-20cm; 20-30cm). No significant differences were found in TC ($3.07 \pm 0.31\%$ [U]; 3.82 ...

Thursday, Jun 03

06:55 PM - 08:45 PM

S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section II

Thursday, Jun 03

06:55 PM - 07:00 PM

Introduction S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section II

Thursday, Jun 03

06:55 PM - 08:45 PM

CS6: Climate Disruption

Thursday, Jun 03

06:55 PM - 08:45 PM

CS5: Worldly Wetlands II

Thursday, Jun 03

06:55 PM - 08:45 PM

CS4: Vegetation II

Thursday, Jun 03

07:00 PM - 07:15 PM

Wetland Restoration Techniques and Ethical Challenges: Case Studies from the Rocky Mountains, USA

Andy Herb
AlpineEco

Ethics play a role in our everyday decision-making whether we realize it or not. As a wetland scientist who spends his days (and many nights!) focused on restoration projects, I am frequently attempting to find the magical balance of employing scientific principles, restoring ecological processes, minimizing cost, maximizing practicability, and staying true to stakeholder requests. All too often, there are serious conflicts between sound science and project requirements, and between project costs and desired outcomes. Deciding what restoration actions "should" be taken is the essence of striking this balance and is ultimately based on ethics, which in this context is ...

Thursday, Jun 03

07:15 PM - 07:30 PM

Scaling-up Beaver Powered Restoration in the Upper Columbia for Climate Resilience: A Decision Support Systems Approach

Crystal Elliot-Perez

Washington Habitat Director, Trout Unlimited

Kurt Fesenmyer

Crystal Elliott-Perez, Kurt Fesenmyer
In the aftermath of Washington's mega-fires and in the context of climate change resilience in the Upper Columbia both for water availability and for fish species, Trout Unlimited realized the critical need to really scale-up beaver-powered restoration work to create impactful ecological benefits at a watershed level. We wanted to think beyond individual projects and look at a landscape perspective in terms of prioritizing sites for improving habitat for ESA-listed salmonids, increasing water storage capacity, and buffering fire effects. We needed a mechanism that could help us identify the sites that were both feasible and appropriate for ...

Thursday, Jun 03

07:15 PM - 07:30 PM

Salt Marsh Dominant *Juncus roemerianus* Morphophysiology Varies with Tidal Creek Spatial Pattern and Marsh System in the Big Bend Region of Florida

Stephanie Verhulst

Ph.D. candidate, University of Florida

Stephanie Verhulst, Carrie Reinhardt
Halophytes are specially adapted plants capable of tolerating high stress salt marshes environments where daily tidal flooding creates anoxic and highly saline soils. Sea-level rise and changing environmental conditions (e.g. drought, herbivory, sedimentation rates, and sudden vegetation die-off) have increased pressure on marsh vegetation adaptations resulting in marsh die-off. Modeling provides promising tools for predicting areas of potential die-off; however, salt marsh conditions are highly variable within and between marsh systems limiting broad landscape scale applicability. This project aims to identify potential linkages between vegetation stress indicators and drivers of marsh die-off (herbivore density, soil characteristics, and ...)

Thursday, Jun 03

07:15 PM - 07:30 PM

Ethical dilemma in wetland creation is due to the absence of genuine motivation and proactive planning

Swapan Paul

Sydney Wetland Institute, Sydney Olympic Park Authority, Australia

New landscapes have been increasingly installing 'wetlands', which has become a fashion rather than a true venture. Whilst the benefits and constraints of wetland creation can be several, many are not considered until after because of two main reasons: an absence of genuine motivation for wetland creation and a lack of proactive planning. Examples will be cited from Australian landscapes and the presentation will advocate for a systemic approach in landscape management so that the wetlands thus created can last long.

Thursday, Jun 03

07:15 PM - 07:30 PM

Evaluation of changes in selected Ramsar sites over the past three decades

Karen Chan

Ms., Tsinghua University

The Ramsar convention was created as a direct response to the large scale wetland loss in Europe and includes the designation and management of wetland sites, wise use of wetlands, and international cooperation as its central tenets. Despite its efforts, threats towards wetlands have not lessened regardless of the protection levels implemented. Furthermore, the convention lacks clear assessment indices. This study aims to identify the differences in the distribution of the changes in land cover, and their impact on fragmentation and habitat loss for Ramsar sites in China and their surrounding area. We analyzed the changes in land cover and ...

Thursday, Jun 03

07:30 PM - 07:45 PM

Development and Application of an Adaptive Management Framework for European Frog-bit Management

Blake Cahill

PhD Candidate, Central Michigan University

Blake Cahill, Anna Monfils, Sara HansenEuropean frog-bit (*Hydrocharis morsus-ranae* L.; EFB) is a free-floating aquatic plant invasive to North America. The species forms dense floating mats and has the potential to reduce the diversity of native plant, fish, and invertebrate communities; alter the physicochemical properties of wetlands; and inhibit the recreational and commercial use of wetlands and waterbodies. First recorded outside of cultivation in North America in Ontario in 1939, EFB has been documented in seven U.S. states and two Canadian Provinces. In 1996, EFB was first documented in Michigan in the Detroit River and has since rapidly expanded its ...

Thursday, Jun 03

07:30 PM - 07:45 PM

Assessing the Adaptive Capacity of Laurentian Great Lakes Wetlands to Climate Change Using a Composite Indicator Methodology

Morgan Hrynyk

Physical Scientist, Landscape Science and Technology Branch - Environment and Climate Change Canada

Morgan Hrynyk, Greg Grabas, Jason Duffe, Patrick Rivers, Pauline QuesnelleClimate change is predicted to negatively impact the biodiversity, productivity and functionality of wetlands in the Laurentian Great Lakes Region. However, the ability for these wetlands to mitigate climate change remains poorly understood and unquantified. Therefore, there is an immediate need to characterize the adaptive capacity of wetlands in order to inform the development and implementation of measures that promote climate change resilience. Adaptive capacity is defined here as the latent ability of a wetland to cope with climatic changes and maintain its current ecological regime. To operationalize this concept, Environment ...

Thursday, Jun 03

07:30 PM - 07:45 PM

Youth Engaged in Wetlands: A Global Network to Conserve Wetlands, Towards Youth Representation in the Ramsar Convention

Maria E. Sanchez

University of Saskatchewan

Maria E. Sanchez, Bidhya Sharma, Dylan Jones, Elise Allély-Fermé, Tatiana Lobato-de MagalhãesThe continuing and alarming decline of wetlands worldwide constitutes an urgent call-to-action for all generations to join efforts in conserving and using wetlands wisely. Youth Engaged in Wetlands (YEW) is an international network whose mission is to provide a global platform for youth worldwide, to enable and empower them to promote wetland conservation. YEW aims to build greater sense of ownership of the Ramsar Convention on Wetlands' mission among youth, through networking and capacity building. YEW's vision is to be the leading youth network at the global level for ...

Thursday, Jun 03

07:45 PM - 08:00 PM

Seed production of a wetland species, *Schoenoplectus americanus*: responses to density and global warming factors

Aoi Kudoh

Graduate Student, Kyoto University

Aoi Kudoh, Adam Langley, Dennis Whigham, Genevieve Noyce, Patrick Megonigal Sexual reproductive effort in wetland plants is influenced by environmental factors such as temperature, photoperiod, and nutrient availability as well as within-populations factors such as shoot density. Environmental conditions in wetlands are rapidly changing, thus it is important to predict the effects of global change on reproduction of wetland plant species. The target species in this study is *Schoenoplectus americanus* (Cyperaceae), a common wetland species in brackish tidal wetlands of the Chesapeake Bay and beyond. We evaluated density and reproduction data from three experiments that range from 3 to +30 years ...

Thursday, Jun 03

07:45 PM - 08:00 PM

Transboundary Wetlands: Exploring Formal Mechanisms for Cooperation

Zoe Rosenblum

Oregon State University and IHE-Delft Institute for Water Education

Despite increased understanding of the benefits of wetlands, global wetland area continues to decrease. Wetlands are being lost at an alarming rate, and with them, biodiversity, floodwater storage, water purification, and countless other functions. There is little information available about mechanisms to manage transboundary wetlands. While the Ramsar Convention is one international mechanism for wetland governance, there are very few cases in which all riparian parties have jointly designated a Transboundary Ramsar Site. Most research on transboundary wetlands explores specific conflicts or management issues or argues for or against the Ramsar Convention as a legal tool to manage wetlands. However, ...

Thursday, Jun 03

08:00 PM - 08:15 PM

Assessment of Floristic Quality, Composition, and Soil Phosphorus Dynamics in Restored and Naturally Occurring Wetlands in Southeastern Wisconsin

Rachel Schultz

Associate Professor, SUNY Brockport

Rachel Schultz, Aaron Marti Previous Wisconsin DNR (WDNR) research has indicated that wetland floristic quality assessment metrics (WFQA; measures of wetland plant community condition) are inversely correlated with the proportion of redox-sensitive soil phosphorus (Fe- and Al- bound; % exchangeable P) when wetlands are grouped by broad cover type (i.e., herbaceous vs. woody). However, no known studies have explored whether this relationship occurs within individual wetland plant community types or in restored wetland sites in Wisconsin or elsewhere. To begin addressing this gap, we surveyed southern sedge meadows (SSM) and emergent marshes (EM) in southeastern Wisconsin within 1) 64 naturally occurring ...

Thursday, Jun 03

08:15 PM - 08:45 PM

Pre-Recorded Q&A S5: Exhibiting Ethics in Wetland Restoration and Creation: Case Studies and Lessons Learned - hosted by the SWS Professional Certification Program & SWS Wetland Restoration Section II

Thursday, Jun 03

08:15 PM - 08:55 PM

Pre-Recorded Q&A CS6: Climate Disruption

Thursday, Jun 03

08:15 PM - 08:45 PM

Pre-Recorded Q&A CS5: Worldly Wetlands II

Thursday, Jun 03

08:15 PM - 08:45 PM

Pre-Recorded Q&A CS4: Vegetation II

Tuesday, Jun 08

08:00 AM - 08:35 AM

P3: Pulsing dynamics and the development of coastal ecosystems facing sea-level rise

Evelyn Gaiser

Professor and Endowed George M. Barley Jr. Eminent Scholars Chair, Florida International University

Water flow pulses are a common denominator of flowing-water ecosystems and may play a particularly regulatory role in low-gradient coastal wetlands. Coastal wetlands receive pulses of freshwater from rainfall and frequently managed flows, while also being subject to marine water pulses from tides and tropical storms. Resultant water level fluctuations often lead to energy subsidies that stimulate production and consumption. These energy subsidies may be particularly important in coastal wetlands facing subsidence and collapse of peat soils driven by accelerating sea-level rise and saltwater intrusion. Where subsidy pulses accelerate sedimentation or soil development by plants and/or algal mats, they may ...

Tuesday, Jun 08

08:35 AM - 08:55 AM

Simply measurable hydrophysicochemical attributes are associated with soil redoximorphic feature & color characteristics in Northern Virginia wetlands

Stephanie Schmidt

Ms., George Mason University

Stephanie Schmidt, Changwoo Ahn Soil color patterns called redoximorphic features (RMFs)—concentrations, depletions, and reduced matrices—are often requirements for soils to be classified as hydric (i.e., able to support wetland ecosystems), but require extensive training to be properly identified. In this study, we characterized RMF and soil color attributes in plots from four wetland sites in Northern Virginia based on watershed urbanization degree and physiographic region. To develop a method capable of assessing and tracking presence and development of hydric soils, we assessed four simply measurable hydro-physicochemical (HP) attributes at each plot and compared both HP and 10 RMF and color attributes ...

Tuesday, Jun 08

08:35 AM - 08:55 PM

Beavers Role in Restoring Sediment Ponds and Water Quality of Reclaimed Mine Site

Amir Hass

Associate Research Professor, West Virginia State University

Amir Hass, Isaac Wolford, Randall Lester, Robert Cantrell, Warren Haynes Sediment ponds constructed downstream from surface mining operations to trap sediments from mining activities are usually removed upon site reclamation and final bond-release phase of the mining permit. Opportunistic as they are, beavers sometimes move in and restore damaged ponds into wetlands. In this study, we evaluate the role of such headwater-restored pond on stream water quality downstream from a mountaintop-removal valley-fill surface mining site at the Central Appalachian broadleaf forest ecoregion in south-central WV, 15 years after reclamation. In-situ stream water measurements of pH, dissolve oxygen, oxidation-reduction potential, temperature and ...

Tuesday, Jun 08

08:35 AM - 10:25 AM

S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands I

Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands. The organizer has not yet had time to seek replacements for the 6 presenters from Quebec who did not respond (yet) to the invitation to present in Spokane. By October, the organizer assumes that he will have enough accepted invitations to fill all 15 slots. If not, then the organizer would be very happy to accept contributed, student talks that address the symposium topic.

Tuesday, Jun 08

08:35 AM - 08:40 AM

Introduction S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands I

Tuesday, Jun 08

08:35 AM - 10:25 AM

S7: Floating Treatment Wetlands

The use of Floating Treatment Wetlands (FTWs) to ameliorate stormwater and other waste water is increasing throughout the world. Studies have shown reductions in nutrients and contaminants in stormwater after being treated with FTWs. Other studies have found extensive use of the habitat created by FTWs by invertebrates, numerous species of fish, amphibians and water fowl, especially when placed in urban waterbodies that are lacking riparian and wetland habitat. The presentations within this symposia will share research project results and ideas on how FTWs can be utilized to improve water quality and habitat within urban and suburban rivers and lakes.

