Title:

S-120: Improve management and maintenance activities of beaches to reduce impacts to coral reefs (including nearshore reefs), make beaches more sustainable, and minimize need for future renourishment projects.

Background:

- This recommended management action relates to the coral reefs near beaches and nearshore hardbottom habitat, such as worm reefs, primarily in Miami-Dade, Broward, Palm Beach, and Martin counties, although it may be applicable statewide.
- This recommended management action is being put forth because there are many associated issues with the deposition of sediments on or near nearshore environments during and after beach nourishment projects. This includes impacts from turbidity and siltation, as well as direct burial of resources.
- This action will address uncoordinated efforts between cities/counties resulting in reef damage. If all standards must be met then it will not matter that a project crosses or is adjacent to a county boundary. An example of this is if all projects are required to have dunes then a project that may span a county line or municipality line will not have dunes on one side and no dunes on the other.

Objective:

- The intended outcome of this action is the need for fewer nourishment projects and reduced impacts to resources through better beach maintenance (through better project design and improved maintenance between projects). This would be in conjunction with other beach management plans, which may be based on sand cells or other engineering or municipality plans. The plan would include the following, several actions to reduce impacts:
    - Better management/maintenance of the existing sand and beach habitat including eliminating, reducing, or improving raking practices on beaches that are state or federally funded in order to extend lifetime of beach project and reduce impact to resources through siltation.
    - Best Management Practices such as improve sand standards including grain size and percent fines (recommend 3% fines). In areas that have nearshore hardbottom in closer proximity make those requirements or standards tighter: find a way to filter silt before placing material on the beach.
    - It is understood that equilibrium toe of fill is a construct of the permitting process and that, realistically, there is no guarantee where the sand will settle. However, lessons learned should take into account past projects that have exceeded the anticipated equilibrium toe of fill and then err on the side of caution and assume that the maximum impact will occur.
    - Identify existing beach erosion issues that are created by stormwater runoff and require municipalities or relevant entities that are receiving state or federal assistance to retrofit/fix those issues before additional beach projects will be undertaken.
    - Require dune creation and stabilization of those dunes through planting.
    - Require appropriate methods of placing material on the beach by constructing berms and retention areas to let the material settle.

- Submerged breakwaters may be appropriate in some areas such as hot spots. Bypassing, such as constructing bypass stations or a moveable dredge, would help with this.
- Bypassing should have contingency plans for when there is excess material in the system (e.g. Hurricane Sandy). A plan should be in place to move material elsewhere rather than force it through the system, resulting in burial of nearshore habitat.
- The state requires that sand that is beach quality be placed on the adjacent eroded beach during a dredge project. However, for federally maintained channels that are maintenance dredged, if it is more cost effective to put offshore than on beach, then the United States Army Corp of Engineers (USACE) is required to do so and therefore the cost goes back to state, or local community. So it must be required that the state or local communities cover that cost difference.
- Retreat of infrastructure, while not a main priority at this time, should be considered and worked towards.

Intended Benefits and/or Potential Adverse Effects:

- Benefits of implementation of this recommended management action include reduced burial, turbidity, and sedimentation over nearshore reefs due to best practices during project management and less nourishment events because of beach maintenance. There will be increased areas for shorebirds and turtles. Additionally, this will result in natural shoreline stabilization, protection of Essential Fish Habitat for early life history stages of species managed under the snapper-grouper complex and spiny lobster fishery management plans, and protection of foraging and resting habitat for marine turtles.
- There will also be better water quality conditions for beachgoers, increased opportunities for recreational fishing, and better nearshore reefs for diver/snorkelers, all of which will increase tourism. Also, longer-lived projects will reduce the cost to taxpayers.
- An anticipated negative impact associated with this recommended management action is that sand characteristics, which would maximize the life and minimize the turbidity of a beach project, could be in conflict with the characteristics needed by nesting sea turtles. Beach projects would become more expensive as additional verification of sand sources may be required, such as additional cores, or if fines are reduced, may need to look elsewhere for sand sources. Monitoring costs could increase. There may be less beach for tourists if part of the footprint is dune.
- The duration of the benefits of this recommended management action is intermittent for each nourishment event.
- If this recommended management action is not implemented, the turbidity impacts to nearshore coral reefs that are already occurring would continue, as would the impacts to nearshore water quality. Not implementing this action would result in the continued reduction in quantity and quality of nearshore hardbottom habitats in the southeast Florida area, which could create a demographic bottleneck for coral reef fishes that use nearshore hardbottom for settling and early life history stage habitat.

Agencies/ Organizations:

- The lead agency for implementation of this recommended management action would be the Florida Department of Environmental Protection (FDEP) and USACE.

- Other potential agencies or organizations who could be involved include National Oceanic and Atmospheric Administration (NOAA), Florida Fish and Wildlife Conservation Commission, United States Fish and Wildlife Service, and county/city/project sponsors that are responsible for the actual individual construction projects.
- The key stakeholders for this recommended management action would be county governments, non-governmental organizations (NGOs) - sea turtle groups (for or against, depends on the grainsize issues), coral reef groups, dive industry, and the tourism industry.

