From:	Arlo Haskell
To:	Wood-McGrath, Avril
Cc:	Joyner, Daryll; Sutton, Kaitlyn; Valenstein, Noah; Coral
Subject:	public comment / Coral Turbidity Criterion / Triennial Water Quality Review
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Attachments:	image.png 2003-Murray-Impacts-Cruise-Ship-Industry-Key-West.pdf 2004-KW-Harbor-Dredging-PPB-Labs.pdf 2010-11-USACE-Key-West-Harbor-Reconnaissance.pdf 2021-0517-DEP-Coral-Turbidity-Comment.pdf

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Florida Department of Environmental Protection
Attn: Avril Wood-McGrath
Division of Environmental Assessment and Restoration
2600 Blair Stone Road, MS 6511 Tallahassee, FL, 32399

re: Triennial Review of Water Quality Standards, Coral Turbidity Criterion Technical Support Document, Public Comment

Ms. Wood-McGrath:

Please accept this as our timely submitted public comments on the draft Coral Turbidity Criterion Technical Support Document, part of the current Triennial Review of Water Quality Standards. **We are requesting that the Coral Turbidity Criterion Document be amended to reflect the available science and documentation which demonstrates cruise ship-generated turbidity is a current and continuing threat to coral and hardbottom communities within the Florida Keys National Marine Sanctuary.** A copy of this communication is attached to this email as a pdf. Footnoted references are also attached or linked via Google Drive.

While the current draft does reference “anthropogenic activities … [including] resuspension from boat activity” (Section 2.0 “Background”), the serious, specific, and well-documented problem of cruise ship-generated turbidity within the Florida Keys National Marine Sanctuary appears to have been overlooked. The listed recommendations from Our Florida Reefs, Coastal Ocean Task Force, and US Coral Reef Task Force Sedimentation and Turbidity Workshop focus solely on marine and coastal construction, beach and coastal erosion, and dredging. **The extensive history of monitoring of cruise ship-generated turbidity within the Florida Keys NMS by FDEP and other state and federal agencies, including numerous apparent violations of subsection 62-302.530(70), Florida Administrative Code, warrants additional specific attention to cruise ship-generated turbidity as a threat to coral and hardbottom communities.**

1. A useful summary of the problem of cruise ship-generated turbidity within the Florida Keys NMS is published in the 2005 report by Thomas J. Murray, “The Impacts of the Cruise Ship Industry on the Quality of Life in Key West.”[1] The following passage begins on p. 117:

> "In April, 1999, due to complaints about high levels of turbidity in harbor water created by

increasing numbers of large cruise ships, the City of Key West formally requested federal study and action regarding vessel-generated turbidity in the Key West Harbor Federal Project. The Corps advised that an updated survey of harbor conditions was planned and turbidity monitoring would be addressed. Later in 1999, the Florida Department of Community Affairs (DCA) reported that the Florida DEP had recently documented substantial turbidity caused by cruise ships in the area. **On March, 1, 1999, the DEP and the FKNMS measured turbidity in the wake of a cruise ship at the Outer Mole at nearly 20 times above background. The same day in the anchorage just west of Marker "9" (see Section 3.B.9) they measured turbidity at 7 locations within a plume from the Enchantment of the Seas that averaged 30 times the background average values of 3.7 NTU(FDEP 1999a). On March 3, 1999, FDEP monitoring of plumes created by cruise ship movement at the Outer Mole showed levels on average 11 times over background with many samples more than 29 NTUs (Class III standards) above background. Measurements in plumes offshore the same day showed levels as high as 193 NTUs while background levels were near 3 NTU (FDEP 1999b). On March 11, 1999 numerous measurements at the Outer Mole by FDEP (in plumes from cruise ships and tugboats) showed background levels averaging about 3 NTU and plume levels averaging nearly 50 NTU (FDEP 1999c).**