Tuesday, Jun 08

08:35 AM - 08:40 AM

Introduction S7: Floating Treatment Wetlands

Tuesday, Jun 08

08:35 AM - 10:25 AM

S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools I

The main objective of this symposium is to showcase new and credible scientific information on tropical wetlands that can offer policy makers relevant knowledge to make sound decisions related to climate change adaptation and mitigation. Specifically, this symposium will aim to show research progress on (1) Our understanding of carbon stocks and dynamics of tropical wetlands (including sinks/sources of greenhouse gases), and how this information can be used to inform policies; (2) New approaches and tools that could be helpful in decision making by identifying adaptation strategies, including ecosystem modelling and scenario analysis at variable geographic scales for effective conservation ...

Tuesday, Jun 08

08:35 AM - 08:40 AM

Introduction S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools I

Tuesday, Jun 08

08:35 AM - 10:25 AM

CS8: Animal Biodiversity

Tuesday, Jun 08

08:35 AM - 10:25 AM

CS7: Identification, Delineation, and Functional Assessment

Tuesday, Jun 08

08:40 AM - 08:55 AM

Searching for a Tiny Bigfoot: Do Black Rails Exist in Coastal Louisiana Wetlands?

Erik Johnson, Justin LehmanThe enigmatic Eastern Black Rail (*Laterallus j. jamaicensis*) has been proposed for Endangered Species Act listing because of apparent low population sizes and rapid declines in part of its range. Little is known about its occurrence or status in Louisiana, where over 2,000 km² of coastal wetlands, important to wildlife and the national economy, have been lost since the 1930s. Between May 2017 and April 2019, we conducted the first focused survey effort in the state for this species, utilizing two survey methods: A) point counts (at 33 sites) and B) drag-line surveys (at 16 sites), the ...

Tuesday, Jun 08

08:40 AM - 08:55 AM

The SWAMP Initiative: Integration of Tropical Wetland Research, Capacity Building, and Policy Development Across the Globe

Randy Kolka
Dr., USDA Forest Service

Carbon-rich tropical wetlands (mangroves and peatlands) are important in climate change adaptation and mitigation strategies and provide numerous ecosystem services such as storm protection, nursery areas for fish, habitat for rare species, long-term storage of carbon, and food, fiber, and fuel for humans. Because of their importance we developed the Sustainable Wetlands Adaptation and Mitigation Program (SWAMP) to assist countries with their accounting and conservation of tropical wetlands. SWAMP is a collaborative effort between the Center for International Forestry Research and the USDA Forest Service through support from the US Agency for International Development. The goal of SWAMP is to ...

Tuesday, Jun 08

08:40 AM - 08:55 AM

Duwamish River Floating Wetlands Project: Scientific and Social Innovation

Nancy Rottle
Professor, University of Washington

Nancy Rottle, Jen Engelke, Leann Andrews, Mason BowlesA third of Puget Sound's coastline and 97% of Seattle's urban core shoreline is armored, replacing historic wetland and riparian habitats that once lined the edges of rivers and estuaries and removing the food source, refuge, and ecological estuarine processes that five species of salmon require to survive. In the Duwamish River, juvenile salmon must swim from their natal streams through a gauntlet of urban industry and a toxic cocktail Superfund site to reach Puget Sound and the Pacific Ocean. Since traditional restoration is not possible where riverside industry provides essential services, innovative ...

Tuesday, Jun 08

08:55 AM - 09:10 AM

Hydroacoustic sonar data quantify fish passage in a hydrologically reconnected wetland at the Shiawassee National Wildlife Refuge, Saginaw, MI, USA

Alexandra (Sasha) Bozimowski
Ecologist, U.S. Geological Survey - Great Lakes Science Center

Alexandra (Sasha) Bozimowski, Anna Greenberg, Eliza Lugten, Eric Dunton, Julie Dellick, Kurt Kowalski, Maria Salem, Xinmiao LiuReestablishing hydrologic connectivity between an impounded wetland and a parent waterbody is an important process in restoring fish habitat. However, it is difficult to quantify fish usage of reconnection structures and fish passage into and out of reconnected sites given limitations caused by low light conditions, poor water clarity, and gear-type specificity associated with common capture methods. High-resolution sonar, such as the Adaptive Resolution Imaging Sonar (ARIS; Sound Metrics, WA, USA), allows researchers to non-invasively view the water column and its contents in high ...

Tuesday, Jun 08

08:55 AM - 09:10 AM

An Evaluation of the Characteristics and Functions of Problematic Wetlands: Alpine Swales, Chugach Mountains, Southcentral Alaska

Charlene Johnson

Wetland & Vegetation Program Manager, 673d Civil Engineer Squadron- Conservation Element

Problematic wetlands are designated as such due to, typically, naturally occurring complex circumstances which may mask one or more features of a landform which otherwise performs the functions of a wetland. In Alaska, Alpine Swales have been identified by the U.S. Army Corps of Engineers and National Technical Committee on Hydric Soils as being problematic due to seasonal hydrology dependent on snowbeds and lack of typical hydric soil indicators. The problematic features are a function of the geologic, biologic, and climatic conditions in high latitude and high elevation alpine ecosystems. This study evaluated the vegetation, hydrology, and soil characteristics of ...

Tuesday, Jun 08

08:55 AM - 09:10 AM

The Duwamish River Floating Wetlands Project: Research Outcomes

Jenn Engelke

PhD Researcher, University of Washington

Jenn Engelke, Leann Andrews, Mason Bowles, Nancy RottleThe Duwamish River Floating Wetlands project deployed and monitored constructed floating wetlands (CFWs) during the 2019 and 2020 seasons of outmigrating juvenile salmon runs on the urban Duwamish River. CFWs are an innovative form of green infrastructure that may be used to enhance water quality and provide a range of other ecosystem services, including providing wetland and aquatic habitat along armored shorelines where traditional restoration is not feasible. The scientific objectives of the monitoring program were to gather information about how CFWs influence juvenile salmon behavior, invertebrate production, plant growth, and water quality ...

Tuesday, Jun 08

08:55 AM - 09:10 AM

Incorporating wetlands in forest reference emission levels

Daniel Murdiyarso

Principal Scientist, CIFOR

Daniel Murdiyarso, Rupesh Bhomia, Sigit SasmitoForest reference emissions level (FREL) is one of the decisions adopted in the Conference of Parties to the UNFCCC to allow countries to attract payment based on the results of mitigation measures implemented nationally. Two main components required and frequently revised are emission factor (EF) and activity data (AD). Following the Supplement of IPCC Guidelines that assists countries to incorporate wetlands including peatlands and mangroves in greenhouse gas inventories, here we propose a high tier of EF for mangroves, widely called coastal blue carbon. The total ecosystem carbon stocks (TECS) of different management regimes, which ...

Tuesday, Jun 08

08:55 AM - 09:10 AM

Interior Wetlands of Mexico: Status and Issues of Waterbird Habitats

Antonio Cantu

Interior Wetlands of Mexico: Status and Issues of Waterbird Habitats, Louisiana State University

Antonio Cantu, J. Patrick Donnelly, Sammy KingWetlands of Mexico's Highlands have historically been key habitats for migratory birds of North America, providing wintering, stopover, and breeding grounds for populations of waterfowl, shorebirds, and other wetland-dependent wildlife. However, major wetland habitats in this region are exposed to multiple threats related to human activities. We identified 10 priority wetlands for migratory birds in Mexico's Highlands based on long-term records by mid-winter aerial surveys conducted by the U. S. Fish and Wildlife Service. Our objective was to evaluate the status and major threats to these sites and identify factors limiting their restoration potential. ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

The Duwamish River Floating Wetlands Project: Community Science and Public Outreach

Leann Andrews
Staff, Green Futures Lab

Leann Andrews
Assistant Professor, Penn State

Leann Andrews, Adrienne Hampton, Ashley Mocerro Powell, Jen Engelke, Mason Bowles, Nancy RottleThe Duwamish River Floating Wetlands project deployed and monitored constructed floating wetlands (CFWs) during the 2019 and 2020 seasons of outmigrating juvenile salmon runs on the urban Duwamish River in Seattle, Washington. Embedded in the project was a highly integrated community science and public outreach program developed using best practices as described in Culturally Sustaining Pedagogies, Principles of Environmental Justice, and Jemez Principles for Democratic Organizing. The goals of the community science and outreach program were 1) to include and employ populations historically underrepresented in science, infusing equity ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

THE DUWAMISH RIVER FLOATING WETLANDS PROJECT: INTEGRATING LIVING SHORELINES AND CONSTRUCTED FLOATING WETLANDS INTO URBAN WATERWAYS

Mason Bowles
Senior Ecologist, Bioemergent Wetland Solutions

Mason Bowles, Jen Engelke, Leann Andrews, Nancy RottleFrom 2019-20 the Duwamish River Floating Wetlands Project combined research and community science on the Duwamish River to determine if living shorelines consisting of constructed floating wetlands (CFWs) can be used to increase salmon habitat and improve water quality to support the survival of outmigrating salmon smolts. The Project developed "biobarge" vessels to host two generations of CFW designs that grew eight species of rush and generated invertebrate food prey preferred by juvenile salmon smolts. Year two changes in design and location showed increased juvenile salmon visitation. The CFW substrates remediated copper, lead, ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

On bait buckets and Boreal ducks: Associations between migrant duck physiology and a wetland-ecosystem engineer

Joshua Stafford
Assistant Unit Leader, USGS - South Dakota State Univ.

Joshua Stafford, Adam Janke, Michael AnteauThe capacity of a migrating bird to accumulate and maintain sufficient lipid reserves to fuel migration and facilitate subsequent reproduction is the ideal currency for gauging the contribution and quality of individual migration stopover habitats. We used concentrations of lipid metabolites circulating in plasma of spring-migrating female lesser scaup (*Aythya affinis*) and blue-winged teal (*Anas discors*) to evaluate the consequences of variation in biotic and abiotic attributes of stopover wetland habitats on their lipid dynamics, or refueling performance. Indexed refueling performance of both species was negatively correlated with high densities of fathead minnows (*Pimephales promelas*). ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

Rate of iron monosulfide formation in S-rich wetland soils

Chelsea Duball

Ph.D. Candidate, University of Wyoming

Chelsea Duball, Dylan Beaudette, Karen Vaughan, Megan Andersen Indicator of Reduction in Soil (IRIS) films are a unique tool used to measure anaerobic conditions, in contribution towards hydric soil identification, and therefore wetland identification. IRIS films are typically used to quantify anaerobic conditions in soils via the visualization of iron (Fe) reduction, whereby the orange iron-oxide (Fe^{3+}) paint on the film disappears under reducing conditions when Fe^{3+} is reduced to soluble Fe^{2+} , thus leaving behind the white color of the bare polyvinyl chloride (PVC) film. Alternatively, under oxidation-reduction levels well below the range of Fe-reduction, sulfate (SO_4^{2-}) reduces to sulfide (S^{2-} ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

Biotic and Abiotic Drivers that impact the ability of Pacific high island mangrove forests to keep up with sea level rise

Richard MacKenzie

Richard A. MacKenzie, Eugene Eperiam, Jessica Grow, J Val Klump, Karen Thorne, Ken Krauss, Kevin Buffington, Maybeleen Apwong, Roseo Marquez, Tamara Greenstone Alefaio Micronesian mangroves represent some of the most intact and productive mangroves in the world and provide food, fiber, and fuel for indigenous peoples across the Micronesian region. These forests are also important role for climate change mitigation and adaptation as they can remove and bury massive amounts of atmospheric CO_2 as well as maintain coastline elevations relative to sea level. Both of these services are largely influenced by belowground processes, such as accretion, sedimentation, and C burial. We ...

Tuesday, Jun 08

09:10 AM - 09:25 AM

Daily Energy Expenditure and Time Activity Budgets of Wintering American Black Ducks in the Central Appalachians

James Anderson

James Anderson, Sally Yannuzzi American black ducks (*Anas rubripes*) have declined in abundance due to habitat loss, hybridization with mallards (*Anas platyrhynchos*), and historic overhunting. Although the overall population of black ducks has stabilized and even increased in portions of its range, important wintering areas in western Pennsylvania and West Virginia have continued to see a decrease. Our objectives were to determine wintering black duck daily energy expenditure (DEE) in Central Appalachia through time-activity budgets, and calculate behavioral differences among wetland systems, levels of naturalness, management schemes, flock composition, year, date, and time of day. Between November and March 2015–2016 and ...

Tuesday, Jun 08

09:25 AM - 09:40 AM

Degraded mangrove structure: what to restore?

Triaklaksita Ardhani

Student, CIFOR

Triaklaksita Ardhani, Cecep Kusmana, Daniel Murdiyarto Mangrove forest structure characterized by its ecological (richness, diversity and evenness) indices were observed in two contrasting restoration practices in Central Java, Indonesia. Large scale, laborious, and capital-intensive restoration program should consider the lesson from specific and controlled cases, where assessments have been made. Restoration with wave barrier took an effect depending on the age of the installation. We found that species richness index is increasing with the age of barriers of 0.20, 0.41 and 0.56 for 0, 1 year and 4 years old of barriers respectively. Likewise, species diversity increase from 0.58, 0.91 an ...

