



**US Army Corps
of Engineers®**

**Port Everglades Navigation Improvement Project
IWG Modelers Meeting
March 2, 2018, 10:45 am to 4:00 pm
Final Meeting Notes**

Teleconference: 1-877-336-1831, Access code: 3709243, Security Code: 1234

Webinar: <https://usace.webex.com/meet/lacy.s.pfaff>

Meeting Goal: Common understanding of Particle Tracking Model Inputs and outputs with the goal of “Will the outputs provide the information needed by the Regulatory agencies, (including informing minimization of dredging and furthest extent that sediment will travel) to fulfill their regulatory responsibilities. “

A. Introduction of Group and Review of Agenda and meeting goals – 36 attendees

Kelly Logan - NMFS Pace Wilber – NMFS Jocelyn Karazsia - NMFS Kurtis Gregg – ERT Inc./ NMFS Mark Lamb - NMFS Gina Ralph - USACE Lacy Pfaff – USACE Jason Spinning – USACE Terri Jordan-Sellers – USACE Steve Conger - USACE Debby Scerno - USACE Matt Miller – USACE Drew Condon - USACE	Laura DiGruttolo - FWC Jennifer Peterson – DEP Lainie Edwards - DEP Vladimir Kosmynin- DEP Brendan Biggs – DEP Ann Lazar - DEP Shelby W. - DEP Peter B. – DEP Kevin Hayes - USACE	Matt Harold – Port Everglades Erik Neugaard – Port Everglades Wade Lehmann – EPA Paul Schraeder – USACE Curtis Strolazzi-USGS Lew Gramer - DEP Brook Moore - USACE Milan Moora - USACE Mike Kibiling. – Taylor Engineering
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Taskers:

- 1. Comparison between the Port of Miami and Port Everglades sediments: Matt and Paul**
- 2. Location of Miami core borings: Kevin/Wednesday March 7**
- 3. Send out today’s presentations: Lacy/Wednesday – March 7**
- 4. Provide core boring information from the nearby Sand By-pass project: Lacy/Friday – March 9**
- 5. Provide the model grid google earth files and the bottom roughness description: Drew (Done)**
- 5. Provide turbidity reports: Jason & Matt/Friday – March 9**
- 6. Corps to provide responses to IWG responding to concerns shared in the meeting before scheduling any follow-up meetings.**

A. Introduction: Welcome by Lacy and Erik. Thank you to the group for their flexibility and participation in understanding the Particle Tracking Model. The original plan was to complete a report and then provide to the group; however, the decision was made to talk through the model now instead of waiting.

B. Understanding of STM runs performed on the West Coast (Attached) – Curt Storlazzi (USGS)

USGS
science for a changing world

March 2018 Meeting

Nearshore Disposal of Fine-grained Sediment in a High-Energy Environment

Curt Storlazzi, Christopher Conaway, Kathy Presto, and Joshua Logan
U.S. Geological Survey, Pacific Coastal and Marine Science Center, Santa Cruz, CA

Katherine Cronin, Maarten van Ormondt, and Jamie Lescinski
Delft, Delft, The Netherlands

Peter Mull *U.S. Army Corps of Engineers, San Francisco District, San Francisco, CA*

Brian Foss *Santa Cruz Port District, Santa Cruz, CA*

versus

QUESTION: Does fine-grained dredge material impact the coast, and if so, how does it compare to natural processes???

Curt shared a presentation entitled: “Nearshore Disposal of Fine-grained Sediment in a High-Energy Environment” performed for a dredging project at the Santa Cruz Port located in the Monterey Bay National Marine Sanctuary. This study was performed at the behest of the San Francisco District, U.S. Army Corps of Engineers. A goal of the study was to answer the question: “Does fine-grained dredge material impact the coast, and if so, how does it compare to natural processes?”