"Cruise ship traffic has been documented to create turbidity plumes during transit between the outer sea buoy and the docks in the harbor, a passage that is typically an hour long (Figure 3.B.8). **In 2000 the FKNMS reported that there is evidence of a turbidity problem relative to movements of large vessels in the Key West area.** Evidence included measurements of turbidity created by ship main engines and thrusters during docking maneuvers, visual observations of cruise ship-generated turbidity plumes and visual observations of seagrass and bottom damage from anchoring. **The FKNMS also reports that measurements of ship-generated turbidity are orders of magnitude greater than measurements of background turbidity,** and that these turbidity events last from one to several hours. FKNMS personnel in 2000 observed a cruise ship "generating a considerable amount of turbidity in its wake" in the offshore portion of Key West channel and then observed stony corals at Western Head Patch Reef adjacent to the channel that had been covered by resuspended silt (FKNMS 2000).

"**Divers performing the State's coral reef monitoring in recent years at these patch reefs about 1/4 mile from the main ship channel report both resuspended sediments from underwater surge associated with passage of cruise ships in the channel and siltation and redeposited sediments from drift of the turbid plumes created by the ships in the channel.** As the dominant current direction in Hawk Channel is to the west, those patch reefs west of the channel are subject to the most siltation.

"Turbidity levels have heavily impacted corals adjacent to the harbor and ship channel, especially to the west. Ship generated turbidity is clearly differentiated and distinguished from natural background turbidity." (FKNMS 2003b). In 2002, the FKNMS reported to the LVWG [Large Vessel Working Grouop] that "large plumes of resuspended sediment are observed with each pass of a cruise ship or other large deep draft vessel in and out of the channel, particularly on low tide. **Turbidity levels observed with docking cruise ships greatly exceed state water quality standards and local fishermen observe and report the direct effect of turbidity plumes on the fish they are targeting. (FKNMS 2002)."**

2. According to the US Navy's 2003 Environmental Assessment, water column profiling conducted by Continental Shelf Associates on September 15, 2002 showed correlation between elevated turbidity and cruise ship traffic. Cruise ships passing through the main ship channel were associated with turbidity plumes as high as 65.2 NTUs at station KW02-10 and as high as 57 NTUs at station KW02-12. Turbidity readings above 29 NTU, in apparent violation of subsection 62-302.530(70), Florida Administrative Code, were found throughout the water column, at depths of 1', 16' and 32'.[2]

Station	Depth (m)	Depth (ft)	Turbidity (NTU)
KW02-5	0.3	1	3.8
	4.9	16	2.7
	10.1	33	0.9
KW02-6	0.3	1	3.1
	4.9	16	1.9
	9.8	32	2.7
KW02-7	0.3	1	2.1
	4.9	16	1.7
	9.8	32	1.9
KW02-8	0.3	1	2.1
	4.9	16	2.7
	9.8	32	2.4
KW02-9	0.3	1	1.4
	4.9	16	1.4
	9.8	32	1.8
KW02-10	0.3	1	64.8*
	4.9	16	65.2*
	9.8	32	64.6*
KW02-11	0.3	1	2.6
	4.9	16	1.6
	9.8	32	2.9
KW02-12	0.3	1	57.0*
	4.9	16	49.6*
	9.8	32	49.0*
KW02-13	0.3	1	2.1
	4.9	16	1.6
	10.1	33	2.6
KW02-14	0.3	1	0.8
	4.9	16	0.5
	10.1	33	1.5

* Turbidity plume associated with passage of cruise ship through the Main Ship Channel.

3. Turbidity monitoring at a Key West dredging project in 2004, performed by PPB Environmental Laboratories in compliance with FDEP Permit No. 0207625-001-E1, routinely found turbidity generated by passing cruise ships that exceeded background levels by an exponential factor, exceeded the legal limit of 29 NTU above background levels, and exceeded dredging-related turbidity.[3] For example:

- On March 21, 2004, background turbidity during the dredging project was measured at 1.4 NTUs. Compliance sampling found turbidity readings as high as 34 NTUs after passage of a cruise ship.
- On March 22, 2004, background turbidity was measured at 2.4 NTUs. Compliance sampling found turbidity readings as high as 89.7 NTUs after passage of two cruise ships.
- On March 23, 2004, background turbidity was measured at 1.1 NTUs. Compliance sampling found turbidity readings as high as 112.7 NTUs after passage of a cruise ship.
- On March 29, 2004, background turbidity was measured at 0.0 NTUs. Compliance sampling found turbidity readings as high as 25.5 NTUs after passage of a cruise ship.

