



TIM CARRUTHERS, PH.D.

Director of Coastal Ecology

Tim Carruthers, Ph.D. has a strong U.S. and international reputation gained from more than 25 years working in coastal ecosystems, focusing on human impacts and management support. He has studied estuaries, coasts, coral reefs, lagoons, and river deltas in both tropical and temperate regions. He has applied this knowledge to coastal adaptation planning, marine management policy, as well as nature-based restoration from the scale of a single village up to whole ecosystems.

ORGANIZATION ROLE

Director of Coastal Ecology

PROJECT ROLE / FOCUS AREAS

Ecosystem approaches for building resilience

Developing financially viable carbon offsets from tidal wetlands

Building cross-agency consensus

Adaptive management

EDUCATION

Ph.D., Marine Science, University of Western Australia, 1998

M.Sc., Marine Botany, University of Western Australia, 1994

B.Sc. Hons, Botany, University of Western Australia, 1990

PROFESSIONAL MEMBERSHIPS

Coastal and Estuarine Research Federation

Society for Ecological Restoration

American Geophysical Union

Tim has worked extensively with state and federal agencies, not only in the U.S., Australia, and New Zealand, but also France and many Pacific Island Countries. He has assisted dozens of U.S. National Park Service sites to assess and synthesize the condition of their natural resources. He has also facilitated consensus amongst multiple agencies to prioritizing monitoring and adaptive management priorities in the northern Gulf of Mexico to provide specific guidance to maximize ecosystem benefits of restoration activities.

Currently, Tim is leading the Coastal Ecology Department in projects supporting integration of physical and ecosystem models, filling data gaps to improve validation of carbon offsets from tidal wetlands, expanding approaches for assessing nekton and benthic invertebrate benefits from ecosystem restoration, adaptive management to support restoration, and large-scale data management and analysis across the northern Gulf of Mexico.

PROFESSIONAL EXPERIENCE

2014–Present: Director of Coastal Ecology, The Water Institute

2011–2014: Coastal and Marine Advisor, Secretariat of the Pacific Regional Environment Programme (Samoa)

2009–2011: Program Manager Integration and Application Network, University of Maryland, Center for Environmental Sciences (Horn Point)

2003–2009: Science Integrator, Integration and Application Network, University of Maryland, Center for Environmental Sciences (Horn Point)

2001–2002: Post-doctoral scholar, Integration and Application Network, University of Maryland, Center for Environmental Sciences (Horn Point)

2002–2003: Mellon Post-Doctoral Fellow, Smithsonian Tropical Research Institute (Panama)

2000–2001: Post-Doctoral Research Fellow, Marine Botany, University of Queensland, Australia



KEY FOCUS AREAS

Avian Monitoring and Maximizing Habitat Benefits for Bird Nesting from Habitat Restoration. (2022-ongoing). *Louisiana Department of Wildlife and Fisheries, Fisheries and Wildlife Service, and Louisiana Trustee Implementation Group.* This program involves collection and data management and analysis to improve bird nest count data across the northern Gulf of Mexico for restoration planning and reporting. In addition, facilitating conversation between avian subject matter experts and engineers / project managers cost neutral project design elements that could increase value of the habitat to breeding birds are being identified and implemented. This program focuses on modern data handling, analytics, and cloud computing.

Nekton Reference Ranges, Restoration Targets, and Monitoring of Restoration Success. (2023-ongoing). *National Oceanic and Atmospheric Administration and Louisiana Trustee Implementation Group.* While small scale interactions of fish and crustacean abundance are well documented to vary with local habitat (marsh, SAV, bare areas), quantifying broader effects of large-scale restoration has not been achieved. Through data synthesis and analysis, targeted field collections, and coordinating a large team of collaborators, this work aims to fill these gaps for fish, crustaceans, and Lower Trophic Level organisms including sediment infauna. From baseline data to reference ranges and eventually to restoration targets and then individual marsh creation monitoring, this project is comprehensive with a focus on Barataria and Terrebonne Basins in Louisiana.

Development of Financially Viable Carbon Credits from Tidal Wetlands. (2021-ongoing). *Coastal Protection and Restoration Authority, Chevron, and Multiple Public and Private Partners.* Current methodologies for verifying carbon credits from wetlands are not financially viable for dynamic tidal marshes. The Institute is supporting the state of Louisiana in determining if updated or alternate approaches may be financially viable. This work is identifying legal and policy as well as scientific needs and then working in partnership to fill those needs. Key focus areas include refining quantification of net carbon flux, including the scaling of net methane flux estimates from the microbial to landscape scales.

Adaptive Management of Ecosystem Restoration in Louisiana and the Northern Gulf of Mexico. (2018-ongoing). *Coastal Protection and Restoration Authority and Trustees of the NRDA Implementation Groups.* The Institute initially worked with CPRA and state agencies in Louisiana to describe and explain the informal adaptive management processes that have been employed for coastal restoration over the past two decades. Subsequently the Institute facilitated development of the Louisiana Trustee Implementation Group 'LA TIG MAM Strategy' to ensure best use of available MAM funding and provide a framework of SMART objectives for ecosystem restoration success. Currently, the Institute is working with restoration practitioners to capture lessons learned as the primary currency of successful adaptive management.

SELECTED PUBLICATIONS

1. Jung, H., Nuttle, W., Baustian, M.M., & Carruthers, T. (2023). Influence of increased freshwater inflow on nitrogen and phosphorus budgets in a dynamic subtropical estuary, Barataria Basin, Louisiana. *Water, 15(11): 1974*
2. Moss, L.C., Carruthers, T.J.B., Bienn, H., McInnis, A., and Dausman, A.M. 2020. Gulf-wide data synthesis for restoration planning: utility and limitations. *Shore and Beach Vol 88(1): 23-33.*
3. Liu, B., Sevick, T., Jung, H., Kiskaddon, E., & Carruthers, T. (2023). Quantifying the potential contribution of submerged aquatic vegetation to coastal carbon capture in a delta system from field and landsat 8/9-OLI data with Deep Convolutional Neural Network. *Remote Sensing 15 (15): 3765*
4. Carruthers, T. J. B., Kiskaddon, E. P., Baustian, M. M., Darnell, K. M., Moss, L. C., Perry, C. L., & Stagg, C. (2021). Tradeoffs in habitat value to maximize natural resource benefits from coastal restoration in a rapidly eroding wetland: Is monitoring land area sufficient? *Restoration Ecology Vol. 30 (4) e13564*
5. Carruthers, T. J. B., Raynie, R., Dausman, A., & Khalil, S. (2020). Strategies to improve implementation of adaptive management practices for restoration in coastal Louisiana. *Shore & Beach, 88(1), 83-91.*
6. Carruthers, T.J.B., Dennison, W.C., Kendrick, G.A., Waycott, M., Walker, D.I., Cambridge, M.L. 2007. Seagrasses of south-west Australia: A conceptual synthesis of the world's most diverse and extensive seagrass meadows. *Journal of Experimental Biology and Ecology 350: 21-45*