

Water Resources Center Community Partners and Stakeholder Posters

2:30-4:30

Ballrooms, MCSC

WRC 113

CAR's History of Fighting for Justice and Supporting Working People

Don Cavellini, Eddie Williams

Pitt County Coalition Against Racism (CAR)

A collection of photos, flyers, and other aspects of our 281 plus years history of fighting for the rights of minorities and workers in eastern North Carolina.

WRC 114

Impacts on the Biodiversity, Abundance, and Community Composition of Fish Larvae and Zooplankton Due to Ship-Channel Dredging

Rebecca G. Asch, Naomi Jainarine, Abigail Alford, Brian Bartlett, Christine Chan, Elise Easterling, Esra Gokturk, Peyton Jackson, Taniya Johnson, Caitlin McGarigal, Quentin Nichols, Brianna Salazar, Jalen Walker, Zachary Reece Warfel, Ceilia Wood, Mae Wright

Department of Biology, ECU

Ship-channel dredging is necessary in many estuaries to maintain navigable waterways for maritime commerce. Nonetheless, it can have negative impacts on water quality and coastal ecosystems via release of suspended sediments, mobilization of pollutants, declines in dissolved oxygen, noise pollution, and mortality of organisms entrained in the dredge. To reduce these impacts, dredging in the Albemarle-Pamlico Estuarine System (the second largest estuarine complex in the continental United States) has been restricted to winter when few fishes utilize it as a nursery. However, during 2020-2022, dredging was permitted in summer on a temporary basis. We conducted a before-after-control-impact study examining how dredging affected abundance, biodiversity, and community composition of fish larvae. Larvae were collected at the site of a >35-yearlong monitoring program (Beaufort Inlet Ichthyoplankton Sampling Program [BIISP]) and inshore and offshore stations historically sampled by the South Atlantic Bight Recruitment Experiment (SABRE). Nearly 33,000 larvae from 68 taxa were sampled in the first year of this study. Density of larvae was depressed at BIISP during dredging, with a recovery following dredging cessation. Seven of the nine most abundant taxa at BIISP exhibited significant changes consistent with negative impacts of dredging. Species richness and Shannon-Wiener diversity declined during dredging with little-to-no recovery afterwards. At SABRE stations, larval density and species richness were also depressed close to intense dredging one month after dredging cessation. Since dredging impacts on water quality were short lived and localized and no impacts on zooplankton density were detected, we hypothesize that changes among fish larvae may be due to shifts in larval origin if spawning fishes avoided dredged areas. Continued summer dredging could have implications for the reproductive success of forage fishes and commercially and recreationally important species.

WRC 115

ROCK Museum

Kaye Lee Brady

ROCK Museum - Kaye Lees Corner Foundation

Includes fliers about classes, the museum, location, outreach, community involvement, request for volunteers & speakers etc.

WRC 116

Greenville Rotary Community Work

Hunt McKinnon

Greenville Rotary

Information on the community work by the Greenville Rotary clubs

WRC 117

A Process for Asset Mapping to Develop a Blue Economy Corridor

Dr. Emily Yeager, Dr. Beth Bee, Taylor Cash, Anjalee Hou, Michael Schilling, Kelsi Dew

Recreation Sciences, ECU

In Spring 2019, researchers from ECU in partnership with Sound Rivers, the conservation non-profit for the Tar-Pamlico River Basin, proposed the idea of identifying non-material QoL assets in the River Basin and subsequently visualizing them on a digital interactive map. Sound Rivers manages the Tar-Pamlico Water Trail which features river access points and reservable camping platforms on a digital interactive map (Sound Rivers, 2016). ECU researchers proposed the new and expanded map to live on Sound Rivers' website with the intention that the camping platform reservation system and existing assets remain in place with the addition of the proposed non-material QoL assets (Eslami et al., 2019). After agreement to partner on the project through a formal memorandum of partnership (MOP) between ECU researchers and Sound Rivers in Spring 2020 (Appendix I), a subsequent Tar-Pamlico BEC advisory group was formed to include the following stakeholders: county economic development directors, parks and recreation departments, tourism authorities, experts/community leaders in each of the eight proposed assets, and residents. To extend agency to residents in the design and content of the corridor beyond the advisory group, we used an appreciative inquiry (AI) approach to identify existing assets within the corridor (Che Aziz et al., 2018). Round one of asset mapping in Spring 2022 consisted of hosting individual asset-mapping workshops in four counties. Round two of asset mapping occurring in Spring 2023 consisted of attending community festivals and events as vendors in each of the counties from the first round of asset mapping.

WRC 118

Communities Thrive Within Strong Networks. Come be a Part of the NC EJ Network.

Dani Lin Hunter and Chris Hawn

NC Environmental Justice Network

The North Carolina Environmental Justice Network supports environmental justice communities across the state with capacity through organizing, communications, financial resources, research, and education. Our poster will highlight the ways that we hope to partner with communities and academics to better support communities' needs. Specifically, it will highlight what we can offer the communities and academics who partner with us and what we need each of them to bring to strengthen our network.

