Port Everglades Minimization Techniques Analysis

Minimization	Description	Equipment	Feasibility	Assumptions	How to Implement	Time Impact	Cost Risk	Other Risks
No Active Overflow in the Entrance Channel	The no active overflow directive will still allow the water to fill the scow to the top and, after a short settling time, will open an orifice to drain off the top water before transiting to the ODMDS. It is necessary to drain off the top water to prevent water sloshing out and keeps the boat from being "top heavy". This process is referred to as decanting. Typical dredge operations utilize active overflow to increase efficiency (called economic loading) by concentrating more solids in the scow. A composition in the scow of 80-90% solids to 10-20% liquid can be achieved, whereas no overflow usually obtains a composition of 10-25% solids to 75-90% liquid. Typically this is measured on a project by the volume of solids being carried in the scow relative to the total capacity of the scow. When no overflow is implemented the Contractor is limited in how much material they can load into a scow due to the high water volume and low solids volume of dredge slurry.	Cutter/Suction Dredge	Feasible	For the time impact to be negligible, the number of scows in rotation must be sufficient to be able to keep up with the cutter production. Also need space in the area to allow the scow to settle before decanting.	Restrict practice in specifications	From negligible to up to 2X the time it takes to dredge the Entrance channel (around 1 additional year). Likely negligible since there is a high likelihood that additional scows would be employed rather than the dredge sitting idle.	$11,000,000 (costs do not include the cost of specifying a specific decanting time)	Does not include a cost impact if it is decided to specify a decant time. Typically this is at the contractors discretion. This will be further discussed. If hydrodynamic analysis determines that the flows in the upper strata of the water column are great enough to disperse the sediments from the project area, the team requests that this minimization technique be revisited. In addition the team is looking more closely at both the hydrodynamics at the bottom of the water column and the sedimentation produced at the dredge head to understand the most prudent minimization technique to employ. Each minimization technique was analyzed for cost and feasibility separately, therefore risk exists that implementing all minimization efforts together, can make the project infeasible.
Monitor Overflow in the Inner Harbor w/ Additional Turbidity Monitoring in Entrance Channel	All sediment released in the water column during dredging in the inner harbor will either settle out in the inner harbor or will pass through the entrance channel to exit to the ocean. Though the monitoring plan has not been developed yet, the team suggests to allow overflow of material as long as minimal sediments are released outside to the entrance channel. This can be monitored by requiring the standard compliance turbidity monitoring (to the requirements TBD by IWG) and also require constant monitoring of the entrance channel (in a method TBD by IWG) to ensure a minimal amount of sediment be released from dredging operations. If measured values from the standard compliance monitoring are exceeded (as set forth in the monitoring plan), an adaptive management plan (also TBD by IWG) will be implemented, such as to immediately restrict overflow or move dredge locations.	All dredges	Feasible	Instrumentation will be used to allow continuous turbidity monitoring. Because of the difficulty in distinguishing the source of sediment (naturally occurring/alternate sources vs. dredge induced) on a point so far away from the dredge site, the team discourages setting thresholds on the measurements in the entrance channel. This can be discussed with development of monitoring plan.	Full time monitors placed in fixed locations are for data collection only, monitoring locations TBD.	Negligible. Monitoring station would likely need to be installed during design phase and prior to award of the construction contract.	Dependent on the magnitude of monitoring; will establish with monitoring plan. Possibly $1,500,000	High silt content of the inner harbor may make it difficult for the contractor to maintain turbidity requirements and unexperienced contractors may not draw this conclusion from the geotech included in the specifications; if using fixed instrumentation, it may be difficult to distinguish background from project generated turbidity. The milky turbid water usually associated with the dredging of the silt in the inner harbor has a visible plume that may alarm some (without actual impact); ship traffic can cause some sediment to go into suspension which will be hard to distinguish from dredge-related. Production gains within scows or hopper are minimal when dredging fine sediments. Each minimization technique was analyzed for cost and feasibility separately, therefore risk exists that implementing all minimization efforts together, can make the project infeasible.

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Minimization	Description	Equipment	Feasibility	Assumptions	How to Implement	Time Impact	Cost Risk	Other Risks
No Rock Chopping--Entire Project	The contractors used a method during the Miami Harbor Deepening contract that employed the cutter-head of a dredge without the suction function on to pretreat rock. This made the contractor's work more efficient by producing a greater ratio of solid/liquid and made his number of scow transports less and completed in less time as well as allowing for the dredge to continue working while other equipment was down.	Cutter/Suction Dredge	Feasible	Other forms of rock pre-treatment will be allowed (blasting, punch barge)	Restrict practice in specifications	9 - 18 months	$3,000,000-$20,000,000	Contractor will lose production when the scows or other necessary equipment are inoperable. If equipment goes down or vessel traffic impedes operations, Contractor is limited to the work they can perform increasing there time onsite and the schedule. . Each minimization technique was analyzed for cost an feasibility separately, therefore risk exists that implementing all minimization efforts together, can make the project infeasible.
Restrict dredging Entrance Channel--Window July-September	Restrict dredging in the Entrance Channel to times TBD by the IWG based on coral spawning.	All dredges	Feasible		Restrict practice in specifications	up to 15 months	up to $12,000,000 for 3 months of restriction and up to $16,000,0000 for 4 months of restriction.	Lost Port revenue from delay of completion of the project; disallowing dredging during the months with the calmest conditions for dredging. Costs do not include any additional monitoring. Each minimization technique was analyzed for cost and feasibility separately, therefore risk exists that implementing all minimization efforts together, can make the project infeasible.
Loading Scows Beyond the Third Reef	The longer pipeline allows more chance for required maintenance and/or risks failures and leakage. The contractor will have a hard time maintaining the slurry speed in the pipes, keeping the pumps running. There are significant safety concerns with trying to keep recreational boats from running into/over line at night and on weekends. Anchoring in 150'+ depth difficult and also has safety concerns with crew change. There are also issues with placing pipe, scows and booster pumps.	Cutter/Suction Dredge	Not Feasible because of safety concerns	If restricting overflow, may no longer be needed anyway.	Restrict practice in specifications	not estimated	not estimate	Please see description
Loading Scows only in Inner Harbor	Similar concerns with "Loading Scows Beyond the Third Reef" alternative though without the anchoring issue. There are also issues with placing pipe, scows and booster pumps.	Cutter/Suction Dredge	Not Feasible because of safety concerns	If restricting overflow, may no longer be needed anyway.	Restrict practice in specifications	not estimated	up to $24,000,000	Please see description
No Anchoring Outside of Channel	The allowance of anchors to be placed adjacent to the channel on the critical habitat would increase the direct (100%) impact. The Miami Harbor project was dredged without anchoring outside of the channel as proposed by the contractor. The contractor completed the dredging by anchoring to the side and behind the dredge and dredging only half of the channel at a time.	Cutter/Suction Dredge	Feasible but must check with industry to ensure it is not a sole source technique	Assume more than one contractor can perform this method	Restrict practice in specification	6 months -12 months	$7,000,000-$28,000,000	May be proprietary technique; decreases efficiency; the high currents at Port Everglades may make it more difficult than Miami. Each minimization technique was analyzed for cost and feasibility separately, therefore risk exist that implementing all minimization efforts together, can make the project infeasible.

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