Tuesday, Jun 08

09:25 AM - 09:40 AM

Recent Changes and Future Uncertainty in Whooping Cranes and Their Habitats along the Texas Gulf of Mexico Coast

Elizabeth Smith

North America Program Director, International Crane Foundation

Endangered Whooping Cranes migrate 4,000 km annually from breeding grounds in Northern Territories, Canada, to wintering grounds in coastal Texas, United States, and require vast expanses of fresh, brackish and saline wetlands. After reaching a record low of 16 individuals in 1941, the Whooping Crane population has grown to about 500 individuals through international species protection, habitat conservation, and public awareness efforts. However, wetland habitat loss and degradation on coastal wintering grounds remains the primary limiting factor for continued Whooping Crane recovery. Sea-level rise (SLR) along the Texas coast in United States is ~4 mm/yr, twice the global SLR rate ...

Tuesday, Jun 08

09:25 AM - 09:40 AM

Green Lake Floating Wetlands Project

Rob Zisette

Principal Aquatic Scientist, Herrera Environmental Consultants

Friends of Green Lake has assembled a leadership team of experts for the design, purchase, planting, installation, and maintenance of constructed floating wetlands for improvement of native bird habitat, fish habitat, water quality, aesthetic value, and wetland education for Seattle's most precious and used resource. Our team includes environmental education experts who would design signage explaining how floating wetlands cost-effectively improve the habitat and function of urban waters. This project would demonstrate a unique restoration approach at a highly visible location for many Seattle residents. Our team has developed a project work plan and preliminary design to maximize the function ...

Tuesday, Jun 08

09:25 AM - 09:40 AM

Optimizing Spring Flows for Juvenile Chinook Salmon Survival Through the San Joaquin River Delta

Patti Wohner

Dr., Oregon State University

Patti Wohner, Adam Duarte, James Peterson Chinook salmon (*Oncorhynchus tshawytscha*) were once abundant throughout California's Central Valley watershed and supported economically and culturally significant fisheries. Land development, river modification, and water use have led to widespread habitat degradation resulting in significant declines in Chinook salmon and other anadromous fishes. In 1992, the U.S. Congress passed the Central Valley Project Improvement Act (CVPIA) that required a doubling of the number of naturally produced anadromous fishes in the Central Valley by 2002 that remains unfulfilled today. The timing, magnitude, variation, temperature, and turbidity of river discharge are highly altered in the Central Valley, ...

Tuesday, Jun 08

09:40 AM - 09:55 AM

How Does Wetland Soil Contamination Relate to Freshwater Turtle Heavy Metal Bioaccumulation?

Darien Lozon

Graduate Research Assistant, West Virginia University

Darien Lozon, Donald Brown, James Anderson, Jason Hubbard Underground and surface coal mining have resulted in heavy metal contamination such as iron sulfide, selenium, and mercury in West Virginia wetlands. Agricultural runoff such as pesticides can also cause zinc, cadmium, chromium, and lead accumulation in wetland systems over time. Heavy metals can pose a threat to the health and safety of humans who interact with contaminated water or consume animals with accumulated levels higher than the EPA regulation. Freshwater turtles can serve as a biological indicator for quantifying environmental health because their life expectancy and high trophic status increase their bioaccumulation ...

Tuesday, Jun 08

09:40 AM - 09:55 AM

Opportunities and Constraints for Wetland Conservation in an Irrigated World

Sammy King

Sammy King

Sammy King, John Vradenburg, Leigh Fredrickson, Murray Laubhan, Paul Tashjian Agriculture and wetland and wildlife conservation are closely linked through state and federal policies, agricultural conversion of wetlands, and wetland and wildlife benefits provided by certain farm practices. In the last few decades, irrigated agriculture has rapidly expanded placing tremendous pressure on water and wetland resources throughout the United States resulting in widespread and often irreversible groundwater declines and surface water shortages. Some conservation practices, such as improved irrigation efficiency, have led to increased water use. Some purported solutions, such as interbasin transfers and conversion of wetlands to on-site irrigation reservoirs, ...

Tuesday, Jun 08

09:40 AM - 09:55 AM

Sources of degradation in Vietnam mangroves and their impact on function

Pham Hong Tinh

Hong Tinh Pham, Dang Hung Tran, Hoang Hanh Nguyen, Quy Manh Do, Richard A. Mackenzie, Sy Tuan Mai, Thi Ha Hoang, Thi Hong Hanh Nguyen Vietnam has approximately 165,000 ha of mangrove forest distributed along its 3,260 km long coastline from the far north to the south end of the country. Vietnam mangrove forests have long been recognized to play important roles in coastal protection against soil erosion and from storms/strong waves, supplying seafood, land reclamation, and carbon accumulation. Analyses of the Normalized Difference Vegetation Index values extracted from time-series Landsat/Sentinel images indicated that in the period from 1995-2019, Vietnam lost ...

Tuesday, Jun 08

09:55 AM - 10:25 AM

Pre-Recorded Q&A S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands I

Tuesday, Jun 08

09:55 AM - 10:25 AM

Pre-Recorded Q&A S7: Floating Treatment Wetlands

Tuesday, Jun 08

09:55 AM - 10:25 AM

Pre-Recorded Q&A S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools I

Tuesday, Jun 08

09:55 AM - 10:25 AM

Pre-Recorded Q&A CS8: Animal Biodiversity

Tuesday, Jun 08

09:55 AM - 10:25 AM

Pre-Recorded Q&A CS7: Identification, Delineation, and Functional Assessment

Tuesday, Jun 08

10:25 AM - 10:55 AM

Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

Tuesday, Jun 08

10:55 AM - 11:15 PM

Floodplain/streambank modulation of river loads of sediment and nutrients, from reaches to watersheds to regions

Gregory Noe
US Geological Survey

Gregory Noe, Cliff Hupp, Edward Schenk, Kristina Hopkins, Labeeb Ahmed, Marina Metes, Peter Claggett, Thomas Doody Floodplain/streambank modulation of river loads of sediment and nutrients, from reaches to watersheds to regions Greg Noe, Krissy Hopkins, Peter Claggett, Cliff Hupp, Ed Schenk, Marina Metes, Labeeb Ahmed, Dianna Hogan Floodplains and streambanks play a key role in watershed nutrient and sediment transport and stream water quality; however, current understanding, data density, and tools are insufficient to make spatially-explicit, quantitative predictions of sediment and nutrients fluxes across multiple spatial scales. We measured bank erosion and floodplain deposition over decadal time scales using dendrogeomorphology, sediment ...

Tuesday, Jun 08

10:55 AM - 11:15 AM

Wetland Assessment: Beyond the Traditional Water Quality Perspective

Amanda Nahlik

Research Ecologist, US EPA Office of Research and Development

Amanda Nahlik, Mary Kentula, Steven Paulsen, Teresa Magee Water chemistry or water quality is often used to determine if aquatic ecosystems meet restoration objectives or Clean Water Act criteria. However, it is not consistently possible to collect water in wetlands because surface water presence varies across wetland types. Using data from the National Wetland Condition Assessment (NWCA), a survey of 967 sites representing 25,153,681 hectares of wetland across the conterminous US, we found surface water could be collected at only 537 of the sampled sites, representing only 41% of the wetland population area and under-representing particular wetland types. We use wetlands ...

Tuesday, Jun 08

10:55 AM - 12:45 PM

S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands II

Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands. The organizer has not yet had time to seek replacements for the 6 presenters from Quebec who did not respond (yet) to the invitation to present in Spokane. By October, the organizer assumes that he will have enough accepted invitations to fill all 15 slots. If not, then the organizer would be very happy to accept contributed, student talks that address the symposium topic.

Tuesday, Jun 08

10:55 AM - 11:00 AM

Introduction S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands II

Tuesday, Jun 08

10:55 AM - 12:45 PM

S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools II

The main objective of this symposium is to showcase new and credible scientific information on tropical wetlands that can offer policy makers relevant knowledge to make sound decisions related to climate change adaptation and mitigation. Specifically, this symposium will aim to show research progress on (1) Our understanding of carbon stocks and dynamics of tropical wetlands (including sinks/sources of greenhouse gases), and how this information can be used to inform policies; (2) New approaches and tools that could be helpful in decision making by identifying adaptation strategies, including ecosystem modelling and scenario analysis at variable geographic scales for effective conservation ...

Tuesday, Jun 08

10:55 AM - 11:00 AM

Introduction S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools II

Tuesday, Jun 08

10:55 AM - 12:45 PM

S9: SWS Career Narratives: 1) Smooth transitions at any career stage (organized by Women in Wetlands)

Career narratives provide guidance and inspiration for the wetland science community. This symposium supports the mission of the Women in Wetlands Section to facilitate professional development for wetland scientists and features established careers from Doug Wilcox's compendium. Focusing on smooth career transitions and sustaining a life-long career, our symposium embodies the meeting theme of "Adaptation Drives Innovation". Session 1: Smooth transitions at any career stage Navigating careers in wetland science involves important transitions (e.g. university to full-time employment, single to family, any career to retirement) that can rarely be mapped. Observations from lessons learned through career transitions can 1) equip people with ...

Tuesday, Jun 08

10:55 AM - 11:00 AM

Introduction S9: SWS Career Narratives: 1) Smooth transitions at any career stage (organized by Women in Wetlands)

Tuesday, Jun 08

10:55 AM - 12:45 PM

CS10: Hydrology and Sediment

Tuesday, Jun 08

10:55 AM - 12:45 PM

CS9: Policy

Tuesday, Jun 08

11:00 AM - 11:30 AM

Soil greenhouse gas emission factors for tropical peatlands

Kristell Hergoualc'h

Senior Scientist, Center for International Forestry Research

Kristell Hergoualc'h, Eric Swails Tropical peatlands are large carbon (C) deposits which store most of their C belowground. When disturbed either by vegetation changes, drainage or both, the soil organic matter which accumulated over thousands of years mineralizes very quickly releasing large amounts of greenhouse gas (GHG) into the atmosphere. Current knowledge on the magnitude of these transfers remains extremely limited, disbalanced geographically, and inaccurate in some instances. For example, tropical organic soil emission factors of the 2013 Wetland Supplement to the 2006 IPCC guidelines were exclusively based on data collected in Southeast Asian ombrotrophic (i.e. nutrient-poor) peatlands and may not ...

Tuesday, Jun 08

11:00 AM - 11:15 AM

The History and Importance of Private Lands for North American Waterfowl Conservation

Mike Brasher

Waterfowl Scientist, Ducks Unlimited, Inc.

Waterfowl conservation in North America provides an example of an abundant wildlife resource that was driven to alarmingly low levels due to unregulated exploitation of its populations and habitats, but which has since recovered due to cooperative efforts across multiple countries. Waterfowl conservation in North America began in earnest during the late 19th and early 20th Century and has developed through international treaties and national policy as well as regional partnerships and supporting efforts of private landowners. In recent years, significant accomplishments have been realized through public/private partnerships that use local knowledge and engagement with stakeholders to develop conservation programs ...

Tuesday, Jun 08

11:00 AM - 11:15 AM

Planning for the 85%: Advice to Help Transition to Science Policy and the World of "Alternative" Careers.

Ariana Sutton-Grier

Visiting Associate Research Professor, University of Maryland

It is a fact that the U.S. is producing many more PhDs each year than there are academic positions to accommodate. This includes academic positions in research institutions as well as academic positions in liberal arts institutions, community colleges, and other academic institutions. This means students need to be preparing for many career options, starting as early as possible. This presentation will focus on my personal career journey as an ecosystem ecologist. I have worked at the Smithsonian Environmental Research Center, been an American Association for the Advancement of Science (AAAS) Science and Technology Policy fellow, been a contractor for ...

Tuesday, Jun 08

11:15 AM - 11:30 AM

Invasive Species and Compensatory Mitigation: Environmental Drivers, Performance Standards, and Best Practices

Douglas DeBerry

Research Assistant Professor, William & Mary

Douglas DeBerry, Dakota Hunter One of the most important and pervasive contemporary issues in the field of ecological restoration is that of biological invasion. From first principles, we know that disturbance represents a mode of introduction for invasive species, and ecological restoration sites can be particularly susceptible to biological invaders because the practices used to create, restore, or enhance ecological conditions are often the same types of disturbances that leave a site vulnerable to invasion. This is especially true of compensatory wetland and stream mitigation sites, where invasive plant species present one of the greatest challenges to managers, designers, and agency ...

Tuesday, Jun 08

11:15 AM - 11:30 AM

From graduate student to environmental scientist in the field

Becka Downard

Wetland Coordinator, Utah Division of Water Quality

In October of 2016 I made the transition from graduate research assistant to environmental scientist with the State of Utah. Since then I've seen how my time at university created optimal circumstances for working in the environmental field. The most important thing I did as a student was develop an interdisciplinary science background. Being interdisciplinary is useful for environmental scientists because it allows you to understand the policies that guide our work, do good science, and foresee the implications of science on policy. Networking as a student and a scientist continues to be helpful in doing effective work. During my ...

Tuesday, Jun 08

11:15 AM - 11:30 AM

Process-based modelling of peat greenhouse gas emissions in Indonesian peatlands

Erin Swails

Post doc consultant, Center for International Forestry Research (CIFOR)

Erin Swails, Jia Deng, Kristell Hergoualc'h, Steve Frokling Efforts aimed at mitigating greenhouse gas (GHG) emissions from land use and land-use change rely on quantification of baseline emissions reference levels and monitoring of actual emissions. Therefore, accurate and precise estimates of peat GHG fluxes are critical for mitigating anthropogenic GHG emissions from tropical peatlands. However, existing measurements of tropical peat GHG fluxes are sparse compared to measurements in temperate and boreal peatlands. Furthermore, due to the high spatial and temporal variability of peat GHG fluxes, quantification using extrapolation of point-based field measurements is inherently uncertain. Process-based models rely on relationships between ...