4. A 2021 report from Florida International University's Water Quality Monitoring Lab demonstrates a significant improvement in turbidity in waters closest to the Key West Ship Channel during the "Covid19 Anthropause," a period marked by the absence of cruise ship traffic from the Florida Keys NMS.[4]

5. The following baseline factors provide additional justification for increased focus on cruise ship-generated turbidity within the Florida Keys NMS:

- The Florida Keys National Marine Sanctuary is home to the majority of corals in Florida's Coral Reef and is critical habitat for endangered Staghorn corals (*Acropora*

cervicornis), which are particularly sensitive to anthropogenically caused turbidity.

- The Port of Key West, situated within the Florida Keys NMS, is one of the busiest cruise ship ports in the world, with over 400 cruise ship calls, carrying more than 1 million people, in 2019.
- Cruise ships calling on the port of Key West are as large as 1050' long, 150' wide, with draft of 29'.
- Access to the Port of Key West is solely through the Key West Ship Channel, a 6-mile long, 250' wide, 34' deep passageway whose particular characteristics appear to result in very high levels of turbidity generated by large cruise ships.
- Endangered Staghorn corals (*Acropora cervicornis*) have been documented within 1,500' of the ship channel, according to the US Army Corps of Engineers.[5]
- There is no effective regulation of the size of ships calling on the Port of Key West. Maximum draft limits appear to be determined by the Key West Bar Pilots Association and/or their parent association, the Florida Harbor Pilots Association. These groups have a financial incentive to bring larger cruise ships to Key West and thus are conflicted from establishing or enforcing impartial draft limits.
- In 2021, local laws established by the City of Key West to regulate ship size were voided by a bill in the Florida legislature. The Florida Harbor Pilots were reported to be responsible for drafting the bill and supporting its passage. As of this writing, the bill awaits the Governor's signature or veto.

In consideration of the extensive history by multiple, highly qualified State and Federal sources of monitored and measured cruise ship-generated turbidity within the Florida Keys National Marine Sanctuary at and well above existing FDEP limits, we are requesting that the Coral Turbidity Criterion Document be amended to reflect the available science and documentation which demonstrates cruise ship-generated turbidity is a current and continuing threat to coral and hardbottom communities within the Florida Keys NMS.

Sincerely,

Arlo Haskell

on behalf of
Key West Committee for Safer, Cleaner Ships
Evan Haskell, President
Jolly Benson, Vice President
Arlo Haskell, Treasurer
David Dunn, Secretary
Capt. Will Benson, Member-at-large

Contact: Arlo Haskell
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cc:
Secretary Noah Valenstein
Daryll Joyner
Kaitlyn Sutton

[1] "The Impacts of the Cruise Ship Industry on the Quality of Life in Key West"; RFQ No. 04-001; City of Key West Naval Properties Local Redevelopment Authority, Thomas J. Murray & Assocs. October 2005. (pp 117-118)

[2] "Environmental Assessment for Fleet Support and Infrastructure Improvements," Naval Air Station Key West, April 2003. US Navy. (Table 3-8, pp 55-56)

[3] Weekly Reports, Operational Control Turbidity Monitoring, Permit No. 0207625-001-E1, Key West Maintenance Dredging Project. PPB Environmental Laboratories, Inc. 6821 SW Archer Road Gainesville, FL 32608

[4] "Preliminary Assessment of Surface Water Clarity Changes in Key West During the Covid19 Anthropause," Dr. Henry Briceño. Florida International University, Institute of Environment, Water Quality Monitoring Lab. SERC contribution number 1009T. March 31, 2021

[5] "Key West Harbor Reconnaissance Report," US Army Corps of Engineers, Jacksonville District. November 2010. (page 15)

2003-US-Navy-Environmental-Assessment.pdf