

Understanding and Strengthening Natural and Social Connections

Entendiendo y Fortalecimiento las Conexiones Naturales y Sociales

Comprehension et Consolidation des Connexions Naturelles et Sociales

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EXTENDED ABSTRACT

The session highlighted ongoing efforts in the Greater Caribbean on ecological and social connectivity in order to enhance cooperation and governance in the region. It is not the first time this concept was a focal area at GCFI. This session occurred one day shy of the 10th anniversary of a GCFI symposium on Caribbean connectivity held in Belize in 2006, led by the late Brian Keller, and Rikki Dunsmore. Papers from the symposium were published in the National Oceanic and Atmospheric Administration's (NOAA) Office of National Marine Sanctuaries Marine Sanctuaries Conservation Series (<http://sanctuaries.noaa.gov/science/conservation/pdfs/carib.pdf>.) and are as relevant today as when they were first written.

Natural and social connectivity across the Caribbean is nothing new. Connectivity has been a fundamental driver for Caribbean marine life and for its people. Many important changes to the resources have occurred across the region over that time. In the past 30+ years, we've seen dramatic ecosystem shifts in the Caribbean initiated by events such as the *Diadema antillarum* dieoff and the increasing frequency and intensity of coral disease outbreaks and bleaching events. The recent invasion of lionfish could make problems even worse. The impacts of humans in decimating fish spawning aggregations, and occasional mishaps like ship groundings and oil spills compromise our ability to restore ecosystems even in highly protected areas.

These events happened over periods ranging from months to a few decades, but the impacts of each are consequences that could last for many decades.

But we are also living in a time when there are more opportunities to network and collaborate to solve some of these problems. And in most cases, these problems have a common thread. They all require better communication, and sharing of our approaches, successes, and failures, followed by coordinated multi-national responses. This session highlighted some of those opportunities, including international agreements, tools, training, and scientific efforts. Kimberly Puglise presented on behalf of Chris Kelble on using a conceptual model to integrate ecological and social information to support ecosystem-based management. Three talks were on actions related to information gathering in the region. Chris Hale discussed the role of the Deepwater Horizon spill in furthering our understanding of regional connections. Will Heyman described a collaborative project funded by the NOAA's RESTORE Act Science Program that is creating an inventory of spawning aggregation sites, seasons, species and their relative vulnerabilities in the Gulf of Mexico. The project aims to design and implement a regional long-term cooperative monitoring program. Christy Semmens described the accomplishments of a 25-year effort by volunteers of the Reef Environmental Education Foundation to collect fishery-independent reef fish data from this and other regions of the world. Three talks on management actions included one on opportunities for professional development in fisheries management by Charles Sidman, another on research and public process relating to shark and ray protection in the Cayman Islands (Rupert Ormond), and the last on a NOAA initiative called the Partnerships for Transboundary Protection, which provides a framework for enhancing regional collaboration (Steve Gittings presented on behalf of Harriet Nash).

Two recent activities did not have presenters in the session, but were mentioned during the session overview. The first was a recent meeting of the Scientific and Technical Advisory Committee (STAC) of the United Nations Environment Programme's SPAW, or Special Protected Areas and Wildlife Protocol focused on biodiversity protection. The committee made recommendations that were to be presented for approval in March 2017 by the Conference of the Parties of SPAW. The draft recommendations made by the STAC include:

- i) Greater participation by countries in the region,
- ii) Ratification of current proposals for participation,
- iii) Greater support for the Global Coral Reef Monitoring Network,
- iv) More emphasis on marine mammal conservation,
- v) Confirming addition of a proposed national park in Cuba,
- vi) Soliciting requests for more marine protected areas,
- vii) Nominations of species for greater protection,
- viii) Looking more closely at ecological connectivity in the region,
- ix) Strengthening regional networks,
- x) Capacity building,
- xi) Engagement of the fishing industry in conservation in marine protected areas, and
- xii) Greater protection for elasmobranchs and Nassau Grouper.

The second is a project funded by NOAA's National Centers for Coastal Ocean Science and Office of Ocean Exploration and Research to study the role of mesophotic coral ecosystems at Pulley Ridge (off the southwest coast of Florida at 60 - 90 m) in replenishing key fish species, such as grouper and snapper, and other organisms in downstream reefs of the Florida Keys and Dry Tortugas. This project team of over 30 scientists included physical oceanographers, bio-physical modelers, population geneticists, biologists, and bioeconomists, as well as resource managers to ensure outputs would be useful for management. Pulley Ridge was designated as a Habitat Area of Particular Concern in 2005 and is protected from fishing with longlines, bottom gear and traps. Surveys to characterize the flora and fauna of Pulley Ridge discovered, among other things, that this mesophotic coral ecosystem is larger than previously thought, and has the densest cover of plate corals (*Agaricia* spp.) known in the Gulf of Mexico lying outside the protected area. The study is still analyzing results, but has identified connections for some species, suggesting Pulley Ridge is a source of larvae for downstream reefs. Researchers documented high lionfish abundances in these deep waters, raising concern about the potential for future impacts on the enormous fish assemblage present. Many are small anthiids, and their size would likely make them highly vulnerable to lionfish predation. They are also an important source of food for native predators, which are also commercially-important species, putting at risk important fisheries.

The session provided a forum to share knowledge, raise awareness of the importance of considering connectivity in management decisions, and encourage protection for historic and remaining spawning aggregation sites in the region. Connections were also made between attendees that we hope will lead to cooperative research, education, and management on matters related to restoration, critical habitat protection, and establishing marine protected areas. Two areas ripe for significant growth are:

- i) Engagement on natural and social connections between the United States and Cuba, and
- ii) The need to better understand how that large and important island factors into regional connectivity and ecosystem health.

KEYWORDS: Social connectivity, governance, Greater Caribbean