Tuesday, Jun 08

11:15 AM - 11:30 AM

Avian Use of Marsh Terraces in Gulf Coastal Wetlands

Madelyn McFarland

Graduate Research Assistant, Mississippi State University

Madelyn McFarland, Brian Davis, Larry Reynolds, Mark Woodrey, Mike Brasher Coastal wetlands of the Gulf of Mexico support millions of migratory birds annually. However, between 2004 and 2009, Gulf states experienced 71% of the total decline of coastal wetlands within the conterminous United States; Louisiana accounted for most of this loss. Marsh terracing is one method used to combat coastal wetland loss. This restoration technique uses in situ sediment to construct segmented ridges in open water areas of shallow, coastal wetlands to dissipate erosive wave energy, reduce turbidity, increase submerged aquatic vegetation production, and provide habitat for a diversity of ...

Tuesday, Jun 08

11:15 AM - 11:30 AM

Evaluation of the Aquifer Exploitation Potential in a Riverbank Filtration Site Based on Spatiotemporal Variation of Riverbed Hydraulic Conductivity

Geng Cui

Dr., Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences

Geng Cui, Shouzheng Tong River infiltration is an important part of groundwater resource recharging in riverbank filtration (RBF) sites. It is not only affected by the hydraulic gradient between river stage and groundwater table, but it also depends largely on the riverbed hydraulic conductivity (RHC). However, due to the hydrodynamic conditions and sediment thickness during the scouring and deposition process, the lithology of riverbed sediments undergoes strong spatial and temporal changes, which leads to strong uncertainty of RHC. The way in which river scouring and deposition influence the RHC is still not completely clear, resulting in the inaccuracies in calculation of ...

Tuesday, Jun 08

11:30 AM - 11:45 AM

Rollback of US federal wetland protections: Implications for wetland acres and functions in Wisconsin

Nick Miller

Director of Science and Strategy, The Nature Conservancy

Nick Miller, Ashley Gries, Chris Smith, Joanne Kline, John Wagner, Loretha Jack, Tom Bernthal Waters of the US (WOTUS) rules define which wetlands and waterbodies receive federal protection under the Clean Water Act (CWA). These definitions have been debated in courts and subject to change since the CWA's inception. The 2020 WOTUS Rule, called the Navigable Waters Protection Rule, is less restrictive than previous iterations, limiting CWA wetland jurisdiction to sites adjacent to—and typically annually inundated by—relatively permanent surface waters. These changes will eliminate federal regulatory protections for many wetlands and put at risk wetland services such as flood abatement, water ...

Tuesday, Jun 08

11:30 AM - 11:45 AM

Interactions between Fe and light strongly affect phytoplankton communities in a eutrophic lake

Yuxiang Yuan

Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences

Yuxiang Yuan, Marinus Otte, Ming Jiang, Xiaoyan Zhu The global increase in occurrence of harmful algae blooms in lakes has gained widespread attention. Although N and P are the main factors for primary productivity in lake ecosystems, dissolved iron (Fe) plays a crucial role as an essential micronutrient for phytoplankton growth. The interaction between Fe and light in phytoplankton growth is reasonably well studied in marine ecosystems, but there is a lack of understanding of this interaction in lakes. We conducted both a field study and an incubation experiment to identify the role of Fe and light in modulating phytoplankton growth ...

Tuesday, Jun 08

11:30 AM - 11:45 AM

Advancements into climate regulation of peatland Greenhouse Gases fluxes: An experience in a tropical peatland, Iquitos, Peru

Lizardo Fachin

Researcher, Instituto de Investigaciones de la Amazonía Peruana - IIAP

Lizardo Fachin, Dennis del Castillo Torres, Erik Lilleskov, Hinsby Cadillo-Quiroz, Jhon Rengifo, Randy Kolka, Rodney Chimner, Tim Griffis, Tyler Roman While much work has been done to understand the ecosystem processes of boreal peatlands, tropical peatlands are lagging in their representation in global peatland research projects, despite the knowledge that they represent one of the largest natural terrestrial carbon (C) pools. The Peruvian Amazon basin contains approximately 75,000 square kilometers of lowland peatlands, which are known to contain large amounts of C, specifically, the Loreto region of Peru which is home to a large portion of these peatlands and provides an ...

Tuesday, Jun 08

11:30 AM - 11:45 AM

Challenging Our Understanding of Western Yellow-billed Cuckoo Habitat Needs and Accepted Management Practices

Patti Wohner

Dr., Oregon State University

Patti Wohner, Jenna Stanek, Robert Cooper, Sammy King, Steven Laymon The focus of many riparian restoration efforts in the southwestern United States is the establishment of vegetative cover, often without re-establishment of flood dynamics. In the absence of flooding and gap forming disturbance, restored forests often senesce without tree recruitment. This has been common in California riparian systems, including those that historically supported federally threatened western Yellow-billed Cuckoo (*Coccyzus americanus*; Cuckoo). Multiple hypotheses exist for Cuckoo declines, but breeding ground habitat quality has not been sufficiently explored as a major contributing factor. We used a historical (1986–1996) spot mapping dataset from ...

Tuesday, Jun 08

11:30 AM - 11:45 AM

Moving from Multitasking to Mission: Growing Old Gracefully in the Workplace

Terry Doss

Director of Environmental Research & Ecological Restoration, NJ Sports & Exposition Authority

Growing old gracefully in the workplace is becoming more difficult given the growth of the “gig” economy and changing cultural standards and principles. People with many years of experience often command higher salaries and more benefits, which conflicts with company directives to lower direct costs and increase productivity. And right about the time that our minds and bodies are slowing down, the speed of change in the workplace keeps getting faster, demands for overtime and weekend work are growing, and new technologies that require more training keep popping up. Retiring from the one firm that you worked for over a ...

Tuesday, Jun 08

11:45 AM - 12:00 PM

Criteria and Indicator approaches towards better monitoring and management of tropical peatlands

Rupesh Bhomia

Scientist, CIFOR

Rupesh Bhomia, Daniel Murdiyarto Peatland restoration needs to be underpinned by monitoring efforts that allow for adaptive approaches to peatland restoration. Peatland restoration monitoring can inform the design, strategy, selection of site and management approaches, and improve restoration efforts through adjustments. Tested monitoring protocols that are simple, easy to measure over time can be very helpful. Scientifically robust, reliable, and practical set of criteria and indicators (C & I) can help to assess progress and outcomes of restoration efforts. An attempt to identify a set of C & I for peatland restoration monitoring in Indonesia was made. The C and I ...

Tuesday, Jun 08

11:45 AM - 12:00 PM

Public Servant to Graduate Student: Sharing Tools between Roles

Professional experience is crucial to advancing your career and skillset in the field of wetland science and management. In particular, jobs with U.S. federal land management agencies operate in a seniority-based position advancement structure. Land managers and researchers recognize the importance of science-based decisions in the success of ecological restoration projects. In order for managers to advance science-based land management, certain technical skills such as statistical analysis, scientific writing, and discipline specific knowledge may be necessary. Returning to school after years spent in the work force can seem daunting, but drawing on skill sets learned in the work force can ...

Tuesday, Jun 08

11:45 AM - 12:00 PM

Western Yellow-billed Cuckoo nesting habitat restoration

Jenna Stanek

Ecologist, Los Alamos National Laboratory

Jenna Stanek, Patti Wohner, Robert Cooper, Sammy King, Stephen Laymon Western Yellow-billed Cuckoos are a riparian obligate species and are listed as federally threatened under the Endangered Species Act in the United States. Their populations continue to decline despite efforts to increase availability of riparian forest. Breeding habitat requirements include large contiguous tracts of riparian forest (>80 ha), large estimated home ranges (16–90 ha), and dense canopy cover. However, local habitat scale features required for nesting may be missing in landscapes of predominantly mature riparian forest in California. We used historical nest data (n = 95) from the South Fork Kern ...

Tuesday, Jun 08

12:00 PM - 12:15 PM

Transiting from fundamental to industrial research

Fatima Awwad

Université du Québec À Trois-Rivières

In a perfect world, funds would always be available for researchers to pursue their fundamental or applied research subjects. Early in my career, it was obvious that scientists in some fields tend to suffer more than others only because their research does not concern directly human health. After working on the feasibility of an artificial wetland in Lebanon, middle east, I transited from environmental to plant science. In France, finding a master thesis funded on plant biology is easy, but finding a financed doctoral thesis was another subject. Because of the fundamental aspects of the topic I was interested in, ...

Tuesday, Jun 08

12:00 PM - 12:15 PM

Conservation easements for “natural relatively natural habitat of fish, wildlife, or plants, or similar ecosystem” in the U.S. Tax Code

John Nyman

Professor, Louisiana State University Agricultural Center

Conservation easements allow landowners to transfer developmental rights to another organization that will not develop the land. Conservation easements are one answer to challenges to wildlife conservation posed by private land ownership. For example, the USDA Natural Resources Conservation Service (NRCS) enrolled over 2.7 million acres of wetlands on private lands. Most wildlife professionals probably believe that those easements, purchased with taxpayer's money, contributed to wildlife conservation. A different program recently attracted negative attention. The U.S. Department of Treasury, Internal Revenue Service estimated that between 2010 and 2017, private investors used syndicated permanent conservation easements to claim \$26.8 billion in ...

Tuesday, Jun 08

12:00 PM - 12:15 PM

Effectiveness of financial incentives for mangrove protection and development in Vietnam

Pham Thu Thuy

CIFOR

Thu Thuy Pham, Chi Dao Thi Linh Chi, Chien Pham Duc, Hoa Hoang Nguyen Viet, Huyen Trang Dao Le, Long Hoang Tuan, Phuong Vu Tan, Thu Thuy Pham, Tien Nguyen Dinh, Truong Nguyen VanMangroves play an important role in providing goods (forest products and fishery resources) and environmental services, both to the marine environment and people. However, in Vietnam, mangrove forests have been threatened by economic pressures and climate change. Since 1990s, the government of Vietnam has issued a large number of policies and donors have funded a large number of projects promote mangrove conservation activities. These policies and projects ...

Tuesday, Jun 08

12:15 PM - 12:45 PM

Pre-Recorded Q&A S6: Wetland Wildlife in Natural, Managed, Reclaimed and Restored Wetlands II

Tuesday, Jun 08

12:15 PM - 12:45 PM

Pre-Recorded Q&A S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools II

Tuesday, Jun 08

12:15 PM - 12:45 PM

Pre-Recorded Q&A S9: SWS Career Narratives: 1) Smooth transitions at any career stage (organized by Women in Wetlands)

Tuesday, Jun 08

12:15 PM - 12:45 PM

Pre-Recorded Q&A CS9: Policy

Tuesday, Jun 08

12:15 PM - 12:45 PM

Pre-Recorded Q&A CS10: Hydrology and Sediment

Tuesday, Jun 08

12:45 PM - 01:15 PM

Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

Tuesday, Jun 08

01:15 PM - 01:35 PM

Mitigating Environmental Impacts from the Abandoned I-95 Highway Embankment Fill at Rumney Marsh in Revere, and Saugus, Massachusetts

Edward Reiner

Senior Wetland Scientist, United States Environmental Protection Agency

Between 1967 and 1969, approximately 49 hectares of Rumney marsh were filled, creating an embankment nearly 3.9 kilometers long for the Interstate 95 project which was never completed. This embankment restricted tidal flow to approximately 180 hectares of salt marsh, as only one opening was created for tidal flow and drainage across the width of the marsh. Removal of the abandoned highway embankment and restoration of the marsh are included as goals in the 1988 designation of the marsh as an Area of Critical Environmental Concern. To date, approximately 31 percent of the original embankment footprint (15 hectares) have been ...

Tuesday, Jun 08

01:15 PM - 01:35 PM

Adaptive water management for wetland conservation in agricultural landscape

Yuanchun Zou

Adaptive water management for wetland conservation in agricultural landscape, Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences

To understand the current situation of contradiction between wetland and agricultural water uses in the main grain-producing areas in Amur River Basin, we analyzed the natural and socio-economic driving factors, and to take a typical wetland-agriculture system as a case to assess the water use conflict and put forward adaptive management suggestions. Results showed that the total surface water storage in the Sanjiang Plain wetlands has decreased from 14.4 billion t in the 1980s to 4.7 billion t in 2010s, which means that it has lost approximate 2/3, due to the wetland loss and degradation. The case study the Qixing ...

Tuesday, Jun 08

01:15 PM - 03:05 PM

S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools III

The main objective of this symposium is to showcase new and credible scientific information on tropical wetlands that can offer policy makers relevant knowledge to make sound decisions related to climate change adaptation and mitigation. Specifically, this symposium will aim to show research progress on (1) Our understanding of carbon stocks and dynamics of tropical wetlands (including sinks/sources of greenhouse gases), and how this information can be used to inform policies; (2) New approaches and tools that could be helpful in decision making by identifying adaptation strategies, including ecosystem modelling and scenario analysis at variable geographic scales for effective conservation ...

Tuesday, Jun 08

01:15 PM - 01:20 PM

Introduction S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools III

Tuesday, Jun 08

01:15 PM - 03:05 PM

S9: SWS Career Narratives: 2) Navigating a wetland scientist career: Lessons for the next generation (organized by Gary Ervin, Excerpts by Doug Wilcox)

Career narratives provide guidance and inspiration for the wetland science community. This symposium supports the mission of the Women in Wetlands Section to facilitate professional development for wetland scientists and features established careers from Doug Wilcox's compendium. Focusing on smooth career transitions and sustaining a life-long career, our symposium embodies the meeting theme of "Adaptation Drives Innovation". Session 1: Smooth transitions at any career stage Navigating careers in wetland science involves important transitions (e.g. university to full-time employment, single to family, any career to retirement) that can rarely be mapped. Observations from lessons learned through career transitions can 1) equip people with ...

