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Engineering & Scientific Consulting

John Gunnell, Ph.D.

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Professional Profile

Dr. Gunnell is a quantitative ecosystem scientist and environmental chemist with over ten years of experience interrogating processes across the entire river continuum, from conducting field sampling to analytical work in fluvial, lacustrine, wetland, and coastal systems. His experience includes the evaluation of impacts from climate change and anthropogenic activities in natural systems.

Dr. Gunnell frequently applies simulation modeling and statistical methods to integrate disparate data sets into a standardized spatio-temporal frame of reference. His work often assimilates geochronology, temporally ordered geochemical proxies, and geographic information (e.g., spatially registered land-use records, remotely sensed data, and aerial photography). Since his expertise occupies several disciplinary intersections, Dr. Gunnell frequently collaborates with multidisciplinary teams of physicists, geologists, fisheries ecologists, and restoration ecologists.

Dr. Gunnell's background in reconstructing baseline conditions and ecosystem trajectories makes his expertise especially useful for clients that need to fill significant historical knowledge gaps when evaluating contemporary and legacy impacts of environmental disturbances (e.g. land use change, contaminant exposure, and climatic stressors). Dr. Gunnell is a broadly-trained environmental analytical chemist. His experience includes but is not limited to trace and minor element geochemistry (using X-ray fluorescence, ion chromatography, energy dispersive spectroscopy, and inductively coupled plasma mass spectrometry), radioisotope geochemistry (uranium-thorium-lead series), and water quality analysis (e.g., nitrate, orthophosphate, alkalinity, and chlorophyll-α).

Academic Credentials & Professional Honors

Ph.D., Marine Sciences, University of North Carolina, Chapel Hill, 2016

M.S., Marine Sciences, University of North Carolina, Chapel Hill, 2011

B.S., Ecology and Evolutionary Biology, University of Michigan, 2009

Prior Experience

Postdoctoral Fellow, Northeastern University, 2016-2020

Graduate Research Assistant, University of North Carolina at Chapel Hill, 2009-2016

Publications

Gunnell JR, Rodriguez AB, McKee BA. How a Marsh is Built from the Bottom Up. Geology 2013; 41(8):859-862.

Greiner JT, McGlathery KJ, Gunnell JR, McKee BA. Seagrass Restoration Enhances 'Blue Carbon' Sequestration in Coastal Waters. PLoS ONE 2013; 8(8)

Presentations

Gunnell JR. Reconstructing warming throughout the Meso-American Barrier Reef System over the past century. Invited oral presentation: UNC Marine Sciences, Chapel Hill, NC, 2019.

Gunnell JR, Courtney T, Westfield IT, Baumann J, Castillo K, Ries JB. Reconstructing the past century of seawater temperature across the Caribbean Mesoamerican Barrier Reef System from multi-elemental coral paleothermometry, Oral presentation: ASLO/AGU: Ocean Sciences, Portland, OR, 2018.

Westfield IT, Gunnell JR, Rasher DB, Williams B, Ries JB. Acidification and warming negatively impact calcification rate, skeletal microstructure, and strength of two ecologically important species of subarctic coralline algae (Clathromorphum compactum; Clathromorphum nereostratum), Poster presentation: ASLO/AGU: Ocean Sciences, Portland, OR, 2018.

Gunnell JR and McKee BA. Suspended Sediment Yield Response to Urbanization in the U.S. Southern Piedmont. Poster presentation: GSA-Southeastern, Columbia, SC, 2016.

Gunnell JR and McKee BA. Coastal Meringues: Are Salt Marshes Inflated with Excess Void Spaces? Poster presentation: ASLO/AGU: Ocean Sciences, New Orleans, LA, 2016.

Gunnell J.R. and McKee BA. Deeply Eroded Soils Dominate the Suspended Load in the Haw River, NC. Poster presentation: WRRI, Raleigh, NC, 2016.

Gunnell JR and McKee BA. Young and Restless: Rapid Carbon Burial in a Newly Emergent Marsh, Oral presentation: CERF, San Diego, CA, 2013.

Gunnell JR and McKee BA. Neon Carbon: Patterns of Land Creation and Carbon Sequestration at the Newport River, N.C.. Oral presentation: ASLO, Otsu, Japan, July 2012.

Capps W, Gunnell JR, Shay T, McKee BA. Trends in Nutrient and Chlorophyll Concentration along the Tar-Pamlico and Neuse Rivers. Poster presentation: Eddie and Jo Allison Smith Family Foundation Symposium, Chapel Hill, NC, 2011.

Jarman K, Gunnell JR, McKee BA. Connectivity and Marsh Accretion in a Coastal Plain River Estuary, Poster presentation: ASLO-NABS, Santa Fe, NM, 2010.

Cameron, L.P., Reymond, C.E., Bijma, J., Büscher, J.V., De Beer, D., Guillermic, M., Eagle, R.A., Gunnell, J., Müller-Lundin, F., Schmidt-Grieb, G.M. and Westfield, I., 2022. Impacts of warming and acidification on coral calcification linked to photosymbiont loss and deregulation of calcifying fluid pH. Journal of Marine Science and Engineering, 10(8), p.1106.

Westfield, I., Gunnell, J., Rasher, D.B., Williams, B. and Ries, J.B., 2022. Cessation of hardground accretion by the cold-water coralline algae Clathromorphum compactum and Clathromorphum nereostratum predicted within two centuries. Geochemistry, Geophysics, Geosystems, p.e2021GC009942.