- Model gives insight but not exact measurements.
- Useful to indicate where to monitor.
- Results are relative to time of year
- Take away – Implications of findings to dredge disposal projects. For this project in California the threshold for dredging is greater than 80% coarse material.
- Vectors of sediment fluxes calculations – cannot use depth average models in coastal situations.
- It is difficult to measure sediments at the mm or cm scale. Measurement of sediment thickness on the bottom was accomplished with a piece of equipment called the “flying eyeball”. Discussed sensitivity of the eyeball and the sample methods.



C. Review of PTM Inputs and answers to modeling questions posed by IWG Members – Corps

1. Geotech Presentation – Kevin Hayes (USACE):

- Outer entrance channel primarily rock approximately 96% with the rest fines.
- Cores went to 10 feet below project depth...67 feet.
- DEP: Concern over using 1 core which was taken at the first reef to extrapolate to characterization of entire entrance channel.
- DEP: Concern over characterization of material...variability of rock very high. Also content of voids also a concern... Conservative amount of fines said by the Corps may not be conservative because of how samples were taken and the composition of the voids.
- USGS: In the evaluation of the geotech cores - how does the sample location approximate to the location of the potential cutter heads? Concern over extrapolation.

2. Sampling locations (Matt):

- Used samples of limestone bedrock as close to the dredging prism as possible.
- Can do additional testing with existing cores.
- ERDC (Paul): Looked at samples as they came in and analyzed fractured materials. Majority in gravel size range. Dredging would break down material even more so; they created more fine material in the lab to analyze.
- What is the difference between the sediments from Miami and Port Everglades? More information needed by meeting participants. Tasker – Matt/Paul
- How does the fracturing rate performed in the lab by ERDC compare to a dredge cutter head? A cutter head operates at 20 to 25 rpms. The crusher used in the lab operates at 100 rpms impacting the total surface of the sample with more fines generated from the crusher than a cutter head. A cutter head is not impacting the total surface area of the sediments being dredged.

- DEP: Is there a correlation between the locations of sediment samples to locations on the reefs? No. Samples were not location based but based on material type.
- Are samples crushed dry? Yes.
- Are they representative of what would be taken up in the slurry? Yes.
- Questions on sediments from Miami. What were the location of the bores from Miami? This information is available. (Tasker – Lacy)
- What did the core borings from the Sand By-Pass project look like and were they in close proximity to each other? This would give some information on variability of sediments in the area. (Tasker – Lacy)

3. Model Inputs: Matt Miller (USACE)

- Ability to accurately assess sediments stops at 4 microns.
- Clays in Miami Harbor have longer resident time. Not the same in Port Everglades.
- NMFS: In addition to sediment size also look at chemical composition to see similarity to natural reefs in the area. Deeper depth sediments have a different origin and therefore a different biological impact to the system. Handled through the ODMDS evaluation? (Check to verify)
- DEP: Interested in settling rates – how are you getting those? Corps is looking at the settling velocity. Developed under quiescent conditions and in higher concentrations that what you would expect to see during dredging operations. Grabbed samples at various depths to see grain size distribution over time. Samples not taken under mixed conditions. Looked at settling rates under confined sediment placement areas.
- Compare lab to field results. This is a function the size and depth of the water body.
- DEP: Marine environment has waves and how does that make a difference? Lakes have wind conditions instead of current conditions. In shallow and large lakes – removals are half as fast as in the lab.
- Also looked at decay of plumes. These were examined and verified ACDC readings. Decay rate in field faster than laboratory values. Not as disaggregated in the field as they are in the lab. Resuspension activity around the dredge is different.
- Model is looking at hopper dredging offshore with overburden material removal. Also modeling mechanical and hydraulic dredges with a focus on clay and silt sized particles.
- NMFS: There was turbidity monitoring with Rock chopping at Miami.
- Model input locations on the slide presentation. Looking at moving and stationary point sources. Discussion of types of dredges being used on slide 27.
- Can change inputs, resuspension rates etc. in the model. If looking at cutterhead dredge can have single model run with model impacts from cutter head itself and decanting.
- Any differences in rates between decanting and overflows? Yes there are and this is shown in the worksheets. Turbidity report has not gone out but will make it available. Tasker: Jason and Matt...next Friday.
- DEP: How are you injecting material into the model? See slide 26. Took a conservative approach and results are indicative of patterns expected to see. Provides a time series

of plots and what it looks like with an operating dredge. Slide 28 shows the focus on clay size particles and not stopping at silt material only.