Tuesday, Jun 08

01:15 PM - 01:20 PM

Introduction S9: SWS Career Narratives: 2) Navigating a wetland scientist career: Lessons for the next generation (organized by Gary Ervin, Excerpts by Doug Wilcox)

Tuesday, Jun 08

01:15 PM - 03:05 PM

S10: Ecological Restoration through Policy Change: Restoring and Managing Beaver in Washington State

Beaver relocation and the construction of beaver dam analogues are the epitome of innovative adaptation for wetland restoration. Our program will provide background and overview for beaver restoration and the law, beaver history and WA beaver policy, the ecological importance of beaver, the Washington Department of Fish and Wildlife pilot live trap and relocate program, state wide modeling, and next steps. Additional discussion will cover beaver restoration strategies. Practitioners provide practical, on the ground, restoration strategies that are nationally applicable, highlighting collaboration with non-traditional partners and the need for outreach and education, offering situational context to beaver restoration. We will ...

Tuesday, Jun 08

01:15 PM - 01:20 PM

Introduction S10: Ecological Restoration through Policy Change: Restoring and Managing Beaver in Washington State

Tuesday, Jun 08

01:15 PM - 03:05 PM

CS12: Restoration

Tuesday, Jun 08

01:15 PM - 03:05 PM

CS11: Agricultural Wetlands

Tuesday, Jun 08

01:20 PM - 01:35 PM

BEAVER RELOCATION STRATEGIES FOR STREAM RESTORATION, CLIMATE RESILIENCE AND WILDFIRE ABATEMENT

Molly Alves

Wildlife Biologist, The Tulalip Tribes

Molly Alves, Alexa WhippleThe near extirpation of beavers from the North American landscape has had dramatic, negative effects on water quantity and quality and ecosystem function and resilience in our watersheds. Better understanding of stream processes and the need for landscape scale restoration actions to address hydrologic degradation has led to an effort to reestablish these ecosystem-engineering mammals. A beaver's evolutionary inclination is to impound water, providing unparalleled benefits to these invaluable ecosystems such as increasing overall biodiversity and mitigating the effects of climate change. However, current beaver numbers are a fraction of historic density in the majority of their ...

Tuesday, Jun 08

01:20 PM - 01:35 PM

Pocket Gophers to Mangrove Swamps: Finding Opportunities

Katherine Ewel

Professor Emerita, University of Florida

Career pathways are seldom smooth. I describe here my own odyssey in order to help graduate students and even advanced professionals accept and even capitalize on unexpected changes that may at first seem disastrous. At Cornell University, I pursued a standard zoology major intended for pre-med students. Fortunately, I discovered the vertebrate zoology major in another part of the university, and so in graduate school at the University of Florida, I studied reproduction in the pocket gopher, a fossorial rodent. **BROADEN YOUR HORIZONS:** I learned multivariate statistics to incorporate environmental influences in my dissertation. My first professional job was helping ...

Tuesday, Jun 08

01:20 PM - 01:35 PM

Comparing Threats, Challenges and Opportunities in South American Tropical Mountain Peatlands and Lowland Peatlands

Erik Lilleskov

Erik Lilleskov, Ana Maria Planas, Craig Wayson, Dennis del Castillo Torres, Esteban Suárez, Juan Carlos Benavides, Kristell Hergoualc'h, Laura Chavez, Randy Kolka, Rodney Chimner Peatlands are ecologically, economically, and culturally important in both the Andes and Amazon basin of tropical South America. Yet the nature, and human uses, of these peatlands differ greatly. Here we provide a synthetic contrast of these systems based on our work and that of others. Andean peatlands are largely herbaceous fens dominated by cushion plants or graminoids. Existing in a zone where grazing is common, they are often intensively used in grazing and cropping agroecosystems, with ...

Tuesday, Jun 08

01:35 PM - 01:50 PM

Restoring ecosystem functioning of wetlands within cultural landscapes

Alishia Orloff

Student, Yale

Indigenous and local knowledge serves as a robust lens for sustainable ecosystem management and restoration. Through agro-ecological practices, Indigenous peoples of Hawai'i have developed comprehensively complex strategies and traditions for maintaining the resilience of wetland ecosystems. Traditional practices such as agro-ecological systems involving kalo (taro) has been exercised in Hawaiian wetlands for centuries particularly because of its capacity to optimize multiple wetland ecosystem services. While often underestimated, these longstanding connections and adaptive strategies are crucial in local bird conservation and water management efforts especially under current environmental pressures. In order to better understand the extent of local management approaches in ...

Tuesday, Jun 08

01:35 PM - 01:50 PM

Mountain peatlands in the tropical Andes contain high carbon stocks

Rodney Chimner

Professor, Michigan Technological University

Rodney Chimner, Erik Lilleskov, Esteban Suárez, John Hribljan Peatlands are numerous across tropical, temperate, and boreal mountains due to higher annual precipitation, cooler temperatures, and higher available water compared to the surrounding lowlands, however, little is known about the carbon stocks of mountain peatlands. We cored peatlands over a large latitudinal gradient including the countries of Colombia, Ecuador, Peru, and Bolivia and over an elevation gradient from 3,400 to 4,800 (m.a.s.l.). In all four countries we sampled, the peatlands displayed a large potential for carbon sequestration in their soils with an average thickness across all sites of 4.5 m and total ...

Tuesday, Jun 08

01:35 PM - 01:50 PM

Land Management and Research in Wetlands

Michael Duever

Ecologist, Natural Ecosystems LLC

I have always liked animals, especially reptiles. I originally kept them as pets, buying some and capturing others in the wild. I studied reptiles in college, and fish populations on my first professional job. As much as I enjoyed working with them, I eventually came to realize that these and all other critters would only continue to exist in the wild if they had a place to live. This made me shift my focus from the animals themselves to trying to understand the environment upon which they depend, the ecological processes that created and maintained that environment, and how it ...

Tuesday, Jun 08

01:35 PM - 01:50 PM

Living with Beavers: In-Place Management of Ecosystem Engineers

Elyssa Kerr

Executive Director, Beavers Northwest

The ability of beavers to modify stream systems and create wetland complexes provides a suite of ecosystem services to improve watershed health including slowing streams, recharging groundwater, and adding complexity to riparian ecosystems. However, when beavers build along streams in urban and rural settings, the impoundment of water often has adverse impacts on roads, homes, and agricultural lands built in historic floodplains. A growing number of programs seek to mitigate these beaver conflicts while retaining the benefits to biodiversity, water quality and quantity, and climate change resilience that beaver complexes provide. Managing beavers in the densely populated Puget Sound region, ...

Tuesday, Jun 08

01:35 PM - 01:50 PM

Plant community response to wetland restoration on retired agricultural cranberry bogs

Sarah Klionsky

PhD Student, University of Connecticut

Sarah Klionsky, Anastasia Pulak, Beth Lawrence, Christopher Neil, Haley Miller Agricultural cranberry farms (bogs) are increasingly being retired in southern New England (USA), and there is great interest in restoring these former wetlands to re-establish native vegetation, attenuate nutrients, and promote flood resiliency. It is unclear, however, if restoring wetland hydrology alone is sufficient to establish targeted wetland vegetation, or if active seeding is required. To determine whether hydrologic restoration is adequate to promote diverse, species-rich, wetland plant communities, we conducted pre- and post-restoration vegetation surveys in three bog cells at one former cranberry bog complex. In one bog cell, we ...

Tuesday, Jun 08

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Duration of Farming is an Indicator of Natural Restoration Potential of Sedge Meadows

Guodong Wang

Dr., Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences

Soil seed banks can be important components of ecological restoration, particularly if the species remain viable in the soil for long periods of time. A germination experiment was conducted in the greenhouse to determine seed bank viability based on length of time farmed. Soils from sedge meadows farmed between 0 and 50 years were collected in Sanjiang Plain, China. Most dominant sedges (e.g., *Carex schmidtii*, *C. lasiocarpa*) and grasses (e.g. *Calamagrostis angustifolia*) survived as seeds if farmed for less than 5 years, therefore fields farmed for short periods of time are the best candidates for wetland restoration. Certain important structural ...

Tuesday, Jun 08

01:50 PM - 02:05 PM

Embracing Challenges and “Riding the Tiger”

Mary Kentula

US EPA Office of Research and Development

My career has been filled with expected and unexpected opportunities that broadened my perspective, taught me new skills, and enriched my way of thinking and being. Key to those experiences were the people who were my mentors and collaborators and the teams of talented and dedicated people who worked together to conduct critical research that addressed significant questions on wetland ecology and management. For example, the assessment of wetland condition in the Upper Juniata and the Nanticoke watersheds in the Mid-Atlantic involved multiple teams and was instrumental in the decision to include wetlands in the US Environmental Protection Agency's National ...

Tuesday, Jun 08

01:50 PM - 02:05 PM

Experiments in Sustainable Restoration Planting for Beavers and Fish

Jennifer Vanderhoof

Experiments in Sustainable Restoration Planting for Beavers and Fish, King County Department of Natural Resources and Parks

Planting trees and shrubs along streams is a common element of restoration projects aimed at salmon recovery in King County and much of the Pacific Northwest. In lowland Puget Sound, it is common for beavers to show up at restoration sites within 3-5 years after installing the plants. A challenge for restoration practitioners has been to retain the trees and shrubs they planted for shade and large wood for salmon when faced with beaver herbivory. Restoration practitioners also appreciate the value beavers bring to these ecosystems. In this talk I'll discuss a small restoration site with heavy beaver herbivory that ...

Tuesday, Jun 08

01:50 PM - 02:05 PM

Application of a Watershed Approach to Mitigate a Large Scale Highway Project - SR 167 Completion Project and Hylebos Riparian Restoration Program

Christina Merten

Associate Ecologist, Herrera Environmental Consultants

George Ritchotte

Christina Merten, Mark EwbankThe Washington State Department of Transportation's (WSDOT's) State Route (SR) 167 Completion Project will construct close to six miles of new highway within the Puyallup/White River Watershed amid urban and agricultural lands. WSDOT is using an innovative watershed approach to address the expected increase in stormwater runoff from new impervious surfaces, reduce flooding, restore streams, and provide wetland mitigation. Existing streams and wetlands are in mostly poor condition, with many channels straightened for man-made purposes and wetlands overwhelmed by invasive vegetation. The project will realign and widen thousands of feet of stream channels to approximate their predevelopment ...

Tuesday, Jun 08

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Tropical alpine and lowland peatland mapping challenges and advances

Laura Bourgeau-Chavez

Dr., Michigan Tech Research Institute

Although peatlands cover a small amount of land globally, they are estimated to store more than 30% of the Earth's soil carbon (C) and are at risk from land use and climate change. Knowledge of peatland type and distribution is crucial to balancing the global C cycle, understanding their vulnerability to change and for planning conservation and restoration activities. Peatlands are difficult to detect and map, and as such, certain peat-dense areas have only recently been identified. Although there are some geospatial products which show generalized peatland distribution on a global scale, few spatially-explicit maps of peatland location and extent ...

Tuesday, Jun 08

02:05 PM - 02:20 PM

A Novel Approach to Quantifying Change in Wetland Distribution and Drainage (1850s-2004) for Conservation Planning in Mixed-Use Landscape

Stephanie Lawlor

Post-Graduate Researcher, University of South Florida

Stephanie Lawlor, Claire Flannagan, Kai Rains, Mark Rains, Shawn LandryQuantifying long-term changes in wetland distribution and drainage is an important step in conservation and restoration planning in agricultural landscapes. However, efforts to accurately map conditions prior to the advent of aerial photography are hindered by a lack of data, so early wetland loss and hydrological alterations have often eluded effective consideration in such efforts. To overcome this barrier, we developed and validated a frequency-intersect method utilizing 1850s Public Land Survey System data and original late-1800s maps. A new sampling approach was devised to delineate wetlands from 1950s aerial photos to ...

Tuesday, Jun 08

02:05 PM - 02:20 PM

Mountain peatlands in the northern Andes and their relevance in the national GHG inventories

Juan Carlos Benavides

Prof., Pontificia Universidad Javeriana

Juan Carlos Benavides, Erik Lilleskov, Esther Velasquez, Rodney ChimnerWorldwide peatlands store nearly one third of the soil carbon, storing nearly as much carbon as the atmosphere. Peatlands in the tropical alpine ecosystems in the Andes (paramos) are frequent and have large concentrations of carbon (up to 2000 MgC ha⁻¹) and are important stocks that are not usually included in the national carbon inventories of South American countries. Peatland degradation has been an important source of carbon dioxide and other greenhouse gases to the atmosphere worldwide but little is known about the climatic impacts of peatland degradation on tropical high elevations. ...

Tuesday, Jun 08

02:05 PM - 02:20 PM

Advice for First-Generation College Students

Beth Middleton

research ecologist, US Geological Survey

Gary Ervin

Professor, Mississippi State University

Beth Middleton, Gary ErvinA first-generation college student is a student whose father and mother do not have college degrees. Like ourselves, students in this group may not get solid advice about what to expect in college. For example, a first-generation college student may not understand the full complement of careers and associated degrees that are available. Their families may push them into careers in medicine and law, or even advise against college. Fortunately for us, we were intent in our desire to study wetlands, despite personal challenges. Some of the common struggles we faced included objections from family who thought ...