WRC 119

Environmental Justice Work in Sampson County

Hayley Gorham, Sherri White-Williamson, Denise Robinson, Saisha Neilsen, Christian Felipe

Environmental Justice Community Action Network

Poster highlighting EJCAN's work in Sampson County / rural eastern North Carolina on various environmental and social justice issues. Explanation of unique challenges faced by the community,

the cumulative burden of multiple significant polluting industries in the county, and actions we are taking to advocate for change, empower residents, and bring about environmental justice.

WRC 120

Together for a Common Cause? Cooperative Tendencies in Transdisciplinary Research Groups Aimed at Solving Water Quality and Quantity Issues in Eastern North Carolina

Kyra Selina Hagge, Delnaz Amroliwalla, Marcia R. Hale, Poonam Arora, Stephen Moysey
Department of Coastal Studies, ECU

Complex issues like climate change, poverty, and disparity demand a transdisciplinary approach to research, which integrates multiple disciplinary lenses and includes the grounded knowledge of community expertise. Such research has the potential to be transformative in its impact, reshaping related relationships and systems. It also requires researchers to make an upfront investment in learning methods and jargon of other disciplines to cooperate, without an assurance of outcomes. Our NSF Coastlines and People (CoPe)-funded project, includes more than 30 scientists working with community partners to address the environmental justice dimensions of water quality and quantity issues in Eastern North Carolina. Five working groups facilitate the project, including Community Science, Sensing and Monitoring, Environmental Modeling, Social Science and Community Implementation. To better understand our team dynamics and tendencies, we asked our colleagues to respond to a questionnaire with two cooperative game theory measures, the SVO and IPUC, at two team events, an annual retreat and a monthly meeting. The social value orientation (SVO) measure determines whether people are pro-self or pro-social when in interdependent situations. We also used a modified Intergroup Parochial Universal Cooperation (IPUC) game to further understand differences in preferences for in-group versus universal cooperation. Our data show that, as expected, there is variation of SVO within and between working groups that may align with preferences for universal cooperation. We are interested in exploring how this difference can be harnessed for more connected communication and supportive team dynamics, which could ultimately lead to robust outcomes and transformative research.

WRC 121

Leading Inclusive Transformation in the Geoscience Community via an Intercultural Network of Learning Ecosystems - LIT GEO

Adriana Heimann Ríos, Edu Leorri, Alex Manda, Stephen Moysey, Department of Geological Sciences, ECU

Gordana Vlahovic, Timothy Mulrooney, Rakesh Malhotra, and Christopher McGinn (at North Carolina State University) and Angel Acosta Colón and Ricardo Infante Castillo (at the University of Puerto Rico at Arecibo).

Introduction of NSF-sponsored LIT GEO team, project goals, activities, participants, and collaboration opportunities.

WRC 122

Herring Run Creek Tributaries Monitoring Project

Sarah Whitfield and 2024 WHS APES Students

Washington High School, Beaufort County School

Engaging high school students in authentic research through biological classification and chemical monitoring of streams that feed into Herring Run Creek/Runyon Creek, tributaries of Pamlico-Tar River Basin.

WRC 123

Impact of Ship-Channel Dredging on Zooplankton Abundance and Species Composition in Summer Months in Beaufort Inlet, North Carolina

Taniya Johnson, Lulea Adams, Abigail Faith, Naomi Jainarine, Rebecca Asch
Asch Lab

In Beaufort Inlet, North Carolina ship-channel dredging has been historically conducted during only the winter to deepen the inlet to support maritime transport. The United States Army Corps of Engineers (USACE) has proposed expanding the dredging season to include summer to reduce costs and increase worker safety. The USACE and state and federal regulatory authorities temporarily allowed dredging year-round from 2020 to 2023, but the anticipated impact of this activity on water quality, fish, and wildlife was unknown. This is a concern because summer is a key season when estuarine habitats inshore of this inlet serve as nurseries for juvenile fishes and invertebrates. The goal of this study is to assess the impact of dredging during the summer on zooplankton biodiversity and density. Zooplankton serves as an important forage base for higher trophic-level organisms. Sampling of zooplankton was conducted on the Piver's Island Bridge in conjunction with NOAA's Beaufort Inlet Ichthyoplankton Sampling Program (BIISP) before, during, and after the dredging during the summers of 2019, 2020, and 2021. A Zooscan was used to produce high-resolution images of subsamples of zooplankton. The images were then uploaded to Ecotaxa, a web application that uses Artificial Intelligence to identify and sort zooplankton samples into 24 taxonomic groups. These data were used to calculate species richness, the Shannon-Weiner Index, the Simpson Evenness Index, and zooplankton density during each dredging period. Preliminary results showed dredging did not have a significant impact on biodiversity metrics and zooplankton density. Our results will inform policy guidance on whether ship-channel dredging activities are safe to permit in the summer months.