4. Model Domain: Drew slides.

- Cutter heads cannot operate when wave height exceeds 3 feet. This is considered high sea states. Dredge may move inside where material could still go out into the outer channel area.
- Possible to share the files.....KMZ file and will see depth assigned to that . Input to bottom stress bottom layer. Roughness across the domain. Also to be provided. Around 1 million grid cells **Tasker - Drew by next Wednesday (Done)**.

5. PTM – Mike Kabling:

- USGS, DEP and NMFS: Disagree with turning off the three dimensional effects to be captured in the 8 layer model. Follow-up call with Corps and other modelers.
- Particle Tracking Model different from STM. PTM will only simulate material placed into the water column from the dredge. Not ambient conditions. PTM will isolate and distinguish plume characteristics.
- NMFS: Were the SFWMD DB-hydro data for freshwater inputs included? Controlled flows are difficult to predict. NMFS: Might be good to do an analysis to see if there is a pattern or how likely that the boundary conditions are correct.
- Is there a period of record for those observations?
- USGS: no current, speed and directional data in the area included? No calibration or validation in offshore areas?
- Calibration/validation/verification in report submitted. Plots model versus data velocity
- USGS: There are RMS errors - large errors as outlined in a report provided to Lacy.
- Mike: looking at the fit versus statistical information.
- USGS: Should be looking at a scatter plot model versus data comparison and of 30 days of data only showing 1 week. These are serious concerns over the validity of the model.
- USGS: Did you harmonically decompose the measurements to separate out the tidal components? No.
- Several IWG modeler members stated that they do not believe that the model is reflecting reality that well. No validation in coastal areas, no data to tell if the model is working. The way the model is configured and calibrated, there is no data offshore to make that comparison.
- The animation in the presentation is representative of the particles coming out from the dredge. Can you compare relative differences in what the dredges are doing – dredge method to dredge method?
- USGS: How dredges would work in a theoretical ocean is a valid use of the model.
- Can compare relative differences in what the dredges are doing – dredge method to dredge method.
- DEP: Do you need a model to tell you which dredge is best in this environment? ERDC: Model can help compare different dredge operations. IWG members would like to see the results of that comparison when available.

D. Path Forward

- Still need to answer the question and reach consensus on “What can the modeling be used for?” especially when looking at extent of sediment deposition.
- Can use to compare dredging techniques.
- NMFS: Note you can’t be too specific on where it would have more or less impact – bottom or the surface.
- DEP: There is a potential to use a monitoring plan to gather that information.
- EPA: Can also use to look at differing methods of dredging and should answer the question “Do the inputs support using the model for dredge comparison?”
- USACE: A conservative approach was taken when selecting the inputs.
- Where and how much sediment is being liberated? How accurate is the measurement on what is liberated? Does the Corps have confidence? ERDC: Yes, when it comes to the range which is dependent on hydrodynamic settings; would need water depth as well to get a proper estimate.
- If model is to be used to determine extent of impacts the IWG participants gave several suggestions to get the existing model to the point where it is useful which involved looking at existing data. Corps is looking at Curt, Lew and Pete’s suggestions.
- Validated results would answer the questions posed versus calibrated results.
- NMFS: Looking for a validated model to help determine extent of sediment impacts and to help define the ESA Action Area.
- IWG believes the most effective way to proceed is to have their questions and issues addressed prior to scheduling another meeting on the topic of how to use modeling to meet the goals expressed above.

E. Taskers and Close: See taskers above.