

Proposal for an International Network of MPAs: *Islands in the Stream*

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ABSTRACT

This paper describes an opportunity to create an international network of MPAs around the Gulf of Mexico, working through collaboration with partner nations around the Caribbean and utilizing the concept of connectivity throughout the region. A network in the comparably-complex Gulf of Mexico region could protect sensitive marine areas such as interconnected deep water coral banks and hard-bottom communities vital to the health and sustainability of the region's marine resources. Historically considered and managed as isolated environments, recent discoveries have documented important biological linkages between these underwater communities that are maintained by the clockwise motion of the Yucatan, Loop and Florida currents. Individual reefs and banks, some of which are connected by bathymetric ridges and scarps, provide a nearly-continuous "corridor" from Cuba, Belize and Mexico, then into the Gulf itself. Though separated by large expanses of ocean, the fishes, corals, and invertebrates common to these reefs and banks demonstrate that the health and vitality of resources "downstream" are linked closely to those located "upstream". They are dependent on one another for continued recruitment and replenishment. The Gulf of Mexico region is important for several human uses, which can be preserved so that conservation goals are met while respecting ongoing recreational and economic activity. Existing uses of the Gulf of Mexico can co-exist with a highly protected network of marine protected areas. This paper explores a strategy to establish an international network of MPAs.

KEY WORDS: Network, connectivity, MPAs, downstream, upstream, sensitive marine areas

Propuesta para Una Res Intrenacional de AMPs: Islas en la Corriente

PALABRAS CLAVE: Res internacional, áreas marinas protegidas

Proposition pour un Réseau International d'AMP: *Island in the Stream*

MOTS CLÉS: Aires marines protégées, réseau international

CHARACTERIZATION

In comparison to the coral reef distribution in the Pacific Ocean, the coral reefs of the Wider Caribbean are situated in a much more confined area. The Wider Caribbean is comprised of two semi-enclosed basins, the Caribbean Sea and the Gulf of Mexico. This close proximity contributes considerably to the connectivity that exists throughout the region. Evidence of the connectivity has been known for centuries from the current flows that bath the area, but more recently by satellite imagery of the chlorophyll plumes flowing out of the Orinoco River to the west across the Caribbean Sea. This connectivity has also been demonstrated in recent decades by the zigzagging tracks of satellite current trackers that record the water movement and circulation and beam the recordings up real-time to satellites.

The coral reefs of the Wider Caribbean are among the most vulnerable in the world. Combined with the lower biodiversity that exists in the Wider Caribbean as compared to the Pacific Ocean, Caribbean coral reefs are diminishing. The closeness and the exposure the coral reef communities have to the intensity of climate change in a confined area, coupled with land-based sources of pollution and habitat loss, exacerbated by destruction from use and development in the most heavily accessed coral

reef environment in the world, while suffering from overfishing has left Caribbean coral reefs in a precarious position.

It is anticipated that the connectivity that exists in the Wider Caribbean is a positive force where the currents provide pathways of travel for larval fish and invertebrates that make up the recruits for the next generation of reef inhabitants. However, these pathways of life may also carry negative influences that can affect the reef inhabitants from far away. Unfortunately, the negative impact of connectivity was demonstrated in January to July of 1983, when a massive die-off of the long-spined sea urchin (*Diadema antillarum*) began in Panama and swept through the Caribbean and reached the Florida Keys in July of 1983. In less than a year, a mysterious pathogen, possibly the microbial response to extremely and unseasonably warm conditions on the Caribbean side of Panama in November, December 1982, and January 1983, spread via the currents and killed 95% of the *Diadema* in the Caribbean in less than a year. Other such microbial responses to elevated sea surface temperatures have been recorded in both fish and invertebrates.

However, there are far more positive examples of how the connectivity of the region benefits the life cycles of so many fish and invertebrates. For example, Tarpon move

from the estuaries of Belize and Mexico all the way to the mouth of the Mississippi River and return again. Bluefin Tuna migrate great distances to spawn off the mouth of the Mississippi River, only to make their way back to the North Atlantic. Whale sharks move from one spawning aggregation site to another, from Belize to Mexico to the Gulf of Mexico coral banks and pinnacles. And, at each stop taking advantage of the copious amount of larval spawn in the water column. Connectivity is the key to the ecology and biology of the Caribbean. It is possibly due to the thorough and complete mixing and distribution of marinelife that occurs in the Caribbean because of the strong currents and connectivity, that the endemism throughout the region is so low.

BACKGROUND

This is a discussion of a proposed concept that could establish a new precedent for marine conservation in the United States. The concept is to establish a network of special marine protected areas in the Gulf of Mexico — the largest such network in the Nation and among the first truly internationally connected networks in the World. This action would extend protection to a biologically-connected network of the Nation's northernmost coral reefs and banks and ensure conservation of sensitive habitats and communities that are critical to the Gulf's most recognizable and threatened living resources. At the same time, it would provide for recreational and ocean uses that are compatible with the primary objective of conservation and lead the Nation and its partners in the Caribbean to a new level of cooperative conservation.

THE PROPOSED ACTION

An integrated network of marine protected areas in the Wider Caribbean, including the Gulf of Mexico will further actions that will help define ocean conservation in the 21st century. Establishing a network in the comparably-complex Gulf of Mexico region will protect a network of sensitive marine areas that are interconnected critical deep water coral banks and hard-bottom communities vital to the health and sustainability of the region's marine resources.

