

CWG Review 1: Spring 2015

Tier 1 Information:

1. Management Action

S-104 Set new and appropriate water turbidity standards and support the efforts to improve turbidity monitoring methods for marine construction to limit damage from coastal constructions to reefs and associated habitats.

2. Intended Result (Output/Outcome)

What is the end product/result of this management action?

- A new Florida State limit of 10 NTU will be set for construction in or adjacent to submerged resources of ecological significance. A new water quality standard for projects near resources sensitive to turbidity and/or sedimentation. This water quality standard should be based on scientific literature and monitoring data and observations from past coastal construction projects to provide assurance that resources will not be impacted by turbidity and siltation generated by coastal construction projects.
- recognition of these ecologically significant resources deserves its own statute/rule that uses a more stringent NTU standard AND better methodology for monitoring (require newer technology - in situ /real time, more frequent monitoring, etc.) and any expansion of mixing zones should be justified by monitoring data or modeling.
- Also, even if there is a lower NTU, if a larger mixing zone variance request is approved, it may negate the protection given by the lower NTU standard. (Note that if a mixing zone extension is approved, DEP considers the ecological value of the resources in the expanded zone and considers the area to be a direct impact in compensatory mitigation determinations.

3. Duration of Activity

Is this a discrete action or a recurring activity? Explain.

- This activity is discrete

4. Justification

What issue or problem will this management action address? Explain.

- Damage to corals caused by high turbidity and silt deposits during construction work. The current turbidity standard may not be effectively minimizing resource impacts caused by sedimentation and high turbidity in the water column resulting from coastal construction projects.
- The referenced paper by Telesnicki and Goldberg which seems to be the only paper to address adverse effects of sedimentation in the laboratory. The answer is clear 'Turbidity above the 6 to 9 NTU level caused adverse effects'
- The current standard of 29 NTU above background is too high. Even the special standard of 15 NTU above background that's been used near sensitive coral reefs in the SEFCRI area (see MICCI, LAS-Phase 2, 2011, report), seems excessive for some species of corals (e.g., Telesnicki and Goldberg, 1995). Additional research would be beneficial to establishing robust threshold. Alternative parameters such as suspended solids or sediment deposition might better reflect the direct aspects of stress to corals. An absolute ceiling level of turbidity should also be incorporated into the standard (in addition to an 'above baseline' threshold). Improved practices and implementation within the current standard of 29NTU over 'baseline' could accrue from better definition of how, when, and where 'baseline conditions' are defined.

5. Potential Pros

What are the potential advantages associated with this management action?

- A new science-based turbidity standard will minimize damage to benthic organisms caused by elevated (relative to background) turbidity and sedimentation/siltation during construction.

6. Potential Cons

What are the potential disadvantages associated with this management action?

- If the turbidity limit (NTUs) is reduced, then mixing zones for projects would likely need to be expanded and may extend over coral reef and seagrass resources. Additional mitigation for significant adverse impacts and sedimentation monitoring would likely be required, which would increase the cost of construction projects. The dredge may also need to slow its production rate to reduce the potential for turbidity or sedimentation violations; or move to greater distances from the resource to allow turbidity levels to drop below the NTU standard; both of which could increase the duration of construction and project costs.

7. Location

County/Counties: Miami-Dade, Broward, Palm Beach, Martin, Other?

- Miami-Dade, Broward, Palm Beach, Martin, potentially any county in Florida with marine areas of special ecological significant, e.g. Monroe. Any county in FL with nearshore hardbottom or seagrass habitats.

Relevant Habitats: Coral reef, seagrass, watershed, etc.?

- coral reef and seagrass

Specific Location: City, site name, coordinates, etc.?

- n/a

8. Extent

Area, number, etc.

- n/a

9. Is this action spatial in nature?

- no

Tier 2 Information:

WHY?

1. Strategic Goals & Objectives to be Achieved

Refer to the [SEFCRI Coral Reef Management Goals and Objectives Reference Guide](#).

- SEFCRI LAS MICCI Issue 1 Goal, Obj1 & 2. Land Based Sources of Pollution: FL Priorities Goal C1 Objective 1 “Minimize water quality degradation associated with coastal construction activities” Maritime Industry and Coastal Construction: FDEP CRCP Coral Reef Ecosystem Conservation Goal C “Minimize and, where possible, eliminate localized human-induced habitat destruction from maritime industry and coastal construction activities.