Tuesday, Jun 08

02:05 PM - 02:20 PM

Humans Predators Drive Restoration of Salt Marsh Dieback on Nantucket, MA

Jennifer Karberg

Dr, Nantucket Conservation Foundation

Extensive salt marsh dieback is driven by intense herbivory by the native purple marsh crab (*Sesarma reticulata*) and results in a complete loss of stabilizing low marsh vegetation, particularly smooth cordgrass (*Spartina alterniflora*). Salt marsh dieback dramatically reduces marsh resilience; leading to increases in soil erosion, sediment softening/subsidence and increased impacts of climate change and sea level rise. After over a decade of salt marsh dieback throughout mainland New England, marshes appear to be recovering although they have experienced significant erosion and subsidence. Purple marsh crab populations explode due to a lack of predators. On Nantucket Island, MA salt marsh ...

Tuesday, Jun 08

02:05 PM - 02:20 PM

A Brief History of Beaver-Human Relations

Ben Goldfarb

Beavers are increasingly accepted as a stream and wetland restoration tool with significant benefits to biodiversity, hydrology, and geomorphology. Beaver relocation, coexistence techniques, and Beaver Dam Analogues have been used in many states by nonprofits, state agencies, and Native tribes. However, beaver-based projects are occasionally impacted by insufficient attention to beaver biology and ecology (e.g., beavers being relocated into unsuitable habitat or the separation of family units). Therefore, a strong understanding of beaver behavior, evolutionary history, and ecology is crucial to successfully working with this valuable but challenging keystone species. In this talk, part of the larger beaver symposium, we ...

Tuesday, Jun 08

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Restoration of a Sphagnum-dominated peatland disturbed by a road: do peat amendment thickness and fertilization matter?

Christine Isabel

Master candidate, Master's student

Christine Isabel, Line Rochefort, Marie-Claire LeBlancNorthern Alberta is covered by a great proportion of peatlands that coincides with important oil sand deposit. A vast network of access roads was developed on these peatlands due to oil sands mining. Roads as well as seismic lines are part of linear disturbances which reaches over than 600 000 km in the Canadian boreal region. Roads in peatlands disturb crucial ecosystem services such as biodiversity, wildlife habitat, peat accumulation and herewith also carbon sequestration. We restored a Sphagnum-dominated peatland impacted by a road located on an in situ oil sand mining site. Restoration included ...

Tuesday, Jun 08

02:20 PM - 02:35 PM

New insights on mountain peatland restoration in Ecuador

Esteban Suarez

Prof., Universidad San Francisco de Quito

Esteban Suárez, Erik Lilleskov, Leo Zurita-Arthos, Rodney Chimner, Segundo ChimbolemaAndean high-elevation (páramo) peatlands are an understudied and highly threatened ecosystem. Although these environments provide crucial ecosystem services throughout the Andean region in the form of water regulation, and carbon storage, traditional uses (agriculture, cattle grazing, water abstraction) have profound impacts on their structure and functioning. However, proper management and restoration of these peatlands is greatly hampered by a lack of baseline information and little local experience on available restoration approaches that could be adapted to the conditions of Andean peatlands. Here we report on a country-scale assessment of the conservation ...

Tuesday, Jun 08

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Pre-Recorded Q&A S8: Tropical wetlands and opportunities for climate change adaptation and mitigation – Scientific advancements and innovative tools III

Tuesday, Jun 08

02:35 PM - 03:05 PM

Pre-Recorded Q&A S9: SWS Career Narratives: 2) Navigating a wetland scientist career: Lessons for the next generation (organized by Gary Ervin, Excerpts by Doug Wilcox)

Tuesday, Jun 08

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Pre-Recorded Q&A S10: Ecological Restoration through Policy Change: Restoring and Managing Beaver in Washington State

Tuesday, Jun 08

02:35 PM - 03:05 PM

Pre-Recorded Q&A CS12: Restoration

Tuesday, Jun 08

02:35 PM - 03:05 PM

Pre-Recorded Q&A CS11: Agricultural Wetlands

Tuesday, Jun 08

03:05 PM - 05:05 PM

Women in Wetlands and Wine

Description: Join us for our short Annual Business meeting followed by a chance to network and meet others in the wetlands field. Our virtual gathering will feature breakout rooms led by members in different stages of their careers and on different career paths. Bring your beverage of choice and enjoy a casual and fun chance to connect around wetlands! Open to all WiW members as well as interested members and anyone who wants to network!*Separate registration is required. Zoom login will be provided to all registrants*

Wednesday, Jun 09

10:00 AM - 12:00 PM

W1: Leveraging multiple new technologies for more efficient wetland assessments, monitoring, and delineation

Description: Learn from practical experience of wetland scientists how to best utilize the new technology ecosystem. Hear from field scientists and providers of GIS software for wetland predictions modeling, Bluetooth-enabled GNSS receivers for submeter accurate geospatial data collection, field applications for efficiency, and post-processing GIS software for creating final maps in respect to wetland monitoring, assessments, restoration, and delineations.*Separate registration is required. Zoom login will be provided to all registrants*

Wednesday, Jun 09

12:00 PM - 04:00 PM

W2: Comparing Wetland Functional Assessment Methods - A Technical Workshop

Description: There are many different functional assessment methods aimed at analyzing the functions of wetlands. Some are developed for specific types of wetlands, some are developed for specific geographical regions, and still others are developed for specific functions. This workshop will examine a few different wetland functional assessment methods, comparing their development, structure, implementation, and goals. Methods examined will include a US Army Corps of Engineers/US Environmental Protection Agency collaboration in New England, a method developed by the West Virginia Department of Environmental Protection Watershed Assessment Branch for West Virginia, and methods developed at Penn State University's Riparia Program. Workshop ...

Wednesday, Jun 09

04:00 PM - 06:00 PM

W3: The Value of Human/Cultural Diversity to Wetland Sciences and SWS

Description: A reflectance and discussion of lectures or panels, of techniques, activities, and outreach ideas towards increasing diversity and retention of SWS members, partners, students, and professional wetland scientists.*Separate registration is required. Zoom login will be provided to all registrants*

Thursday, Jun 10

03:00 PM - 03:35 PM

P4: The limits of tidal wetland vertical adjustment to sea-level rise: Cahoon, Reed and Day revisited

Neil Saintilan

Professor of Environmental Science, Macquarie University

Feedbacks between inundation, sedimentation and carbon sequestration allow a degree of vertical adjustment to sea-level rise in tidal mangroves and marshes that may extend over millennial timescales. From early in the Holocene, mangroves tracked sea-level rise at rates considerably higher than those encountered over the past century, and in doing so appear to have influenced global atmospheric greenhouse gas concentrations. However, paleo-stratigraphic studies in mangroves and tidal marshes have suggested that the upper limits of this vertical adjustment may be exceeded by rates of sea-level rise projected for the latter half of this century. The global Surface Elevation Table-Marker Horizon ...

Thursday, Jun 10

03:35 PM - 05:25 PM

S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making I

Innovative approaches to assessing wetland recovery from impacts related to groundwater drawdown will be discussed in this symposium. Historically, the majority of potable water supply in Florida has come from groundwater. Aquifer drawdown can result in wetland impacts, including shorter hydroperiods, organic soil loss, and community composition changes. Water Use Permit regulations require applicants to periodically renew permits, address existing wetland impacts, minimize any future impacts, and adjust water use if necessary. In order to adequately protect wetlands, the natural functioning of various wetland types (considering both hydrology and ecology) needs to be investigated, and estimates of resilience (allowable drawdown ...

Thursday, Jun 10

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S13: A Universal Declaration on Rights of Wetlands: Shifting our Paradigm Restores the Human-Wetland Relationship in Support of Wetland Restoration, Conservation and Wise Use

Current approaches to wetland restoration, conservation and wise use have failed to stop global loss and deterioration of wetlands. Following the lead of indigenous cultures in recognizing the inherent rights of nature, including wetlands, the growing Rights of Nature movement may be the transformational paradigm shift needed to reverse current trends towards further climate destabilization, wetland and ecological loss and degradation, biodiversity loss, freshwater shortages, and resulting social upheavals. This symposium proposes a Universal Declaration on the Rights of Wetlands, thus providing a wetlands-focused response to the Rights of Nature movement as well as to the World Scientists' Warning to ...

Thursday, Jun 10

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Introduction S13: A Universal Declaration on Rights of Wetlands: Shifting our Paradigm Restores the Human-Wetland Relationship in Support of Wetland Restoration, Conservation and Wise Use

Thursday, Jun 10

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S12: Landward migration of tidal wetlands I

Tidal wetlands provide a wide array of ecosystem services but they have been experiencing extensive loss with accelerating rates of sea-level rise (SLR). The potential for tidal wetlands to migrate landward in some locations may mitigate some of the consequences of their loss at the seaward edge. However, there exists large spatial variability in landward migration potential and limited information in the compensatory potential for ecological functions lost at the water boundary. Through this symposium, we aim to 1) examine spatial variability of landward migration patterns in different wetland types and regions, 2) investigate the abiotic and biotic factors that ...

Thursday, Jun 10

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S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration I

It is well established that microbes play a large role in how wetland ecosystems function. However, detailed study of community composition and the functions that microbes provide to plants and other biota is difficult. Advances in technology now allow us to ask specific questions about how microbes operate in both natural and degraded systems and use that information to guide restoration approaches. This symposium will explore how microbes help non-native Phragmites and other invasive plants outcompete native plants, can be part of future management approaches for invasive plant species and the subsequent restoration to native communities, and play a large ...

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Introduction S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration I

Thursday, Jun 10

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Introduction S12: Landward migration of tidal wetlands I

Thursday, Jun 10

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Assessment of Wetland Health and Recovery in Water Supply Planning and Operation Decisions

Warren Hogg

Water Use Permitting Manager, Tampa Bay Water

Warren Hogg, Chris Shea, Whitney Kiehn Palustrine wetlands currently make up over 25 percent of the land surface in the Northern Tampa Bay area. Ground water extraction from public supply wellfields began in this area in 1930 and increased as the local population grew. The rate of ground water extraction from 11 wellfields reached 167 million gallons per day on an annual average basis in early 2001. This high rate of sustained extraction was a contributing factor to low or absent water levels in area wetlands and the transition from wetland toward upland plant species. Elected and regulatory officials in the ...

Thursday, Jun 10

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Historical land cover changes at riverine vs. marine dominated coastal estuaries in southeastern Mississippi – forest-marsh dynamics

Devin Jen

University of Southern Mississippi

Devin Jen, Gregory Carter, Loretta Battaglia, Margaret Waldron, Patrick Biber, Wei Wu Coastal marshes, which provide a number of ecosystem services including flood control, nutrient regulation, carbon sequestration, and wildlife habitat, have been experiencing extensive loss due to sea level rise (SLR) in addition to other natural and anthropogenic factors. One way in which coastal marshes can respond to SLR is through landward migration when suitable habitat is available to mitigate overall loss. The objective of this research is to assess whether the landward migration of coastal marshes was occurring in southeastern Mississippi over two ~30-year intervals since 1955. More specifically, ...

Thursday, Jun 10

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Why could a Declaration of Rights of Wetlands support wetland wise use?

Nick Davidson

Adjunct Professor

We face a recognised global biodiversity crisis. Wetlands are not exempt. In 1971, 50 years ago, the Ramsar Convention on Wetlands was established by governments because of then increasing concerns over wetland loss and degradation – and its impacts on wetland-dependent species. But since 1970 the area of wetlands has progressively continued to decline, through deliberate drainage and conversion, in all parts of the world. Deterioration in the state of our remaining wetlands is becoming progressively more widespread, including for designated Wetlands of International Importance (Ramsar Sites). Populations of freshwater species have declined since 1970 far more than species depending ...

Thursday, Jun 10

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Above- and Below-Ground Microbes and Their Potential Role in *Phragmites australis* Invasions

Keith Clay

Keith Clay, Carolyn Schroeder, Christina Birnbaum, Emily Farrer, McKenzie Smith, Pawel Waryszak, Susannah Halbrook, Zackery Shearin Research has revealed great microbial diversity associated with plants, roles as symbionts or pathogens, and potential for mediating plant invasions. While initial research has elucidated microbial diversity, the current challenge is to evaluate the effects of individual microbes and microbial communities on plant performance through experimental manipulations or sampling across environmental gradients. The objective of our research is to describe patterns of fungal diversity associated with invasive *Phragmites australis*, an important wetland invader, and to explore how microbes affect plant performance using both fungal isolation ...

Thursday, Jun 10

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Innovating to Adapt to Climate Destabilization and Biodiversity Collapse: A Declaration of the Rights of Wetlands

Gillian Davies

Senior Ecologist and Natural Climate Solutions Specialist and Visiting Scholar, Senior Ecological Scientist

Gillian Davies, Max Finlayson Despite establishment of the Ramsar Convention on Wetlands (1971), and many wetlands conservation and restoration efforts at national and sub-national levels, wetland loss and degradation continue apace, and are part of a larger trend in ecosystem and biodiversity loss and degradation. The current paradigm for conservation of wetlands is failing to meet stated goals. In the context of climate destabilization, the need to reverse these trends is urgent. Often led by local and Indigenous peoples, a global rights of Nature movement is shifting the ethical and legal paradigm for the human-Nature relationship. As wetland professionals, how can ...

