

Multidisciplinary Assessment of Deep-Water Coral Ecosystems: Tools to Detect Impacts of Sub-Lethal Stress

Christina A. Kellogg
U.S. Geological Survey, St. Petersburg, FL
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The Gulf of Mexico outer continental shelf supports extensive commercial and recreational fisheries, and unique benthic communities including deep-sea corals. A critical information gap was identified: the need for tools to detect impacts of sub-lethal stress and to quantify health and resilience factors in deep-sea coral ecosystems. While there are additional components of this multidisciplinary assessment, this talk will focus on one objective: Characterizing taxonomic and functional genes in coral microbiomes (a collection of microorganisms that is intimately associated with the host animal, and all their genetic capabilities) to develop indicators of coral health or sub-lethal stress. Deep-sea corals have a microbiome that is a fundamental part of their biology. Microbiomes can change quickly (hours to days) in response to environmental stress, often preceding visible effects. Determining baselines that encompass both the taxonomy ('who is there') and metabolic functionality ('what are they doing') of these coral microbiomes is essential to our ability to predict what sorts of microbial shifts could signal disease or environmental sensitivity to events like oil spills, plumes of drilling mud, or environmental change. Results include identification of conserved core bacterial associates present in the deep-sea coral *Lophelia pertusa* and the first metagenomic dataset of microbial functional genes available for a deep-sea coral. Both the taxonomic and functional datasets produced for *L. pertusa* are derived from multiple individual coral colonies in the Gulf of Mexico and western Atlantic, and provide critical microbial baselines not previously available.