2. Current Status

Is this activity currently underway, or are there planned actions related to this recommendation in southeast Florida? If so, what are they, and what is their status.

- Yes, the State of Florida is preparing for the Water Quality Standard Triennial Review. The Division of Water Resource Management is compiling information regarding the current turbidity standard
- At times, DEP is already implementing project specific turbidity standards which trigger additional monitoring to detect siltation/sedimentation on coral reef resources and require corrective actions if turbidity or sedimentation levels are exceeded.

3. Intended Benefits (Outcomes)

What potential environmental benefits or positive impacts might this management action have?

- Hopefully no more disasters like the one caused by the Port of Miami expansion in 2014. A new science-based turbidity standard will improve the protection of sensitive marine resources by minimizing impacts associated

with coastal construction related turbidity and sedimentation.

What potential social/economic benefits or positive impacts might this management action have?

- A science-based turbidity standard will provide regulatory agencies with reasonable assurance that impacts to resources will be minimized to the maximum extent practicable. Minimization of impacts to coastal resources from project-related turbidity and sedimentation/siltation will aid in maintaining the ecological functions and economic benefits provided by those resources. This will result in better protection of these resources as a recreational attraction to tourists, as well as maintaining functional larval and juvenile habitats, which support the fishing industry.

What is the likely duration of these benefits - short term or long-lasting? Explain.

- An improved water quality standard for turbidity will have long-lasting impacts on coastal resources. While project-related turbidity from many projects is often temporary, turbidity can be elevated for a prolonged period of time. Furthermore, areas subject to multiple/repeat projects may experience cumulative effects of elevated turbidity. Higher water quality standards (lower NTU limits) may better protect resources from effects caused by prolonged or chronic exposure to elevated turbidity.

4. Indirect Costs (Outcomes)

What potential negative environmental impacts might this action have?

- A standard of 10 NTU may be too high to provide sufficient protection for coral reef resources. Even at 10 it may be still too high. None

What potential negative social/economic impacts might this action have?

- Higher costs for coastal construction projects. If the turbidity limit (NTUs) is lowered then mixing zones for projects would likely have to be expanded. Therefore, additional mitigation and monitoring would likely be required, which would increase the cost of construction projects. Construction methodologies may also need to change (e.g., more scows, less overflow, lower production rates, moving the dredge to a greater distance from reef resources if exceedances are detected, shutting down due to weather), which will impact construction costs.

What is the likely duration of these negative impacts - short term or long-lasting? Explain.

- Economic impacts are likely to be long lasting, all future construction projects would have to comply with new water quality standards.

5. Risk

What is the threat of adverse environmental, social, or economic effects arising from not implementing this action?

- Continued damage to coral reefs each time a coastal construction project is carried out. The current turbidity standard may not prevent project-related impacts to marine resources, especially those resources that are sensitive to turbidity and sedimentation such as hardbottom communities and submerged aquatic vegetation.

6. Relevant Supporting Data

What existing science supports this recommendation? (Provide citations)

- There are numerous published papers describing damage to coral reef caused by high turbidity: 1) Erftemeijer et al (2012) Environmental impacts of dredging and other sediment disturbances on corals: a review. <http://www.ncbi.nlm.nih.gov/pubmed/22682583> 2) Erftemeijer et al (2006) "Environmental impacts of dredging on seagrasses: A review" 3) Pollock et al (2014) "Sediment and Turbidity Associated with Offshore Dredging Increase Coral Disease Prevalence on Nearby Reefs" 4) Flores et al (2012) "Chronic Exposure of Corals to Fine Sediments: Lethal and Sub-Lethal Impacts" 5) Rogers (1990) "Responses of coral reefs and reef organisms to sedimentation" 6) Sheridan et al (2014) "Sedimentation rapidly induces an immune response and depletes energy stores in a hard coral" <http://link.springer.com/article/10.1007/s00338-014-1202-x> There seems to be only one paper describing the effects of high turbidity in laboratory conditions, namely: Telesnicki, G.J. and W.M. Goldberg., 1995 in their paper

'Effects of turbidity on the photosynthesis and respiration of two South Florida reef species. Bulletin of Marine Science 57(2): 527-539.' observe no effects with turbidity levels of 7-9 NTU and measurable effects with levels of 14-16 and 28-30 NTU.

