

Deep Coral Reef Ecosystem Studies: Caribbean
Ecology, Integrity & Status of Deep Caribbean Mesophotic Coral Ecosystems

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Project Description: Caribbean mesophotic coral ecosystems are largely unexplored mainly due to the limitations of submersibles, remotely operated vehicles and autonomous underwater vehicles. This program grows from expertise developed under the NOAA Center for Sponsored Coastal Ocean Research's Coral Reef Ecosystem Studies 2002 program and consists of a multidisciplinary team (biology, geology, chemistry, and physics) to study the biology and ecology of mesophotic coral ecosystems off La Parguera, Puerto Rico. Surveys using remotely operated vehicles will guide initial work, but key to the program is the development of a deep diving (300 ft) capability for detailed manipulative work and sampling.

Research is driven by 24 specific hypotheses within 3 objectives:

- **Characterization** – species compositions and changes in space and time, disease prevalence and dynamics, genetic variability, reproduction and recruitment, plus the current and historical environment affecting reef distribution and function. Work includes still/video photography, specimen collection, repeat sampling and experimental manipulations.
- **Connectivity** – the relationship and ecological flow between deep and shallow reefs using taxonomic, genetic, reproductive and recruitment studies, and simulation modeling. Can deep reefs seed threatened shallow species, or are deep reefs dependent upon larval import from shallow reefs?
- **Vulnerability** – new/different species, small populations, slow growth and close proximity to land potentially make Caribbean deep reefs unique yet vulnerable to anthropogenic stress. A scientific management committee ensures proper scheduling and completion of all activities.