Title:

N-146: Establish and implement a Marine Protected Area (MPA) zoning framework for the Our Florida Reefs region of interest that includes but is not limited to no-take reserves, no-anchor areas, restoration areas, and seasonal protection for spawning aggregations to enable sustainable use, reduce user conflict, and improve coral reef ecosystem condition.

Background:

- This recommended management action relates to the entire Our Florida Reefs (OFR) region of interest and the reef ecosystem. Included in the zoning aspect is a consideration for land management or connectivity to coastal habitat (i.e. must include watershed planning and restoration).
- This recommended management action is being put forth because there are user conflicts, unsustainable uses of the resource, direct impacts to reefs from ships, boats, debris, and anchors, disruptions to spawning aggregations, the continued documentation of degradation of the reef ecosystem, and altered reef community structure, including a general lack of recreationally and commercially important reef fish. Different areas within the OFR region of interest will benefit from different management actions.

Objective:

- The intended outcome of this action is to create a zoning framework that encourages ecosystem productivity, improves ecosystem function, reduces extractive uses, conserves existing habitat and surrounding habitat, and protection and replenishment of the reef ecosystem (sustainable use).
- This recommended management action could assist current fisheries management by increasing the spawning potential of aggregating species if aggregations occur within the area. Certain species with limited home ranges could increase within the area. Spillover effects could occur into non-restricted areas for certain species that are overfished. This network would maintain biodiversity, protect habitats from fishing damage, and allow areas to recover. These areas could build resilience to impacts such as climate change and hurricanes. These areas can act as a benchmark for natural ecosystems that can be used to measure human impacts in surrounding areas and improve resource management. Such areas encourage nature-based recreation and tourism.
- There may be better fishing outside the Marine Protected Area No-Take Zones (MPA NTZs) for certain species. Zoning could attract positive attention to the ecotourism industry, help to maintain local livelihoods, create jobs, and safeguard south Florida's culture and lifestyle.
- Specific objectives include the following:
  - Protect areas that are unique within the OFR region of interest
  - Protect vulnerable/sensitive species and habitats including Endangered Species Act listed species
  - Seasonal protection for spawning aggregations
  - Protection based on resources (based on the science/data about resources)
  - Protect areas with high percentage of coral coverage, density and/or species richness
  - Protect high-density coral areas
  - Protect 20-30 percent of coral reefs and each type of associated representative reef habitat in the Southeast Florida Coral Reef Initiative (SEFCRI) region from extractive use (no take)
  - Protect 20-30 percent of coral reefs in the OFR region of Interest from extractive use (no take)
  - Protect representative coral habitat
  - Protect representative coral reef ecosystem associated habitats (mangroves, seagrass, estuaries)

- Provide increased protection for key reef-associated fish species and habitats upon which they depend for their entire life cycle
- Protect habitat by eliminating damage from boating, fishing, and diving impacts (and eliminate habitat damage from fishing gear and all fishing interactions)
- Protect coral reef ecosystem from maritime industry impacts (ports, shipping lanes, supporting infrastructure)
- Protect from coastal construction impacts
- Protect from water quality issues
- Restore depleted fish populations
- Increase fish reproduction and supply of recruits to surrounding fishing grounds through larval dispersal
- Restore coral populations (Identify suitable/feasible areas for coral restoration)
- Decreased user conflicts between extractive and non-extractive uses
- Protect areas of hard corals that have shown signs of resistance to bleaching and coral disease

Intended Benefits and/or Potential Adverse Effects:

- Benefits of implementation of this recommended management action include: (1) decreased direct impacts to the reef, (2) decreased user conflicts, (3) efficient allocation of resources for restoration, conservation, enforcement targeted at the right areas, (4) allows for regional decision making rather than being opportunistic, thereby allowing for a more comprehensive regional approach to planning, (5) allows for empirical testing on the effectiveness of recommended management actions, (6) allows you to plan at the level of ecosystem function,(7) spawning potential could increase as well as a spillover effect, and (8) allows looking at connectivity. The intended benefits of this recommended management action include reducing multiple threats to reef ecosystem resources, providing a clear path ahead for the balanced conservation and use within the OFR region of interest, and improving reef condition and conservation of reef function, which lead to improved reef associated economy in southeast Florida.
- An anticipated reaction to negative impacts associated with this recommended management action includes stakeholder opposition to increased restrictions, greater enforcement and compliance needs based on complexity of zoning structure including the cost of greater enforcement and management.
- Potential negative impacts of fishing-related MPAs include significant financial losses to fishermen (Fletcher et al. 2015), increased concentrated effort outside the boundaries of zones (Freitas et al. 2013; Stevenson et al. 2013) which may lead to local depletions and reduced satisfaction of anglers (Freitas et al. 2013), increased targeting of other species (Freitas et al. 2013), and increased user conflicts in concentrated areas (Abbot and Haynie 2012).
- The duration of the benefits of this recommended management action is ongoing for the implementation, but the establishment of the process is discrete.
- If this recommended management action is not implemented, conflicts between users and negative impacts on natural resources are likely to increase without a clear plan for the entire region as development pressures increase and use of marine resources expands.