Since 2002, The World Summit on Sustainable Development, the IUCN's World Parks Congress, the Convention on Biological Diversity, and the Group of 8 Nations have all called for establishing MPA networks by the year 2012. This discussion describes the opportunity for the United States to initiate creation of such a network.

WHY THE GULF OF MEXICO?

Historically considered and managed as isolated environments, recent discoveries have documented important biological linkages between these underwater communities that are maintained by the clockwise motion of the Yucatan, Loop and Florida currents. Individual reefs and banks, some of which are connected by bathymetric

ridges and scarps, provide a nearly-continuous "corridor" from Belize and Mexico, then into the Gulf itself. Though separated by large expanses of ocean water, the fishes, corals, and invertebrates common to these reefs and banks demonstrate that the health and vitality of resources "downstream" are linked closely to those located "upstream". Further, they are dependent on one another for the continued biological recruitment and replenishment.

The Gulf of Mexico region is very important for many human uses, which can be preserved so that conservation goals are met while respecting ongoing recreational and economic activity. Protection of these special areas must carefully incorporate existing recreational and commercial uses into the management structure for the network. In the Gulf of Mexico, existing uses can, and do, co-exist with a highly protected network of marine areas.

THE CONCEPT OF CONNECTING THE "ISLANDS IN THE STREAM"

- i) The "Islands" are those special places anchored in the vast Gulf of Mexico that are oases for marine life.
- ii) The "Stream" is the river (loop current complex) in the Gulf that connects the oases (Islands).

The periphery of the Gulf of Mexico is surrounded by an incredible diversity of hard-bottom features rising from the seafloor and forming a series of submerged "islands". Some of these features are ancient shorelines, others former seabeds thrust up by salt movement; still others originate from ancient coral reef growth. No matter what their origin, they now all serve as outposts for diverse communities of tropical and subtropical plants, invertebrates and fishes. These outposts, when taken together, form a chain of "jewels" encircling the Gulf of Mexico, and comprise a regional reservoir of Caribbean reef animals and plants.

Each oasis in the chain is linked to the others by currents. These currents are like a "liquid wind" that supplies and replenishes habitats of every kind in the ocean realm. Currents are the ocean's version of the breezes that disperse the seeds of dandelions and maples, and the spores of mushrooms. They carry water from the Caribbean Sea into and around the Gulf of Mexico supplying habitats that are often distant and isolated. These habitats are dependent upon nutrients and larvae carried by currents, which carry tropical species north into the Gulf, casting plant spores, animal larvae, and even adult creatures over huge expanses. As such, the continued health of each feature is linked to the connectivity created by the currents - damage to one jewel in the chain can impact the rest. The strength of these connections provides a clear basis for establishing a network of special places not only to protect each of these unique features, but the entire network as a system.

IMPROVED OCEAN GOVERNANCE

The offshore areas of the Gulf of Mexico, and their resources, are currently managed under multiple authorities by several federal agencies. For example, the US Department of the Interior's, Minerals Management Service (MMS) has historically protected topographic features through stipulations in leases that prevent drilling in sensitive zones, called no activity areas. Also, the US department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and the Gulf of Mexico Fishery Management Council (GMFMC) have designated several of these same topographic features as Habitat Areas of Particular Concern, which provide limits on the types of fishing that can occur in the area, or closes the areas altogether. In addition, NOAA's Office of National Marine Sanctuaries manages the Flower Garden Banks National Marine Sanctuary (FGBNMS) which includes several of the "islands" or topographic highs in the northwestern Gulf. The FGBNMS has the highest remaining living coral cover in the Wider Caribbean. However, there is currently no unifying framework to comprehensively manage all of these areas and all of the activities affecting them.

The Gulf of Mexico provides the opportunity to establish the largest network of marine protected areas in the nation and unify these authorities so that it is managed in the most comprehensive and coordinated manner possible.

MAKING THE NETWORK INTERNATIONAL

Like most ecosystems on earth, the Gulf of Mexico system does not obey international boundaries. Because of the current system that flows northward from the Caribbean along the Yucatan Peninsula into the Gulf of Mexico, hard-bottom habitats downstream from the Caribbean are prime areas for thousands of species of corals, sponges, fish and other tropical species. One of the major sources is the Meso-American Barrier Reef System (MBRS), the second longest barrier reef system in the world. It may represent what scientists call a center of diversity for the region, which means that it contains nearly all of the reef species present in the region. Other Caribbean reefs may have comparable diversity, but the sheer size of the MBRS and its proximity to the Gulf of Mexico leaves no question about the importance of the biological productivity of the MBRS for points north. It is a connected and interdependent system.

As in the U.S. portion of the Gulf of Mexico, important "oases" for marine life are found in the waters off Mexico and Belize. By forming partnerships with Mexico, Belize and other nations and providing needed support and guidance, the participating nations could simultaneously complete an international Gulf-wide network without giving up any jurisdictional authority.

CONCLUSION

There is so much that is known today that was not known a very short time ago. The advanced technology and improved remote sensing capabilities available today have made it possible to accurately describe and delineate the physical and natural boundaries that we have to incorporate into our management. These technologies have helped us comprehend the vast connectivity that exists and how it affects areas upstream and downstream. Now, there is much more known about the far reaching influences of stressors on our coral reef ecosystems, while increasing knowledge about the spatial and temporal barriers that exist. All of this has increased the number of large scale management tools necessary to apply to an ecosystem-based approach to management, working across domestic and international boundaries. A functioning network of MPAs across domestic and international boundaries, with the focus on successful management of the resources is more representative of how the system was created to function. Jurisdictional and political boundaries distract from the natural functions of a thriving ecosystem.