Thursday, Jun 10

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Behavior of *Phragmites australis* leaf endophytes in North America: Implications for habitat restoration

Aaron Devries

Biologist II, USGS Great Lakes Research Center

Aaron Devries, Kurt Kowalski, Wesley Bickford In North America, *Phragmites australis* spp. *australis* is a large invasive grass that is capable of displacing entire wetland plant communities, unlike the closely related native *Phragmites australis* spp. *americanus* that occurs in the same environment. To test the hypothesis that members of the *Phragmites australis* microbiome regulate plant growth at the subspecies level and thus contribute to invasiveness, 162 microbes were isolated from plants representing these two lineages and used to perform seedling, mature leaf, and saprophyte bioassays. Based on a literature survey of the North American *Phragmites* microbiome, the collection of microbes represents ...

Thursday, Jun 10

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Use of Remote Sensing to Assess the Impacts of Stressors on Wetland Change and Migration

Glenn Suir

Research Agronomist, U.S. Army Corps of Engineers

Glenn Suir, Charles Sasser, Christina Saltus, Douglas Wilcox, Evan Grimes, J. Mason Harris, Molly Reif, Wei Wu Wetland zonation, which can be caused by succession (i.e., temporal trends), physical factors (i.e., elevation, hydrology, and salinity gradients), and biological interactions (i.e., competition and predation), can play significant roles in wetland ecosystem goods and services. Additionally, direct and indirect impacts from biotic and abiotic stressors can have short- and long-term influence on wetland zonation and their form and function. Measuring changes in wetland condition and composition, especially as a function of zonation, can be difficult. Monitoring habitat switching or migration has traditionally been ...

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Hydrologic Impacts of Well Fields on Human and Wetland Environments in Southwest Florida

Michael Duever

Ecologist, Natural Ecosystems LLC

There are a number of wellfields in South Florida, which I've had some involvement with over the last several decades. When human activities are being proposed in south Florida, there is often the perception that the above ground and shallow below ground depth of the wet season water levels is the most (only?) important hydrologic consideration. This is because it is a major factor determining a site's suitability for agricultural or residential development. With South Florida's flat topography and porous limestone substrates, one of my concerns has always been about the extent of the above and below ground impacts of ...

Thursday, Jun 10

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Elevation as a Control on Salt-Marsh Upland Ecotones on the Mississippi Coast

Carlton Anderson

Research Scientist, University of Southern Mississippi, Gulf Coast Geospatial Center

Carlton Anderson, Gregory Carter, Margaret Waldron Salt marshes are unique shallow-gradient landscapes that are highly susceptible to the combined effects of altered sediment supply, sea level rise, and other environmental factors. Changes in elevation on the order of centimeters to decimeters can alter the spatial arrangement and composition of plant species. As a result, vertical zones of plant communities exist within narrow ranges of elevation marked by sharp changes in vegetation composition and diversity. The ecotone zone, situated between the lower-intermediate marsh and upland plant communities, consists of specialized plant species adapted to tolerate certain extreme edaphic conditions. The spatial locations ...

Thursday, Jun 10

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Hydroperiods of Cypress Domes in West-Central Florida, USA

Cortney Cameron

Staff Hydrogeologist, Southwest Florida Water Management District

Cortney Cameron, Michael Hancock The depth and duration of standing water in wetlands are critical factors defining habitat type and overall ecologic value in the landscape. A better understanding of these relationships can improve our ability to define limits of hydrologic impacts, beyond which wetland functions can be greatly damaged. The Southwest Florida Water Management District and Tampa Bay Water have been monitoring water levels in wetlands in west-central Florida for over 40 years. The District's database includes water level data for over 500 wetlands, most with 10 to 40 years of at least monthly daily data. From this database, 41 ...

Thursday, Jun 10

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The rights of wetlands in the context of the Intergovernmental Panel on Biodiversity & Ecosystem Services: linking biodiversity and human well-being

Siobhan Fennessy

Jordan Professor of Environmental Studies and Biology, Kenyon College

The Americas Assessment of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) details the critical relationship between biodiversity, ecosystems, and the capacity of nature to provide benefits, while recognizing a diversity of world views and multiple values of nature. The Americas are diverse, hosting 40% of the world's most biodiverse countries with three times more "biocapacity" per capita than the global average. However, the increasing demand for food, water, and other material goods has increased consumption and intensified land use, continuing a pattern of widespread degradation and destruction of wetlands with regional wetland losses ranging from 20-60% of ...

Thursday, Jun 10

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The interactive effects of Phragmites growth form, microbial communities, and plant invasiveness: differences between native and non-native lineages.

Wesley Bickford

Wesley Bickford, Deborah Goldberg, Donald Zak, Kurt Kowalski Plant-associated microbes play an extremely important role in plant growth, nutrient acquisition, and tolerance to stressors. A growing body of literature suggests that invasive plants may either be benefited more strongly or harmed less by surrounding microbes than native plants. We examined the microbiomes of the non-native, invasive *Phragmites australis* ssp. *australis* and the native, non-invasive *Phragmites australis* ssp. *americanus* to determine if their microbiomes differ in ways that could explain the vast performance differences between the two lineages. We synthesized multiple studies that examined microbes inhabiting leaves, roots, and rhizosphere soils of ...

Thursday, Jun 10

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Shifting allocations between biomass and soil carbon pools drive net loss of carbon in retreating coastal forests

Alexander Smith

Graduate Student, Virginia Institute of Marine Science, College of William and Mary

Alexander Smith, Matthew Kirwan Sea level rise is leading to the migration of coastal ecosystems and the replacement of terrestrial forests with tidal wetlands. Wetland soils are well known to accumulate carbon at faster rates than terrestrial soils, implying that sea level rise may lead to enhanced carbon accumulation. Here, we quantify biomass and soil carbon stocks across four rapidly migrating forest-to-marsh ecotones in the Chesapeake Bay (USA), a hotspot for sea level rise and coastal forest retreat. We find that despite increases in the amount of carbon stored in marsh soils, herbaceous vegetation, and shrubs across the forest-marsh ecotone, sea-level ...

Thursday, Jun 10

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Cultural, local community and Indigenous peoples' issues for a Declaration of the Rights of Wetlands

Matthew Simpson

Dr, Director

Matthew Simpson, Dave Pritchard Much of the recent growth in contemporary formal recognition of the rights of nature draws on improved understandings about the belief systems and traditional practices of Indigenous peoples and local communities (IPLCs). The cultural and linguistic heritage of IPLCs contributes to the world's diversity. Their knowledge and practices have enhanced respect for the environment and natural resources, often offering models of sustainable approaches to water security, food security, health and well-being. Rights of wetlands can be an important component of enlightened and holistic approaches of this kind, which see the human species as part of the ecosystem ...

Thursday, Jun 10

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The Peculiar Nature of Florida's Sandhill Wetlands, Ponds & Lakes and Their Relationship with the Regional Aquifer

ReNae Nowicki

Senior Ecohydrologist, EcoHydrologix LLC / School of Geosciences, University of South Florida

Rena Nowicki, Mark Rains Embedded in the sandhill of west-central Florida (xeric communities on rolling hills and ridges of marine sands) are a peculiar type of wetland, pond, and lake referred to locally as the "sandhill" type. Formed in karst and completely surrounded by uplands, their peculiarity lies in their distinct hydrologic cycle, which ranges widely over both time and space. The high points of these cycles, which occur infrequently, create a false sense of normality that is not met during the remainder of the cycle, when surface water may be shallow or absent for extended periods of time. This, and ...

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Rhizophagy cycle as a target for reducing invasiveness of *Phragmites australis*

James White

James White, Hadeel Almaliki, Kathryn Kingsley, Kurt Kowalski, Peerapol Chiaranunt, Qiuwei Zhang, Xiaoqian Chang Plants establish symbioses with soil microbes that are important for nutrient extraction from soils and plant development. One such symbiosis is the rhizophagy cycle, where bacteria alternate between a free-living phase in soil where they acquire nutrients and a plant-dependent protoplast phase inside plant root cells where root cells oxidatively extract nutrients from bacteria. In the rhizophagy cycle, roots attract bacteria to root tips by secretion of exudates (e.g., sugars, organic acids). Invasive *Phragmites australis* is a plant that is notoriously difficult to control. We hypothesize that ...

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Are Microbes the Key to a New Form of *Phragmites* Control?

Kurt Kowalski

Research Ecologist, Research Ecologist

Kurt Kowalski, Danielle Snow, James White, Kathryn Kingsley, Keith Clay, Wesley Bickford Bacteria, fungi, and other microbes promote growth, accelerate nutrient acquisition, increase stress tolerance, enhance disease resistance, and confer many other benefits that can help invasive plants outcompete native plants. Wetland managers apply many tools to control *Phragmites australis* spp. *australis* including combinations of herbicide, cutting, burning, and flooding. The Great Lakes *Phragmites* Adaptive Management Framework (<https://www.greatlakesphragmites.net/pamf>) and other research studies are reducing the uncertainty about the efficacy of treatment combinations given site conditions, but the optimal approach is unclear and managers continue to identify the need for additional non-toxic ...

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A General Approach to Hydrologic Recovery Metric Development with Application to Geographically Isolated Wetlands in Xeric Landscapes

Dan Schmutz

Chief Environmental Scientist, Greenman-Pedersen, Inc.

Dan Schmutz, Chris SheaHydrologic recovery of wetlands impacted by water table drawdown due to groundwater production necessarily involves improvements to wetland hydropatterns (e.g., levels, duration, and return frequency). How much improvement is sufficient to declare a degraded wetland as recovered? We propose here a general approach to establishing a hydrologic recovery metric, and demonstrate a specific application for freshwater, geographically isolated wetlands. Our approach involves • identifying sufficient replicate wetlands, • collecting monthly water level data of sufficient length, • categorizing the wetlands into two groups based on ecological conditions—stressed and unstressed, • calculating median water level offsets relative to ...

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The Rights of Wetlands in support of a safe climate and effective wetland restoration – The charter model

Wetlands are an integral component of the global ecosystem that connects through gas exchange with the atmosphere. Wetlands sequester carbon dioxide and respire both carbon dioxide and methane. They support large amounts of biological diversity including migratory birds that connect local wetlands to global biodiversity. Current attempts to declare that wetlands have a fundamental right to exist can learn from previous declarations on the rights of nature that have utilized the charter model. We will examine two examples, the World Charter for Nature (WCN) (1982) and the World Charter – 1999, and determine if either provides a suitable model for ...

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Pre-Recorded Q&A S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making I

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Pre-Recorded Q&A S13: A Universal Declaration on Rights of Wetlands: Shifting our Paradigm Restores the Human-Wetland Relationship in Support of Wetland Restoration, Conservation and Wise Use

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Pre-Recorded Q&A S12: Landward migration of tidal wetlands I

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Pre-Recorded Q&A S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration I

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Break

About the music videos you are watching during breaks The songs you hear in these videos are original compositions and written and recorded specifically for the SWS 2021 Annual Meeting by Mike MacDonald and SWS Member Andy Baldwin (the one cover is Backwater Blues, a public domain song written by Bessie Smith in 1927). Andy and Mike perform live as the acoustic rock duo Blue Sea Revival, based in Annapolis, Maryland. Collectively forming the album Songs from the Swamp, the music was recorded, mixed, and mastered on GarageBand. Across the album Andy and Mike variously sing lead and background vocals, ...

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S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making II

Innovative approaches to assessing wetland recovery from impacts related to groundwater drawdown will be discussed in this symposium. Historically, the majority of potable water supply in Florida has come from groundwater. Aquifer drawdown can result in wetland impacts, including shorter hydroperiods, organic soil loss, and community composition changes. Water Use Permit regulations require applicants to periodically renew permits, address existing wetland impacts, minimize any future impacts, and adjust water use if necessary. In order to adequately protect wetlands, the natural functioning of various wetland types (considering both hydrology and ecology) needs to be investigated, and estimates of resilience (allowable drawdown ...

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S15: Typha: Current science on genetics to management

Typha (cattail) is an iconic wetland plant found worldwide. Under normal conditions, Typha is a normal, healthy part of wetland ecosystems. However, over recent decades, the distribution and abundance of Typha in North America has increased due to anthropogenic disturbances to wetland hydrology and increased nutrient loads. In addition, vigorous non-native and hybrid taxa have exacerbated the spread of Typha. The expansion of Typha has required widespread management, albeit control is often short-lived or ineffective. Despite the negative impacts, Typha can provide beneficial ecosystem services including bioremediation to reduce pollution and providing biofuel feedstocks. In the proposed symposium, we will ...

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S12: Landward migration of tidal wetlands II

Tidal wetlands provide a wide array of ecosystem services but they have been experiencing extensive loss with accelerating rates of sea-level rise (SLR). The potential for tidal wetlands to migrate landward in some locations may mitigate some of the consequences of their loss at the seaward edge. However, there exists large spatial variability in landward migration potential and limited information in the compensatory potential for ecological functions lost at the water boundary. Through this symposium, we aim to 1) examine spatial variability of landward migration patterns in different wetland types and regions, 2) investigate the abiotic and biotic factors that ...

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S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration II

It is well established that microbes play a large role in how wetland ecosystems function. However, detailed study of community composition and the functions that microbes provide to plants and other biota is difficult. Advances in technology now allow us to ask specific questions about how microbes operate in both natural and degraded systems and use that information to guide restoration approaches. This symposium will explore how microbes help non-native Phragmites and other invasive plants outcompete native plants, can be part of future management approaches for invasive plant species and the subsequent restoration to native communities, and play a large ...

