



## HARRIS BIENN



### Company Role

Geospatial Scientist/Lead GIS Analyst

### Project Role / Focus Areas

- Geospatial and geostatistical analysis
- Multi-hazard severity
- Socioeconomic vulnerability and equity
- Sociohydrology

### Education

- B.S. – Environmental Engineering, Louisiana State University, 2018
- Marine Corps Leadership Course, United States Marine Corps Leadership Academy, 2010
- Spatial Intelligence Analysis, Marine Corps Air Ground Combat Center, 2009

### Awards / Honor

- Judge's Choice, 28<sup>th</sup> WERC Environmental Design Contest, April 2018
- Navy Achievement Medal, July 2011
- Afghanistan Campaign Medal, December 2009, September 2010
- Combat Action Ribbon, January 2010

### Experience Profile

Harris Bienn is a researcher for The Water Institute of the Gulf, where he is a member of the Human Dimensions group. Harris joined the Institute in 2014 as a research intern in the Engineering Design and Innovation group. His focus has since shifted the realm of sociohydrology and his ongoing research is focused on assessing the sociocultural and environmental impacts of climatic flux, quantification of multi-hazard severity, and identification of nature-based solutions for sustainable water resource management. His academic interests include environmental equity analysis, quantitative modeling of human response to environmental hazards, and data visualization and analysis using geographic information systems (GIS).

His recent work at the Institute includes a comprehensive water resources assessment for the state of Louisiana, resilience assessment efforts in Louisiana and across the Gulf Coast, quantitative methods to account for social vulnerability in large-scale environmental restoration projects, and geostatistical methods for assessing the combined impacts of multiple hazards on vulnerable populations.

Prior to joining the Institute, Harris worked for the Jacobs Alliance Group at the ExxonMobil Chemical Plant doing process engineering preparations for turnaround projects. Harris spent four years in the United States Marine Corps as an enlisted infantryman and left the service in 2012.

Harris graduated from Louisiana State University's College of Civil and Environmental Engineering in May of 2018 with a bachelor's degree in Environmental Engineering. He anticipates future academic endeavors related to the nexus of anthropogenic development and adaptive water resources management.

### Professional Experience

The Water Institute of the Gulf

2014-Present

- *Research Associate*

Jacobs Engineering Group

2012-2013

- *Process Technician*

United States Marine Corps, 3rd Battalion 4th Marines

2009-2012

- *Section Leader*

### Selected Projects

***Statewide Water Resources Framework, Louisiana (2016)***. This study appraised current and expected future water supply and demand and developed a planning instrument that can 1) better inform management decisions, and 2) minimize the potential impact of future growth on overall water supply costs, including for energy use. To effectively manage Louisiana's water resources, the study developed an assessment framework that can conjunctively appraise supply and demand in both ground and surface water units across the state.

## **Selected Projects (cont.)**

Surface water and groundwater resources typically differ significantly in their availability, quality, management needs, and development and use costs. Managing both resources together, rather than in isolation, allows water managers to use the advantages of both resources for maximum benefit. This study developed a framework and tested its application in three regions across Louisiana.

One key feature of the framework is a conceptual water budget that quantifies the inputs, outputs, water withdrawals, and usage in ground and surface water in hydrologic units across the state. The framework has been constructed to provide uniformity of analysis across hydrologic units using existing data sources. Many elements of the assessment framework can be measured directly using existing data sources or estimated using established techniques. To minimize the impacts of known or expected gaps in information and data, those elements that could not be measured directly were calculated using the water balance equation.

### ***Modeling current and future river needs to maintain fish and freshwater forest habitat in the Lake***

***Maurepas basin, Maurepas, Louisiana (2018)***. Using the Integrated Compartment Model developed by the Institute and partners for use in the 2017 Coastal Master Plan, Institute researchers used the model in a new way to determine how changes – either more water or less water – to the flow of the river would impact the estuary at Lake Maurepas. In this pilot project for the Amite River, researchers also wanted to determine how forces such as sea level rise, subsidence and projects included in Louisiana’s 2017 Coastal Master Plan could impact the river’s flow, both now and into the future.

***Supporting Our Working Coast, Louisiana (Ongoing)***. Partnering with industry, The Water Institute of the Gulf is working across the coastal zone with ports and industry to help address some of the challenges faced by infrastructure in these changing landscapes. The following are two examples of how the Institute is implementing its “Working Coast” strategies.

South Louisiana’s Port Fourchon plays a critical national economic security role by providing the U.S. with approximately 18% of its total oil supply and servicing over 90% of the Gulf of Mexico’s deepwater oil production. As Port Fourchon continues to grow, there are plans to potentially deepen the port’s access channel which will yield millions of cubic yards of sediment. This situation presents a unique opportunity as the port will need to dispose of the material while also desiring additional storm protection. The Institute has proudly worked to create a Public-Private Partnership with the Port, Shell, Chevron, and Danos to determine the best, nature-based way to use the dredged material to protect the port’s critical infrastructure, improve the environment; make communities from Fourchon to Larose more resilient; and yield carbon-capture sequestration benefits.

The Port of Lake Charles faces challenges due to the large amounts of sediment flowing into the Calcasieu Ship Channel, forcing ongoing dredging. While the port has been proactive in finding ways to beneficially use the dredged sediment, the port seeks a sustainable way to better manage sediment through the system. Currently, the Calcasieu Ship Channel must be dredged yearly to make sure it meets the 400-by 40-foot-deep federally mandated requirements. It’s estimated that the Port of Lake Charles will need to have 97 million cubic yards of disposal capacity for dredged material within the next 20 years. In August 2017, the port tasked the Institute with providing a better understanding of how sediment moves through the ship channel as part of a strategy to reduce dredging needs and to evaluate alternative locations to find long-term and realistic dredge disposal sites.

### ***Assessing Temporal and Spatial Variability in Community and Parish Level Responses to Oil Spills and***

***Other Events in Coastal Louisiana, New Orleans, Louisiana (Ongoing)***. This ongoing study, a partnership with the University of Arizona Bureau of Applied Research in Anthropology, seems to expand and enhance understandings of the socioeconomic effects of major disruptive events, such as oil spills, hurricanes, floods, and drought, on communities in the short- and long-term and to understand the cumulative effects of such events on communities.

## **Selected Reports**

1. Scott A. Hemmerling, Tim J.B. Carruthers, Ann C. Hijuelos, Sequoia Riley, and Harris C. Bienn. 2016. Trends in Oil and Gas Infrastructure, Ecosystem Function, and Socioeconomic Wellbeing in Coastal Louisiana, The Water Institute of the Gulf, Baton Rouge, LA, WISR-001-2016.
2. Scott A. Hemmerling, F. Ryan Clark, and Harris C. Bienn. 2016. Water Resources Assessment for Sustainability and Energy Management, The Water Institute of the Gulf, Baton Rouge, LA Selected Documents

## **Selected Conference Proceedings and Presentations**

1. Analyzing the Flooding Vulnerability of an At-Risk Neighborhood in New Orleans, Louisiana Using Community-Sourced Data. 28<sup>th</sup> WERC Environmental Design Contest. Apr. 8-11, 2018. Las Cruces, NM.
2. Simulating Ecological Responses to Coastal Ecosystem Restoration: A Case Study of Proposed Sediment Diversion Operation on the Lower Mississippi River. Restore America’s Estuary Summit. Dec. 2016. New Orleans, LA.
3. Model Development for Deltaic and Coastal Ecosystem Restoration: Nutrients, Pelagic Primary Production and Sedimentary Processes. State of the Coast. Jun. 1-3, 2016. New Orleans, LA.