- Dr. Bob Richmond (Hawaii) has a manuscript coming out that synthesizes all of the known sediment/turbidity thresholds for corals. It will be a stop light style matrix that includes 3 types of data: 1) Sedimentation Rate, 2) Turbidity/Suspended Sediment Concentration, and 3) Sediment Accumulation as Depth
- United Nations Environment Programme and PIANC report "Dredging and port construction around coral reefs" http://www.unep-wcmc.org/system/dataset_file_fields/files/000/000/099/original/2010_PIANC_Dredging_and_port_construction_around_coral_reefs_Report_108-2010_FINAL_VERSION_LowRes.pdf?1398441422
- Hawai'i has turbidity standards that may be of interest in clarifying and scoping of this recommendation: http://health.hawaii.gov/cwb/files/2013/04/Clean_Water_Branch_HAR_11-54_20141115.pdf

7. Information Gaps

What uncertainties or information gaps still exist?

- It is not certain that a limit of 10 NTUs will be low enough. Additional information is needed to develop a turbidity standard that will minimize impacts to resources. It would be helpful to know the relative resilience and resistance of various marine communities to turbidity and sedimentation. Multiple factors need to be considered including the magnitude (NTUs) and duration (persistence) of turbidity. Moreover, a comprehensive literature review of turbidity related impacts on benthic marine communities will likely be required to justify a change in the current water quality standard. Alternative measurements of water quality (e.g., total suspended solids) should potentially be considered in addition to assessing the appropriate turbidity standard (NTUs).
- **March/April 2015 South CWG Update:** Using NTU to understand silt and sediment is potentially not appropriate. Have to look beyond just turbidity and need to add cumulative effects temporally etc.
- Marty Seeling and the turbidity working group should be contacted and understand what that group is doing.
- Nick Morrel signed up- please ask Jennifer Peterson

WHEN?

8. Anticipated Timeframe for Implementation

How long will this recommendation take to implement?

- 2-5 years

9. Linkage to Other Proposed Management Actions

Is this activity linked to other proposed management recommendations?

- yes

If so, which ones, and how are they linked? (e.g., is this activity a necessary step for other management actions to be completed?)

- S-106, S-114, S-115, S-119, S-120, S-122.

Does this activity conflict with other existing or proposed management actions?

- No

WHO?

10. Lead Agency or Organization for Implementation

What agency or organization currently has/would have authority? Refer to the [Agencies and Actions Reference Guide](#).

- Florida Department of Environmental Protection. Other agencies, including the EPA, are involved in the revision of Florida's water quality standards.

11. Other Agencies or Organizations

Are there any other agencies or organizations that may also support implementation? Explain.

- Unknown

12. Key Stakeholders

Identify those stakeholders most greatly impacted by this management action, including those from whom you might expect a high level of support or opposition. Explain.

- Any stakeholders involved in coastal construction activities (including permittees and regulatory agencies) will be most greatly impacted by this management action.

HOW?

13. Feasibility

Is there appropriate political will to support this? Explain.

- Political support for management actions that significantly increase coastal construction costs is expected to be minimal.

What are the potential technical challenges to implementing this action? Has it been done elsewhere?

- Puerto Rico has a limit of 10 NTU

14. Legislative Considerations

Does the recommendation conflict with or actively support existing local, state, or federal laws or regulations? Explain.

- While the current rule states that turbidity must be less than or equal to 29 NTUs above background, this proposed management action may require a rule change to implement a higher standard (lower NTUs) or alternative turbidity standard (total suspended solids) on a project-by-project basis depending upon the resources within the project area and their relative tolerance (resistance and resilience) to turbidity and sedimentation.

15. Permitting Requirements

Will any permits be required to implement this action? Explain.

- While no permits are required to change the Rule, the new standard would be enforced through coastal construction permits including both Joint Coastal Permits and environmental Resource Permits.

16. Estimated Direct Costs

Approximately how much will this action likely cost? (Consider one-time direct costs, annual costs, and staff time, including enforcement.)

- Technically, there is no cost to change or create a law. But, you need to have legislative champions that will shepherd the change/new bill through the various stages of the legislative process. The cost comes in implementation

Will costs associated with this activity be one-time or recurring?

- The above number is a guess. How much does it cost to change Florida law or to introduce a new law? Exact cost is unknown, but this action could increase costs of coastal construction. The cost to change the standard is one-time, however there are recurring costs for construction monitoring and review.

If recurring, approximately how long will staff time and annual costs be necessary to implement the management action?

- As long as the Department issues permits for coastal construction.

17. Enforcement

Does this require enforcement effort?

- Yes but the enforcement effort is not any different or costly than current standard.