Agencies/ Organizations:

- The lead agency for implementation of this recommended management action would be the Florida Department of Environmental Protection, National Oceanic and Atmospheric Administration (NOAA), the Florida Fish and Wildlife Conservation Commission (FWC), and individual counties.
- Other potential agencies or organizations that might get involved were not identified in this recommended management action.
- The key stakeholders for this recommended management action would be the fishing and diving community, other users and future generations.

- The legislative considerations to take into account include: Potentially- Florida Statutes 379: 379.104 Right to hunt and fish.—The Legislature recognizes that hunting, fishing, and the taking of game are a valued part of the cultural heritage of Florida and should be forever preserved for Floridians. The Legislature further recognizes that these activities play an important part in the state's economy and in the conservation, preservation, and management of the state's natural areas and resources. Therefore, the Legislature intends that the citizens of Florida have a right to hunt, fish, and take game, subject to the regulations and restrictions prescribed by general law and by s. 9, Art. IV of the State Constitution. History.—s. 8, ch. 2002-46; s. 8, ch. 2008-247. Note.—Former s. 372.002.
    - This strategy may change where people fish, but it does not impact the right to fish. The amount of closed area is tiny compared to areas open to fishing. Florida has widely used closed fishing areas as part of its management. Closed areas are most likely to improve fishing as demonstrated elsewhere in Florida. This strategy not only supports the ability of Florida citizens to fish but also to experience healthy reefs as part of their natural cultural heritage. Marine reserves are a proven techniques to support conservation, reef health, and fishery management.
    - The challenge is to sustainably hunt, fish, etc.

Permitting/ Enforcement Requirements of RMA:

- The permitting requirements with this recommended management action are unknown. However, permits would be required for any buoy marking system for area boundaries if that were involved, or for mooring buoy placements because they would be attached to the bottom. FWC permits are more variable and usually involve species or groups of species, or for the use of particular gear (lobster traps, special nets, etc.), so would really depend on the action.
- Enforcement will be required for implementation of this recommended management action. It will certainly require a large amount of enforcement effort, which will depend on the chosen approach. Initially, a public relations campaign to inform all users that the MPA NTZs are in effect and the rules that apply is proposed, together with monitoring to see how well the MPA NTZs are respected. Initially, education and self-enforcement by users is expected to provide 70-90 percent compliance. Enforcement becomes more important later to discourage active poachers.
- Measurable Outcomes/Success Criteria/Milestones with this recommended management action all depend on the intended benefits (i.e. how is success to be measured? Increased spawning potential of certain species? Increased biodiversity? Resilience to climate change? Higher catches outside of the reserves?).

Cost:

- The primary cost of the planning process is the time of the participants and use of spatial tools> Implementation will be the real cost.
- Potential funding may be acquired possibly through the Southeast Florida Coral Reef Initiative, the Waitt Foundation. Marine Protected Areas Fund, private & corporate funding, Coastal Zone Management programs, and Florida wildlife conservation funds.

Time Frame & Extent:

- The anticipated timeframe for implementation of this recommended management action will depend on many factors, but a framework for decisions should be able to be completed in one year and a comprehensive marine spatial planning process for the region is likely to take 3 - 5 yrs.

Miscellaneous Info:

- This recommended management action is linked to S-3, S-107, N-134, and N-137.
- Some uncertainties or gaps with this recommended management action include: (1) No-take MPA-

NTZs in the Florida Keys have not benefited corals (Toth et al. 2014), so it is uncertain and possibly unlikely they will benefit corals in the SEFCRI region. (2) Spillover of adult fish has not conclusively been shown to be a net benefit to reef fish fisheries and is dependent on many factors, such as sustainability status of the fishery, size of the reserve, and home range behaviors of species of fish in question (Buxton et al. 2014), and (3) Spawning aggregation sites are limited in SEFCRI region. Known aggregations for goliath grouper and common snook exist, while potential sites for gray snapper have been identified. Anecdotal reports of historical mutton snapper spawning aggregation sites exist in the region but have not been confirmed.

