



# BRENDAN YUILL, Ph.D.

THE WATER INSTITUTE  
OF THE GULF



## Company Role

Research Scientist: Water Resources

## Project Role / Focus Areas

- River and Sediment Engineering
- Applied Fluvial Geomorphology
- Watershed Management

## Education

- Ph.D. – Watershed Management and Hydrology, University of Arizona Tucson, 2009
- M.S. – Geography, University of Wyoming, 2003
- B.S. – International Relations, Boston University, 1993

## Experience Profile

Brendan Yuill, Ph.D. is a numerical modeler at The Water Institute of the Gulf with a background in fluvial geomorphology and watershed hydrology. He has more than 15 years of experience investigating hydrologic, hydraulic, and sediment dynamics in riverine and coastal environments, using both field-based and numerical methods.

At the Institute, Dr. Yuill has collaborated with all types of scientists to address problems related to sediment diversions, borrow pits, subsidence, and compound flooding. Dr. Yuill is a member of the Coastal and Deltaic Systems Modeling team and has led interdisciplinary projects throughout the United States in deserts, rainforests, areas of generous relief, and Louisiana.

Prior to joining the Institute, Dr. Yuill was employed as a research geologist at the U.S. Army Corps of Engineers Engineer Research and Development Center and as a post-doctoral researcher in coastal restoration at the University of New Orleans. Previous to that, he earned his Ph.D. in watershed hydrology at the University of Arizona. He has developed, managed, or lent a helping hand on research projects on a wide range of topics including flash flood sedimentation, levee risk assessment, tree scour, channel restoration and design, turbulence modeling, lateral bar stability, and sensor development.

His current interests span the field of engineering geomorphology, from hillslope stability to receiving-basin sediment retention.

## Professional Experience

The Water Institute of the Gulf 2013-Present

- *Research Associate*

Tulane University, Earth and Environmental Sciences 2011-Present

- *Adjunct Assistant Professor*

USACE Coastal and Hydraulics Lab, Engineer Research and Development Center

- *Research Geologist* 2010-2013

University of New Orleans, Earth and Environmental Sciences

- *Research Associate (Post-doctoral Researcher)* 2008-2010

## Selected Projects

***Lower Barataria Basin and Lower Breton Sound Sediment Diversion Feasibility Study, Louisiana (2016).*** Field data collection in support of this project included monitoring a range of processes (e.g., flow velocities, sediment transport, turbidity, salinity) distributed through a range of complex environments. Sediment tracer particles were employed to monitor how river sediment was diverted through the diversion analogue and advected through the downstream receiving-basin. Receiving basin bathymetry was characterized using multiple integrated methods of data collection (e.g., multibeam sonar, terrestrial RTK GPS survey, airboat-mounted LiDAR) in response to the vast range of water depths that were present which stymied traditional survey methods.

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

**Partnership for Our Working Coast, Louisiana (Ongoing).** Partnership for Our Working Coast is working to identify beneficial, nature-based solutions for this material to contribute to Louisiana's coastal sustainability efforts, protect coastal communities, and support America's Working Coast.

**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.

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.

## **Selected Publications**

1. Allison, M., **Yuill, B.**, Törnqvist, T., Amelung, F., Dixon, T.H., Erkens, G., Stuurman, R., Jones, C., Milne, G., Steckler, M. and Syvitski, J., 2016. Global Risks and Research Priorities. EOS, 1 October 2016.
2. **Yuill, B.T.**, Khadka, A.K., Pereira, J., Allison, M.A. and Meselhe, E.A., 2016. Morphodynamics of the erosional phase of crevasse-splay evolution and implications for river sediment diversion function. *Geomorphology*, 259, DOI: 10.1016/j.geomorph.2016.02.005.
3. **Yuill, B.T.**, Gaweesh, A., Allison, M.A., Meselhe, E.A., 2015. Morphodynamic evolution of a lower Mississippi River channel bar after sand mining. *Earth Surface Processes and Landforms*. DOI: 10.1002/esp.3846.
4. **Yuill, B.T.**, Roig-Silva, C., Walshire, L. 2013. Application of an alluvial architecture model to predicting seepage risk in floodplains. *Engineering Geology*. doi.org/10.1016/j.enggeo.2013.04.003
5. **Yuill, B.T.**, Gasparini, N.M. 2011. Hydrologic controls on wash load concentrations in firstordered watersheds. *Journal of Hydrology*, doi: 10.1016/j.jhydrol.2011.09.11

## **Selected Documents**

1. **Yuill, B.T.**, Baustian, M.M., Moss, L.C., Allison, M.A. and Authority, R., 2014. Researching Uncertainties Related to Sediment Diversions: Fresh Water, Nutrient and Sediment Effects to Coastal Louisiana Receiving Basins Research Work Plan. Water Institute Technical Report.
2. **Yuill, B.T.**, Roig-Silva, C. 2013. A Computational Model to Simulate Groundwater Seepage Risk in Support of Geotechnical Investigations of Levee and Dam Projects. USACE Technical Report, ERDC/GSL TR-13-5, 46 p.
3. **Yuill, B.T.** 2012. Predicting Coarse Sediment Transport From Desert Washes With Patchy Bed Material. USACE Technical Report, ERDC/GSL TR-12-17, 29 p.
4. Klimas, C., **Yuill, B.T.** 2011. Skokomish River Ecosystem Restoration Project Ecosystem Benefits Analysis. ERDC report prepared for the Seattle District, USACE. 43 p.
5. Yuill, B.T., and Reed, D.J. 2009. Subsidence in Coastal Louisiana. EOS, Transaction, American Geophysical Union, 90(25): 217.

## **Selected Conference Proceedings and Presentations**

1. **Yuill, B.T.**, Changes in Channel Bar Morphology and Sediment Infilling Rates in Response to Dredging within the Lower Mississippi River. State of the Coast Conference. New Orleans, LA, March 19, 2014.
2. **Yuill, B.T.**, Gasparini, N.M. Predicting Runoff Sediment Concentrations in Low-order, Desert Watersheds: Accounting for the Effects of Transmission Loss. 9th International Conference on Military Geosciences. Las Vegas, NV, June 21, 2011.
3. **Yuill, B.T.** Weighing Form and Process in the Geomorphic Analyses of Engineering Projects. USACE Infrastructure Systems Conference Atlanta, GA, June. 16th, 2011.