Vision: *Water sustainability for complex socioecosystems.*
Mission: *The Water Institute brings together faculty, students and stakeholders to conduct transdisciplinary research, provide innovative educational experiences, and facilitate public outreach efforts that promote science-based solutions to local and global water challenges.*

Faculty

Shawn Landry, PhD, Geography and Environmental Science and Policy, University of South Florida
Director, Research Associate Professor

Kai Rains, PhD, Ecology, University of California Davis
Research Associate Professor

Research Center Summary

- The Water Institute serves as a hub for water-related research at USF, connecting faculty and students with external partners.
- Each year, over a half-million visitors use the public websites that have been developed by the Water Institute.
- Water Institute environmental monitoring internship programs provide valuable job skills to 5-10 students annually.
- The Water Institute Open Data GIS Portal provides spatial data for students, faculty and the public.
- Approximately 90% of Water Institute salaries and expenses are supported by contracts and grants.
- Over 11 counties depend upon the Water Atlas as a core part of their stormwater and surface water management programs.

Data-driven, Geospatial Website Projects

Plant Atlas: A suite of 4 websites, each with a comprehensive, searchable database of regional flora with taxonomy, range maps, photographs, and herbarium specimens. A fifth plant atlas website is under development. Sponsors: multiple. www.plantatlas.usf.edu Visitors/year: ~220,000

Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR): Database creation and population were the focus of Phase I of this project. During Phase II an interactive, public "SEACAR Atlas" website with mapping capabilities will be created that presents status and trends analysis and related data. Sponsor: Florida Dept. of Environmental Protection, Office of Resilience and Coastal Protection.

Florida Species & Habitat Monitoring Catalog: This online metadata catalog describes wildlife monitoring statewide in terrestrial and aquatic habitats, in support of the Florida Wildlife Legacy Initiative. Sponsors: Florida Fish & Wildlife Conservation Commission, U.S. Fish & Wildlife Service.

Water Atlas: This suite of 10 websites is sponsored by state, regional, and local government agencies. It makes surface and groundwater data more discoverable and understandable by policy-makers, water resource managers, and the public. It provides tools for data analysis, download, and visualization. wateratlas.usf.edu. Visitors/year: ~284,000

Florida Water Resource Monitoring Catalog: Sponsored by the Florida Department of Environmental Protection, this online catalog of statewide water quality and hydrology metadata has an interactive map and links to publicly-accessible sampling data. It allows citizens and policy-makers to know where water is being monitored, by whom, when/how often, and for what purpose. water-cat.usf.edu Visitors/year: ~1,200

Tampa Tree Map: Using this website, everyone can map trees in the City of Tampa and on the USF campus. For each tree mapped, environmental benefits and the annual value of ecosystem services are calculated based on species and size. tampatreemap.usf.edu Sponsors: Multiple. Visitors/year: ~1,500

Water Institute Project Sponsors Include:

Data-driven, Geospatial Website Projects *(continued)*

Alabama Butterfly Atlas: This website has life history accounts, distribution maps, photographs of each butterfly life cycle stage, host plant lists, gardening tips, and monthly flight charts for Alabama butterfly species. Primary Sponsor: University of West Alabama. alabama.butterflyatlas.usf.edu Visitors/year: ~26,000

Florida Preservation Atlas: This directory of local historic preservation programs includes links to local archaeological site protections and has an interactive map of Florida's Certified Local Governments and Florida Mainstreets. Sponsor: Florida Public Archaeology Network. floridapreservationatlas.usf.edu Visitors/year: ~900

Other Research Projects

City of Tampa Tree canopy and Urban Forest Analysis, 2016. PI: Shawn Landry. Sponsor: City of Tampa.

The primary goals of this project were to conduct the field and remote sampling and data analysis necessary to measure the 2016 extent, condition and value of the tree canopy and urban forest, and how the forest changed during the five years since the previous study, and in the ten years since the first study.

Collaborative Tool Development for Promoting Resilient Ground Water Resources and Holistic Watershed Management at the Kachemak Bay National Estuarine Research Reserve. PI: Kai Rains. Sponsor: National Oceanic & Atmospheric Administration.

Groundwater discharge and recharge play a critical role in maintenance of temperature and nutrient supply for salmon-bearing streams on the remote Kenai Peninsula. This project will use GIS tools to integrate diverse datasets, develop hydrologic models, and use ground-truthing to provide the necessary knowledge for effective management of these systems.

Bathymetric Survey of Wet Ponds in Orange County. PI: Shawn Landry. Sponsor: Orange County, Florida.

The focus of this project is to conduct field sampling and obtain bathymetry data for approximately 1,100 wet stormwater ponds in Orange County. Faculty, staff and students have developed rapid field sampling protocols to collect water depth data using sonar and GPS technology attached to small water craft (e.g., kayak or jon boat). Students learn field techniques, GIS and 3D mapping skills by processing the depth data to create bathymetric contour data and maps.

RAPID Collaborative Research: The Role of Landscape Configuration and Socio-economic Legacy in Understanding Tree Response to Hurricane Irma. Co-PI: Shawn Landry. Sponsor: National Science Foundation.

While destructive, Hurricane Irma offers an opportunity to increase our knowledge about the response of trees and urban forests to hurricane disturbance. The goal of this research is to understand how windstorm-caused tree failure relates to urban forest structure, and socio-ecological context, and to test these hypotheses across a range of urban forest conditions.

Understanding Risk at Wastewater Treatment Plants in Tampa Bay During Extreme High-Precipitation Events. PI: Mark Luther. Co-PI: Shawn Landry. Sponsor: Tampa Bay Environmental Restoration Fund.

Improved understanding of environmental conditions causing sewer and stormwater overflows in the Tampa Bay region will be obtained by developing a risk model based on precipitation, storm surge, and water utility records. The model will then be used to predict future probability of overflow under accepted sea level rise scenarios.

Ranking inundation potential of wetlands in the Northern Tampa Bay area. PI: Kai Rains. Sponsor: Tampa Bay Water.

Following cutbacks in groundwater pumping at 11 well fields operated by Tampa Bay Water, thousands of wetlands in the Northern Tampa Bay area showed evidence of hydrologic recovery. The objectives of this study are to use a combination of field data and remote sensing to map and characterize the stream flow entering and exiting each wetland and to rank wetlands across this region in terms of their inundation potential.