- Supporting and relevant data includes the following:
  - The following is a quote from 'Fifty years on: lessons from marine reserves in New Zealand and principles for a worldwide network. – Bill Ballantine' "Self-sustaining total area: The final and most important principle, defines the size of the system. The system must be sufficiently large in area to maintain itself through time, independently (as far as possible) of the surrounding seas. This amount cannot be calculated with any precision, but general principles allow us to give useful guidelines. For the purposes of science and education (and recreation and information to general management) the system would need at least 10% of all areas. For the conservation of marine biota, the system would need at least 20% of all areas. (In the two systems so far created, detailed scientific investigations proposed a minimum of 25% of all areas, see below for more detail). For the maximum benefit to fisheries, the total area should be at least 30%, as calculated from computer models. Before dismissing this as 'merely computer modeling' it should be remembered that all existing fisheries management in advanced countries is based on computer modeling using the same data."
  - Some exploited species increased in size and abundance in protected areas, although aquaria and non-exploited species fluctuated above and below baseline levels (Ault et al. 2013).
  - Fisheries that have benefited from the spillover of juveniles and export of eggs and larva have been documented from MPA- NTZs throughout the world (Gell and Roberts 2003; Halpern 2003; Abesamis and Russ 2005; Bartholomew et al. 2007).
  - "Replenishment areas" in Hawaii helped recover depleted yellow tang populations collected in the aquaria industry (Rossiter and Levine 2014). References: Ault et al. 2013. Assessing coral reef fish populations and community changes in response to marine reserves in the Dry Tortugas, Florida, USA. Fisheries Research. 144 (2013) 28-37. Rossiter and Levine. 2014. What makes a "successful" marine protected area? The unique context of Hawaii's fish replenishment areas. Marine Policy. Vol. 44. pp. 196-203.
  - "Marine reserves are predicted to benefit adjacent fisheries through two mechanisms: net emigration of adults and juveniles across borders, termed 'spillover', and export of pelagic eggs and larvae. Inside reserves, populations increase in size, and individuals live longer, grow larger and develop increased reproductive potential." [1.] 1. Citation: Bohnsack, J.A. (1998) Application of Marine Reserves to Reef Fisheries Management. Aust. J. Ecol. 23, 298– 304 "Reefs protected from overfishing at Bermuda experienced four hurricanes since 1984 with no loss in average coral cover, whereas recently overfished reefs on the Central Barrier in Belize declined by 49% after hurricanes." [2.] 2. Citation: Jackson JBC, Donovan MK, Cramer KL, Larn W (editors). (2014)Status and Trends of Caribbean Coral Reefs 1970 – 2012. (Mason Smith commented that he thinks the study [2] refers to reefs overfished of parrotfish and not relevant to the SEFCRI area.) "Increases in protected populations are often rapid, frequently doubling or tripling in two to five years. Stocks of five families of exploited reef fish tripled in biomass inside reserves within five years of protection in St Lucia." [3.] 3. Citation: Roberts, C.M. et al. (2001) Effects of Marine Reserves on Adjacent Fisheries. Science 294, 1920–1923.
  - There are a substantial amount of scientific studies that support this recommendation, including multiple studies conducted in Florida:
    - Ault, J.S., J.A. Bohnsack, and G. Meester. 1998. A retrospective (1979-1995) multispecies assessment of coral reef fish stocks in the Florida Keys. Fish. Bull., U.S.

96(3): 395-414.

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- Ault, J. S., S. G. Smith, G. A. Meester, J. Luo, J. A. Bohnsack, and S.L. Miller. 2002.
- Baseline Multispecies Coral Reef Fish Stock Assessment for Dry Tortugas. NOAA Technical Memorandum NMFS SEFSC 487. 117 p.
- Ault, J.S., J.A. Bohnsack, S.G. Smith, J. Luo. 2005. Towards sustainable multispecies fisheries in the Florida USA, Coral Reef Ecosystem. Bull. Mar. Sci. 76(2): 595-622.
- Ault, J.S., S.G. Smith, J.A. Bohnsack, J. Luo, D.E. Harper, and D.B. McClellan. 2006. Building sustainable fisheries in Florida's coral reef ecosystem: positive signs in the Dry Tortugas. Bulletin of Marine Science 78(3): 633-654.
- Ault, J.S., S.G. Smith, T. Switzer, J.A. Bohnsack, M. Patterson, M.W. Feeley, D.B. McClellan, B.I. Ruttenberg, D. Hallac, T. Ziegler, J. Hunt, and D. Kimball. 2012. Status of Tortugas region reef fishery resources from fishery-independent visual and trap survey assessments. Pages 4-13 in Implementing the Dry Tortugas National Research Natural Area Science Plan: The 5-Year Final Report 2012. South Florida Natural Resources Center, Everglades and Dry Tortugas National Parks, Homestead, FL and the Florida Fish and Wildlife Conservation Commission, Tallahassee, FL.
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- Bohnsack, J.A., J.S. Ault and B. Causey. 2004. Why have no-take marine protected areas? Pages 185-192 in J.B. Shipley, ed. Aquatic Protected Areas as Fishery Management Tools. American Fishery Society Symposium 42, Bethesda, MD. 299p.
- Bohnsack, J.A., D.B. McClellan, D.E. Harper, J.A. Ault, S.G. Smith, G. Meester, and J. Luo. 2006. Preliminary analysis of FKNMS reef fish monitoring through 2002. Pp 119-124 in Keller, B.D. and S. Donahue (eds). 2002-03 sanctuary science report: an ecosystem report card after five years of marine zoning. U.S. Department of Commerce, NOAA, National Ocean Service, Office of National Marine Sanctuaries, Florida Keys National Marine Sanctuary, Marathon, FL. 378 p.
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- The whole Southeast Florida Coral Reef Initiative process of OFR is to develop a management plan. The specific recommendation is "zoning," which is part of any management plan.

Goals/ Objectives to be achieved:

Refer to the SEFCRI Coral Reef Management Goals and Objectives Reference Guide

- FL Priorities Goal D1, Obj. 3 / FL Priorities Goal D2, Obj. 1 & 2 / FL Priorities Goal D4, Obj. 1.