Permitting/ Enforcement Requirements of RMA:

- There are no permitting requirements for this recommended management action.
- There are no enforcement requirements for this recommended management action.
- A measurable way to show success of this recommended management action would be with pre- and post-nourishment benthic surveys, along with annual monitoring requirements to assess coral and hardbottom condition becoming part of the permit. Success should also be reviewed after major storm events, such as hurricanes. Results should be apparent within 1 - 2 years, but may be monitored up to 5 years, and a reduced number of beach projects or increased longevity of beaches would indicate success.

Cost:

- The estimated direct cost of implementing this recommended management action to develop the plan would require a dedicated staff position or contractor and therefore $100,000 - $250,000. This would provide for an unbiased third party to come in and organize the effort.
- Potential funding could be acquired through the state legislature via FDEP or NOAA cooperative grant funding, NGOs, or USACE Research and Development sources.

Time Frame & Extent:

- The anticipated timeframe for implementation of this recommended management action is 5 years to develop and implement, but then continually as work to implement each beach project goes forward and agreements are reauthorized.

Miscellaneous Info:

- This recommended management action is not linked to any other proposed recommended management action.
- Some uncertainties or gaps with this recommended management action include the grain size and percent fines which need to be set.
- Supporting and relevant data includes the following:
    - http://www.dep.state.fl.us/beaches/publications/pdf/EFNHBE.pdf
    - Telesnicki & Goldberg paper: Telesnicki, G., and Goldberg, W., 1995. Effects of turbidity on the photosynthesis and respiration of 2 South Florida reef coral species. Bulletin of Marine Science, 57, 527–539.
    - Rogers, C. S., 1983. Sublethal and lethal effects of sediments applied to common Caribbean reef corals in the field. Marine Pollution Bulletin, 14, 378–382.
    - Marszalek, D. S., 1981. Impact of dredging on a subtropical reef community,

Southeast Florida, U.S.A. In Proceedings of Fourth International Coral Reef Symposium, Manila, Philippines. Vol. 1, pp. 147–153.

- Dodge, R. E., and Vaisnys, J. R., 1977. Coral populations and growth patterns: responses to sedimentation and turbidity associated with dredging. Journal of Marine Research, 35, 715–730.
- Encyclopedia of Modern Coral Reefs: Structure, Form and Process: David Hopley, 2010.
- Impacts of Sedimentation on Coral Reefs, Michael J. Risk, Evan Edinger, pp. 575-583 [links: http://link.springer.com/referenceworkentry/10.1007%2F978-90-481-2639-2_25#;
- https://books.google.com/books?id=5umXDDmqxwIC&pg=PA577&lpg=PA577&dq=Telesnicki,+Goldberg+sedimentation+coral+paper&source=bl&ots=u8Ew0lI973&sig=lbyWI3yVC_gyJ6xeXUsp6XRF2I&hl=en&sa=X&ei=mU-7VNLgHoGJNpOGggC&ved=0CEsQ6AEwBw]
- Junjie RK, Browne NK, Erftemeijer PLA, Todd PA (2014) Impacts of Sediments on Coral Energetics: Partitioning the Effects of Turbidity and Settling Particles. PLoS ONE 9(9): e107195. doi:10.1371/journal.pone.0107195
- "Ecological function of nearshore hardbottom habitat in East Florida: a literature synthesis http://www.dep.state.fl.us/beaches/publications/pdf/EFNHBE.pdf

- Broward and Miami-Dade have county-wide plans, Palm Beach County does not. Neither Broward nor Miami-Dade have dune features in their current federal authorization. Both counties have elected to build dune features at 100% local cost where the beach is wide enough to support a dune feature. During reauthorization, Miami-Dade and Broward counties will be/should be required to include a dune feature. Also, Palm Beach and Martin counties should require dune features.
  - Each beach maintenance project has its own plan; some are federal projects, while others are local projects. Each has a permit that requires the identification of appropriate sand sources prior to construction. Each permit has a specific condition requiring certain construction practices that will minimize turbidity and keep it within acceptable limits.
  - Hot spot projects are underway and have been successful in Miami-Dade County.
  - Some inlets already have bypass stations.
  - The FDEP currently identifies areas of critical beach erosion and has developed a strategic beach management plan to address these areas.

Goals/ Objectives to be achieved:

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

- FL Priorities Goal C3 Obj. 4 / FL Priorities Goal C4, Obj. 3,4, 5 / FL Priorities Goal A1 Obj. 3.
- FDEP CRCP Coral Reef Ecosystem Conservation Goal C / FDEP CRCP Coral Reef Ecosystem Conservation Obj. 5.
- SEFCRI LAS MICCI Issue 1 Goal Obj. 2 / SEFCRI LAS MICCI Issue 2 Goal.