Provide an explanation if available.

- Implementation of a new water quality standard will likely require additional training and effort by regulatory agencies compliance officers and support staff to ensure new turbidity requirements are being enforced. It should not require any additional enforcement because today the current limit of 29 NTU has to be enforced, it simply sets a lower NTU limit.

18. Potential Funding Sources

Identify potential funding organizations/grant opportunities, etc.

- Current staff budget and time

19. Measurable Outcomes/Success Criteria/Milestones

How will the success of this recommendation be measured? How will you know when the intended result is achieved?

- When the limit of 10 NTU becomes Florida law. The effectiveness of this recommendation could be measured by reviewing the results of biological monitoring reports submitted in compliance with coastal construction permits. A reduction in turbidity-related stress and lower sedimentation on benthic organisms would be a measureable outcome indicating the success of this management action.
- One size doesn't fit all. Differences between project type, equipment, and resources all impact the scenario, so we support a more case by case approach based on the coral reef resources present. Increasingly DEP is doing this in permit conditions already and requiring lower turbidity standards to trigger additional sedimentation monitoring and specific conditions which require the dredge to stop dredging and move to a greater distance from the reef resources until accumulated sediment levels return to background conditions. This should be pursued by the regulatory agencies in the interim while a more stringer water quality standard is developed.

SEFCRI/TAC Targeted Questions:

1. **TAC** - Is the recommendation likely to achieve the intended result? Explain.

Tier 1 – #2 (Intended Result - Output/Outcome)

- It would constitute an important first step to resolving the issue of excessive turbidity during dredging or coastal construction.

2. **TAC** - Is the recommendation sufficient to address the identified issue or problem? Explain.

Tier 1 – #4 (Justification)

- Only if implemented, with adequate enforcement and appropriate fines for noncompliance, and supplemented by in situ monitoring for sedimentation/siltation impacts.
- Big improvement in acute impacts

3. **TAC** - Is the recommendation technically achievable from a science or management perspective? Explain.

Tier 2 – #8 (Anticipated Timeframe for Implementation) and Tier 2 - #13 (Feasibility)

- Yes in the sense that stricter standards are applied elsewhere in the US and internationally. Don't know how well they are enforced, however.
- DEP is engaged in internal discussions about addressing this standard in their triennial review process.
- Current standard and implementation is not protective of corals. (29 NTU standard - above background)
- Idea – The definition of the background is not protective or reflective of what a true background might be. There might be some procedural adjustments that can improve the protection that are easier than regulatory adjustments.
 - Discuss pre-project backgrounds measured over longer periods of time, regional backgrounds, etc.

4. **SEFCRI Team, PPT & Other Advisors** - Has this been done (by SEFCRI, other agencies or organizations in the SEFCRI

region)? Explain.

Tier 2 – #2 (Current Status)

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5. **SEFCRI Team, PPT & Other Advisors** - Is this recommendation a research or monitoring project? (Recommendations should be turn-dirt management actions, not the step you take before a management action). Explain.

- TAC team 4: This starts as a literature research project but quickly becomes an effort to enact legislation that would greatly benefit management actions.
- MM: Yes, could greatly improve protection of corals and reefs from impacts, especially dredging projects

6. **SEFCRI Team, PPT & Other Advisors** - If either of the following applies to this management action, provide feedback on which information submitted by the Community Working Groups may be more appropriate, or if entries should be merged. Explain.

- a. There are different viewpoints for an individual management action (i.e. two working group members provided separate information, as indicated by a '/' marking between them).
- b. Information submitted for this and other draft management actions is sufficiently similar that they might be considered the same.

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7. **SEFCRI Team, PPT & Other Advisors** - Non-agency Question: Is the recommendation technically achievable from your stakeholder perspective? If not, do you have suggestions that would allow this to become technically achievable from your stakeholder perspective? Explain.

Tier 1 - #5 (Potential Pros), Tier 1 - #6 (Potential Cons), Tier 2 - #3 (Intended Benefits), Tier 2 - #4 (Indirect Costs) and Tier 2 - #12 (Key Stakeholders)

- Yes

8. **SEFCRI Team, PPT & Other Advisors** - Agency Question: Is the recommendation technically achievable from a management perspective? If not, do you have suggestions that would allow this to become technically achievable from your agency's management perspective? Explain.

Tier 2 – #10 (Lead Agency or Organization for Implementation) and Tier 2 - #11 (Other Agencies or Organizations)

- yes; politically could be very uncertain