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Introduction S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration II

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Introduction S12: Landward migration of tidal wetlands II

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Introduction S15: Typha: Current science on genetics to management

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Introduction S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making II

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Estimating Intermittent Streamflow Rates Between Geographically Isolated Wetlands and Rivers Using Watershed Terrain and Historical Runoff

Geoffrey Fouad

Assistant Professor of Geography, Monmouth University

Geoffrey Fouad, Kai Rains, Terrie Leeln regions where wetlands regularly/seasonally flood, wetland overflows can produce intermittent streamflow in tributaries that connect geographically isolated wetlands to distant rivers. The lack of comparable, region-wide information on the location and magnitude of intermittent streamflow generated by wetlands has hampered efforts to adequately prioritize and protect wetlands and the natural tributaries connecting them to rivers. The present study combines national long-term streamflow data and high-resolution light detection and ranging (LiDAR) terrain data to organize wetlands along tributaries and estimate the streamflow rate between wetlands and rivers in a 1505-square-kilometer area north of Tampa Bay, ...

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Land use consequences and considerations for restoring wetland microbial functions

Ariane Peralta

Associate Professor, East Carolina University

Human and climate-induced environmental changes can affect microbial ecosystem functions in unexpected ways that can complicate restoration efforts. The occurrence of interacting environmental stressors (e.g., flooding, drought, salinization) is expected to increase in frequency, duration, and intensity. In most engineered and restored wetland ecosystems, the contribution of microbial communities is often ignored even though microorganisms determine the types and rates of ecosystem functions. To make sure that restoration activities result in expected outcomes, considerations of land use legacies are necessary. Legacy effects are the contribution of past land use (or lack of land use) that leave behind long-term changes to ...

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Is native cattail at risk of extinction by hybridization in the US Midwest?

Pamela Geddes

Associate Professor, Northeastern Illinois University

In North American wetlands, two cattail species -native *Typha latifolia* and exotic *T. angustifolia*- hybridize generating *T. x glauca*. *Typha angustifolia* and the hybrid spread invasively, negatively affecting wetlands. Due to high trait variability and hybridization, *Typha* species are difficult to identify morphologically. Building on previous work that relied on microsatellite markers to differentiate *Typha* species (including hybrids, parental backcrosses, and advanced-generation hybrids) in southern Canada and in the US upper Midwest and northeast, our goals were to 1) estimate relative frequencies of additional Midwestern cattail populations, and 2) quantify their hybridization. We also assessed level of agreement between morphological ...

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Tidal Marsh Resilience at the Landscape Scale: A National Product to Characterize Marsh Migration Pathways and Strategic Adaptation Opportunities.

Rachel Stevens

Stewardship Coordinator and Wildlife Ecologist, GBNERR

Rachel Stevens, Jamie Carter, Nate Herold, Suzanne ShullThe National Estuarine Research Reserve System and NOAA's Office of Coastal Management have worked with partners to develop a nationwide assessment of tidal marsh resilience at the landscape scale. The protocol allows systematic comparison of marsh current and future conditions over large areas and evaluation of parcel-level conservation and restoration projects in a realistic and forward-looking way. Characterization of the full range of conditions throughout a region of interest, for example Refuge, National Park or State, allows us to determine how representative a specific marsh is of the system it is located in. ...

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The Influence of Soil Amendments on the *Spartina alterniflora* Microbiome and Plant Growth in an Oiled Environment

Stephen Formel
Tulane University

Stephen Formel, John Pardue, Sunshine Van Bael, Vijaikrishnah ElangoMuch of the work following the Deepwater Horizon oil spill focused on whether microbial communities enhanced biodegradation of oil in coastal and marine environments. In the salt marshes of the northern Gulf Coast, a natural extension of previous work is to ask how changes in microbial communities of the salt marshes influenced the resilience and functionality of salt-marsh plants and whether plant-microbe relationships can be manipulated to enhance restoration success. The foundational salt-marsh grass *Spartina alterniflora* was found to be fairly resilient to the oiling it received in 2010, yet it is ...

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Zonation in coastal communities: Maladaptation to climate change or hidden climate-proofing?

Loretta Battaglia
Associate Professor, Southern Illinois University

Loretta Battaglia, Bradley Delfeld, Gwendolyn Murphy, Julia Cherry, Pamela WeisenhornCoastal communities exhibit pronounced zonation in composition across the marine-terrestrial transition. With rising seas and intensified storm surges, species that are ecologically "locked" in rigid zones may be at a disadvantage if they are slow to move to more suitable inland habitat. In contrast, species that span several zones, as adults and/or propagules in the soil, should be quicker to respond to chronic and acute saline intrusions. We hypothesized that the latter pattern is more common than previously thought because organisms may be inconspicuous outside of their dominant zone. The objective ...

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Managing invasive cattail to increase biodiversity and habitat complexity in Great Lakes coastal wetlands

Amy Schrank
Assistant Extension Professor, University of Minnesota Sea Grant

Amy Schrank, Shane LishawaThe diverse plant assemblages in Great Lakes coastal wetlands (GLCWs) provide important ecosystem services including critical habitat for native fish, wildlife, and bird species in and beyond the region. The structural complexity of these wetland systems provides larval, juvenile, and adult fish habitat for > 90% of the fish species in the Great Lakes. Biodiversity and ecosystem function of these GLCWs are threatened by hybrid cattail, *Typha X glauca* (hereafter *Typha*), an aggressive invader that homogenizes wetlands by out-competing native plant species and producing copious litter. Though the effects of *Typha* invasion on higher trophic levels is ...

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Field Validation of the National Hydrography Dataset and a Regional Hydrography Dataset in Tampa Bay, Florida, USA

Savannah Fransbergen
University of South Florida

Savannah Fransbergen, Geoffrey Fouad, Kai Rains, Mark Rains Wetlands lacking surface-water connections to downstream waters are often afforded less protections than their hydrologically connected counterparts, thus, it is important such connections be accurately mapped. We conducted field validation and GIS analysis to assess the accuracy of surface-water flowpath networks depicted in two hydrography datasets, the National Hydrography Dataset (NHD) and a Regional Hydrography Dataset (RHD) in the Northern Tampa Bay area. The RHD, a product developed for local water management purposes, combines LiDAR data with long-term streamflow records to generate a cubic meter-per-second grid which is then used to predict the ...

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Inbreeding and inbreeding depression in invasive cattail hybrids (*Typha × glauca*) and their progenitors (*T. latifolia* and *T. angustifolia*)

Danielle Rock

Danielle Rock, Joanna Freeland, Marcel Dorken In regions around the Laurentian Great Lakes, the two cattail species *Typha latifolia* and *T. angustifolia* regularly hybridize to form the hybrid cattail *T. × glauca*. Hybrid vigour in first-generation (F1) *T. × glauca* has made this hybrid invasive in wetlands around the Great Lakes, although the longer-term impacts of *T. × glauca* will also depend on the fitness of advanced-generation hybrids relative to F1 hybrids and progenitor species. Reproduction may be key to the evolutionary trajectories of this hybrid complex: all *Typha* spp. can reproduce both sexually and clonally. *Typha* spp. are wind-pollinated, and ...

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The effects of organic inputs on microbial dynamics in saturated soils: what (little) we know

Brian Scott
University of Maryland

Brian Scott, Andrew Baldwin, Stephanie Yarwood Organic soil amendments, including transplanted topsoil, are widely used in wetland creation. In addition to being a source of nutrients, amendments can alter soil microbial dynamics directly through bioaugmentation and indirectly by modifying the soil biogeochemistry. Through a combination of lab and field studies, we have been investigating the impact of organic amendments on biogeochemical processes. Our sites are wetlands and therefore our focus is on iron reduction and methanogenesis. Organic amendments alter the ferrous iron and methane expression due to the (energetic) quality of the amendments and changes in soil pH. Fresh organic material ...

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Coastal Ecosystem Vulnerability and Sea level Rise in South Florida: A Mangrove Transition Projection

Fred Sklar
Director, SFWMD

Fred Sklar, Carlos Coroinado-Molina, Christine Carlson We used static, elevation and land cover data to estimate sea level rise impacts (SLR) to urban, developed lands and coastal wetland systems in Everglades National Park and the East and West coastal regions in South Florida. Maps and data tables estimating potential state change to open water were compiled through overlay analysis of elevation, land cover, and SLR masks with future land cover projected using a land cover transition threshold model. Analysis was based on a 2- to 5-km-wide longitudinal band along the SW and SE coasts of Florida where sea-level rise has no ...

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Development of a Recovery Metric for Geographically Isolated Marshes

Chris Shea
Senior Environmental Analyst, Tampa Bay Water

Chris Shea, Warren Hogg, Whitney Kiehn Tampa Bay Water's Consolidated Water Use Permit required a recovery analysis for approximately 380 monitored wetlands. Monitored wetlands were grouped into habitat types for development of recovery metrics – quantitative standards for identifying continuing impacts from groundwater withdrawals. Twenty-six geographically-isolated marsh wetlands were grouped by wetland condition and water levels standardized by subtraction from a "normal pool" elevation. (The normal pool elevation is based on vegetative or physical indicators of long-term inundation.) Long-term median water levels between stressed and unstressed groups were then compared and a threshold value distinguishing the two groups calculated. In order ...

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Evidence for hybrid breakdown in the cattail (*Typha*) hybrid swarm in Southern Ontario

Vikram Bhargav
Trent University

Vikram Bhargav, Joanna Freeland, Marcel Dorken Hybridization leads to the mixing of genetically distinct lineages, and in some cases produces hybrids that are successful invaders. Hybrid success can be driven by heterosis, which is increased hybrid fitness arising from heterozygosity and novel gene combinations. Heterosis typically peaks in first-generation hybrids (F1s), and in some hybrid zones advanced-generation hybrids (F2+) can exhibit lower fitness than F1s. This decrease in fitness is called hybrid breakdown, which can occur from the uncoupling of co-adapted gene complexes. The overall incidence of hybrid breakdown remains poorly understood, particularly in plant hybrid zones. The Laurentian Great Lakes ...

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Controls of wetland microbial methane production and oxidation; lessons for wetland restoration

Globally, wetlands are responsible for one third of annual methane (CH₄) emissions from natural sources. Methane is a potent greenhouse with a growing atmospheric concentration. As such, understanding the factors that influence wetland CH₄ emissions is essential for modeling and predicting the effects of global climate change. Wetland CH₄ emissions are a result of two microbial processes, CH₄ production (methanogenesis) and CH₄ oxidation (methanotrophy), both of which are responsive to numerous interacting environmental and edaphic conditions. The main driver of CH₄ production in all wetland systems is the presence of saturated, anoxic, soils, as it allows the anaerobic process of ...

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North Carolina salt marshes: threats and conservation opportunities

Carolyn Currin
Ecologist, NOAA NCCOS

Carolyn Currin, Anna Hilding, Jenny Davis Dynamic models of marsh vulnerability to RSLR suggest that marshes that occur in microtidal (≤ 1 m tide range) systems with low suspended sediment concentrations (< 20 mg/l) are most at risk of falling behind predicted increases in the rate of RSLR. We analyze data from 32 Surface Elevation Tables (SETs) installed in coastal marshes across the central coast of North Carolina and compare rates of marsh surface elevation change with changes in local water level (RSLR). The SETs in this study have data records that are 8-14 years in duration, and include both fringing ...

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Legacies of Glyphosate Use for Invasive Cattail Control: Leaching Potential from Decaying Litter and Effects on Germination of Native Macrophytes

Verena Sesin
PhD Candidate, Trent University

Verena Sesin, Christina Davy, Joanna Freeland A major goal of invasive plant management is the restoration of native biodiversity, but because effective methods for invasive plant control may also harm native plants, informed application of control methods is necessary. The herbicide glyphosate, commonly sprayed in invasive plant management, can be toxic to native macrophytes, but is thought to degrade relatively quickly in water and soil. However, glyphosate from spray can accumulate in the tissues of invasive plants where it can persist for a minimum of several weeks. It remains unclear whether this accumulated glyphosate could be released into surrounding substrate as ...

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Wetland plant zonation along an experimental flooding gradient: a test for competition and facilitation among emergent marsh plants

Daniel Campbell
Environmental Scientist, Birchbark Environmental Research

Daniel Campbell, Paul Keddy The zonation of plants along flooding gradients is a conspicuous feature of wetlands. Controls of zonation are often attributed to physical factors alone, such as the tolerance of wetland plants to flooding or drought. Current theory of stress gradients suggests that biological factors contribute to these patterns: competition should be prevalent in less flooded (less stressful) environments and pushes some species toward more flooded environments, while facilitation should be prevalent in more flooded (more stressful) environments allowing species to survive more flooding than they would if grown alone. The principal evidence for this effect comes from saltmarsh, ...

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Intersection of Microbial Ecology and Traditional Ecological Knowledge in Support of Manoomin Restoration

Chan Lan Chun
Associate Professor, University of Minnesota Duluth

Chan Lan Chun, Carol Reschke, Darren Vogt, Noel Pavlovic, Thomas Howes Manoomin (wild rice, *Zizania palustris*) is a culturally significant food plant for Great Lakes indigenous peoples. The Ojibwe people regard manoomin as sacred because it is the "food that grows on water" that was part of the traditional migration story explaining the historical movement of Anishinaabe people from the northeastern U.S. and Canada to the Great Lakes region. We present a cultural perspective on manoomin, and how we used with insights from traditional ecological knowledge (TEK) to inform this study's western scientific method. TEK informed where we could sample and ...

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Pre-Recorded Q&A S14: The Role of Wetland Health and Recovery Assessments in Water Supply Decision-Making II

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Pre-Recorded Q&A S12: Landward migration of tidal wetlands II

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Pre-Recorded Q&A S11: Microbes: Small Players with Big Impacts on Invasive Species Management and Wetland Restoration II

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Awards Ceremony and Annual Business Meeting

Separate registration is required. Zoom login will be provided to all registrants