WRC 124

Innovation Early College High School (IECHS) Research: Investigating the Effects of Hog Farming on Local Rivers in Eastern North Carolina

Joseline Mata, Kamora Gorham, Joseph Eakes, Alanna Matthews, Abdal Rahman Musallam, Jasmin Perez, Oana Ridsen, Bobby Bowser, Stephen Moysey

Hog farming is instrumental for the North Carolina economy generating more than \$10 billion a year and providing jobs for 40,000 people. North Carolina is the third-largest producer of pork in the United States, with each hog producing about 11 pounds of waste daily. Hog waste contains nutrients such as phosphorus and nitrogen as well as pathogens, and watersheds can be affected by hog waste through rainfall events. Just in 2021, it was reported that one million pounds of hog waste entered Tuckahoe Creek (Neuse River Basin). Furthermore, fishing and swimming in contaminated water may lead to adverse side effects like diarrhea, vomiting, and nausea. This project aims to study water quality in areas with a high concentration of hog farms to determine how nearby hog farms affect local watersheds in the Tar-Pamlico River Basin. To do this, water will be collected from rivers upstream and downstream near industrial hog farms. The samples will be analyzed for ammonia, nitrates, phosphates, and waterborne pathogens. The data gathered from this project will be used to report the effects of hog farms on local watersheds, inform public stakeholders, and potentially aid in further research.

WRC 125

Coastlines and People Community Water Corps

Gigi Otranto, Jalind Lampa, Kent Brantley, Deshawn Matthews, Austin Newton, Emily Killebrew, Lauren Holliman, Dave Schwartz and Tara van Niekerk.

Water Resources Center (WRC) WaterCorps

What does Community Water Corps (CWC) do? The CWC works with communities in Princeville, Greenville, and Nags Head to identify and investigate local environmental issues of concern. We facilitate and co-develop STEM related programs with our community partners that aims to spread awareness and build capacity within local communities.

WRC 126

WaterCorps ~ A Student-Led Environmental Consulting Organization/Updates and Opportunities

Jeffrey McPhillips, Camryn Landreth, Nicholas Kruchten, Matthew J. Sirianni, Stephen Moysey
Water Resource Center (WRC)

ECU WaterCorps program is a student-led consulting-style organization that focuses on geoscience workforce skills development. Unlike traditional student research experiences, WaterCorps participants operate in real-world project-based work environments that parallel what is found in the environmental or engineering consulting industries. In WaterCorps, students take on various paid roles (i.e. interns, staff, and project owners) and are responsible for engaging with internal and external partners to scope projects that address client needs. Projects span four different service lines (Field, Lab, Data Analysis, & Communications) and have included: 1) development and delivery of educational materials for young students and industry professionals; 2) water quality field monitoring and lab analysis along the Tar-Pamlico River; and 3) deploying and maintaining environmental sensors in partnership with ECU's Environmental Sensing and Data Network. Through WaterCorps, students are exposed to the societal relevance of their work and gain real-world context for the value of the technical skills and disciplinary knowledge they receive during their degree.

WRC 127

NC Community Information Portal

Water Resources Center (WRC)

Exploring and supporting environmental justice through collaborative community science.

WRC 128

Investigation of Storm Surge Versus Saltwater Intrusion on Coastal Aquifer Salinization in Hyde County, North Carolina.

Elnaz Pezeshki Stephen Moysey, Alex Manda, Andrea Gibbs, Tyler Palochak, Jon Gullett

Farmers in Hyde County, NC are increasingly reporting low yields as a result of soil salinization. Understanding the cause of this salinization and how it is linked to storms and hurricanes is valuable for planning and forecasting the long-term impacts of climate change. The drivers of soil salinity in coastal regions are likely to be associated with multiple surface water and groundwater processes. For example, storm surge flooding could provide a direct source of salt to soils and groundwater storage. However, farmers anecdotally report that if soils are already saturated prior to the surge

event, the saltwater won't be able to infiltrate into the subsurface, and lasting crop impacts will be minimal. In contrast, saltwater intrusion in surficial aquifers could be an ongoing source of salt to soils during periods with high evapotranspiration rates. To investigate these processes, we instrumented a salt-impacted farm site in Hyde County near Middletown, NC. This field is 800 m away from Middletown Creek, which discharges to the Pamlico Sound 1.5 km downstream from the study site. Three sets of nested piezometers ranging in depth from 1.1-3.4 m were installed at the farm to monitor water levels and fluid electrical conductivity, salinity, and temperature. Additional measurements of salinity were periodically made at various surface water locations in the area. The study site was flooded as a result of storm surge caused by Hurricane Florence in September of 2018. The salinity of flood waters reached 10.7 PPT with observations in Middleton Creek varying between 13-18 PPT in the month following the hurricane. Most monitoring wells did not show significant temporal changes in salinity after the storm, with only one shallow well varying between 2-8 PPT and the other two shallow wells remaining around 5 PPT. Salinities in monitoring wells at about 3 m depth were also static, but observed to have salinities as high as 9 PPT. An extensive zone of high electrical conductivity was verified at this depth using vertical electrical soundings made with a Geoprobe and electrical resistivity imaging surveys. Likewise, grain size analysis of core samples suggests the presence of a high permeability zone at this depth. Thus, it appears that storm surge did not contribute significant quantities of salt to groundwater in this case, whereas saltwater intrusion seems to be occurring via the high permeability zone.