CE 591-003

Hydrologic Forecasting Seminar

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Team Science Professional Development Assignment – Working with Other Disciplines

­**Interview 1: Rick Deerman, Professional Engineer & Certified Floodplain Manager**

1. In my interview with Rick, I explained the premise, methods, goals, and values of my research in the Water R2O NRT Program. My research is paleo streamflow reconstruction of the Adige River located in northern Italy, using the tree-ring based proxy the Palmer Drought Severity Index (PDSI) within a 450-kilometer radius to correlate rainfall with unobstructed streamflow. By using different reconstruction methods such as stepwise linear regression and no-code AI, similarities and uncertainties in the reconstructions can be easily visualized. Because observed streamflow records are typically short in nature for the Adige River, reconstructing past streamflow can be an extremely helpful tool in understanding water resources for proper management and forecasting.
2. Rick Deerman was chosen to be interviewed due to his current practice with hydrological modeling and water resource management, and as his role as my boss at InSite Engineering here in Tuscaloosa. Since I plan to begin full time work for the company post-graduation, it is important to communicate how my experience and research in the Water R2O NRT Program will be of benefit and operation to the company and communities we work for. After discussing my research, I asked Rick to explain his educational background and experience in the field of hydrology. He has his bachelor’s degree in civil engineering and master’s in environmental, without having pursued research in his education at The University of Alabama. He has worked as a professional engineer in consulting for over 25 years, with a specialized focus on hydrologic modeling in the civil engineering field. His current practice consists predominantly of evaluating spatial differences in 10, 50, and 100-year storms for establishing stormwater solutions for site development as well as determining minimum and peak flows for a variety of applications.
3. Rick’s practice as a professional environmental engineer specializing in hydrologic modeling for civil engineering applications is of special value to my current research for the NRT program and practice at InSite Engineering. As an environmental / civil engineer-in-training at the same firm as Rick, I can consistently learn from his experiences and apply knowledge gained with hydrologic modeling such as utilizing HEC-HMS and historical environmental data to evaluate site stormwater conditions. In part d, I will explain how paleo streamflow can be utilized in the field of municipal civil / environmental engineering.
4. Rick explained that his current practice utilizes streamflow / creekflow data to establish baseline minimum flows to meet regulatory requirements for wastewater discharges. He mentioned that there is often a lack of reliable streamflow and creekflow data, especially in West Alabama, where a majority of our municipal work at InSite is focused. He explained the importance of reconstructed streamflow as it would give insight into low flow periods for better estimating baseline minimum flows, which subsequently reduces risk to the water body receiving wastewater discharges. The methods of paleo streamflow reconstruction have been utilized in other locations including parts of the southeastern US and central Europe, and with the proper resources like PDSI datasets and unimpaired streamflow data, it could be done for creeks and streams for wastewater discharge modeling and regulatory purposes. I hope to utilize my newfound knowledge of hydrologic forecasting from the NRT program in my day-to-day operations at InSite Engineering, working with Rick Deerman.

**Interview 2: Corinne Baroni, MS Environmental Engineering Student, Graduate Council Fellow & Researcher**

1. In my interview with Corinne, I explained the premise, methods, goals, and values of my research in the Water R2O NRT Program. My research is paleo streamflow reconstruction of the Adige River located in northern Italy, using the tree-ring based proxy the Palmer Drought Severity Index (PDSI) within a 450-kilometer radius to correlate rainfall with unobstructed streamflow. By using different reconstruction methods such as stepwise linear regression and no-code AI, similarities and uncertainties in the reconstructions can be easily visualized. Because observed streamflow records are typically short in nature for the Adige River, reconstructing past streamflow can be an extremely helpful tool in understanding water resources for proper management and forecasting.
2. Corinne was selected to be interviewed because of her active involvement with water resources research, as well as her spatial focus in the Black Belt region of Alabama, where my current internship focuses. Additionally, being in a similar research focus as Corinne, it was very informative to compare methodologies. Corinne Baroni is pursuing her Master’s of Science in environmental engineering as a Graduate Council Fellow and Researcher at The University of Alabama. She has been working in the Elliott water quality lab since Summer 2021 and graduated with her Bachelor's in environmental engineering from UA in Spring 2023. Her thesis project is quantifying fecal microbes in the Alabama Black Belt and studying their relationship to the suspended sediment load and varying climatic events using novel, time-integrated methods.
3. Corinne’s research, although more focused on water quality, utilizes similar qualitative, proxy-based methods for indicating fecal microbes attached to sediment with E. coli concentrations in samples, while my research utilizes the Palmer Drought Severity Index for indicating streamflow. Corinne stated in the interview while reflecting on her research, “[my research] utilized time-integrated sampling methods to capture more robust data over a longer period with the end goals of improving surface waterway monitoring and management.” My research capabilities learned from the NRT program would allow for Corinne and I to work together on either of our research projects, as our conversation revealed the similarities in our methodologies, experiences, and common end goal of improving surface water management.
4. I believe my capability as a researcher with the R2O mindset would be valuable for Corinne’s research, as communities in the Black Belt need environmental justice, which only comes through gaining insight through research, and implementing sustainable and attainable solutions. Understanding and quantifying surface water resources, whether that is historical flow data of the Adige River or fecal coliform concentrations in the Alabama Black Belt region, is the basis of both of our projects. One specific capability of my research that may be beneficial for Corinne’s project is the integration and use of AI modeling. Uncertainty in the concentrations of fecal coliforms might be better represented using various models.