

The Atkins Coastal Engineering Scope of review considered potential environmental impact to Siesta Key, the Ted Spering Park on Lido Key and navigation channel and bay bottom of Big Sarasota Pass. Sarasota County, at the request of many environmentally concerned residents of the Sarasota County, funded this Peer review of the United States Army Corp of Engineers (USACE) plan to dredge the Big Pass Shoal. The sand dredging is part of an engineering design by USACE to renourish and mitigate future erosion of Lido Beach and portions of south Lido Key on behalf of the City of Sarasota.

Executive Summary of the Atkins North America Coastal Engineering Report November 2015

The Lido Key Federal Shore Protection Project (Lido SPP) is a federally authorized Hurricane and Storm Damage Reduction (HSDR) project proposed by the U.S. Army Corps of Engineers (USACE) with the City of Sarasota (City) as local sponsor. Atkins was tasked by Sarasota County, a key stakeholder, to review elements of the Lido SPP specific to the potential for physical impacts to Ted Spering Park, north Siesta Key and navigation through Big Sarasota Pass as documented by USACE studies and reports provided by the County.

Reports supplied span approximately 15 years of significant effort by the USACE to assess feasibility and analyze several design alternatives. However, the reports provided do not always include input data (and metadata) used for analysis. This leaves question and uncertainty with respect to data quality, repeatability, and geographic coverage as well as model calibration, verification and results. The reports lack the supporting documentation necessary to confidently accept the conclusions.

There appears to be conflicting information about proposed project elements (i.e. number, location and geometry of groins; dredge volumes, boundaries, depths and frequency, etc.) between the supplied reports, information provided in public meetings and that contained in the Joint Coastal Permit (JCP) application to the Florida Department of Environmental Protection (FDEP). The USACE reports do not conclude with a comprehensive presentation of results for the final selected design alternative. A request to the USACE for clarification and additional information have been made by the reviewer through the County, but as of this report not received. We believe that understanding the long-term plan would aid in the evaluation of this initial action presented. Is this proposal a one-time event or an overall inlet management strategy of cyclically mining sand to maintain Lido Key beaches?

Results presented in the USACE reports consider an initial ebb shoal dredging event with groin construction and beach nourishment. Studies have not been provided that present analysis of the long term effects of the proposed activities. Reports indicate that natural sand bypassing occurs from Lido Key, across the Big Sarasota Pass and onto Siesta Key. This natural transfer of sand maintains beach conditions on Siesta Key.

Back-passing of sand by dredging a portion of the ebb shoal may interrupt this movement with consequent effects for Siesta Key. The proposed back-passing volume of 1.3 MCY is an order of magnitude greater than the estimated annual net southward transport of approximately 118,000 cy/yr across the ebb shoal. The report states that there is no effect on down drift beaches due to the proposed back passing of this material.

We would expect, however, that the removal of the sand from the ebb shoal would delay (reduce) the southerly transport of some percentage of the reported natural by-passing after dredging. The physical processes that dictate how much delay or potential impact dredging may cause are not described. Atkins has concerns with respect to documentation of the accuracy and extent of the ebb shoal surveys.

Much of the data (surveys) used to document the basis of design report was collected prior to 2002 (i.e. latest shoreline change analyzed was dated 2000). We recommend an update to analyze shoreline change, volume change and erosion rates with more recent data (2000 to 2015). This effort would be prudent to assure that conditions have not changed which may influence final project recommendations and design.

The discussion related to the sediment budget is incomplete. The sediment budget developed by Coastal Tech and USF did not include accompanying information to document its validity. Information related to onshore transport and the north and south boundary conditions reference other work without comment to the reliability of that information. The USACE refined the Coastal Tech/USF sediment budget, but a key feature of both budgets is that they represent periods of nourishment. There is no documentation of an "un-nourished" condition to describe the background erosion and subsequent sediment budget for the Lido Key cell and the regional system.

Concerns regarding model selection and calibration/verification led us to question the results of the modeling and subsequent coastal engineering analysis for the use of groins. The Generalized Model for Simulating Shoreline Change (GENESIS) is a one-line (one contour) sediment transport model which is used for shoreline change and not capable of providing nearshore current patterns at the proposed groins. The reports Atkins Peer Review of the Lido Key Federal Shore Protection Project | October 2015 4 do not document the potential for longshore currents at the groins to divert sand offshore and away from down drift beaches. This could impair the natural transport to the ebb shoal at Big Sarasota Pass.

Additional concerns regarding the use of the GENESIS model include a lack of detail concerning documentation of model domain boundary conditions, and proper calibration and verification. The USACE reports did not indicate whether the LiDAR data used in the model was properly ground-truthed which could explain reported large increases to the ebb shoal volume. Due to the potential risk of impacts to down drift beaches associated with this project, a model that can accurately describe the currents and two-dimensional (longshore and offshore) transport should be considered.

This peer-review of select reports was initiated to critically review the work by the USACE with regard to 1) impact to Ted Sperling Park, 2) impact to navigation, 3) impact to down drift shorelines and 4) impact of a no action alternative. Based on the information that has been provided, Atkins cannot provide a professional opinion on the various recommendations provided in the USACE reports. To do so without the information and subsequent analysis required would be as qualitative in nature as those recommendations described by the USACE. The comments below are related specifically to the USACE recommendations.

1. Lido Beach and Ted Sperling Park - The analysis of the impact of the groins in the reports is not conclusive (i.e. additional modeling of the existing longshore currents and predictive model runs to study the effect proposed groins will have on the longshore transport of sediment is needed). Groins as located are a concern as they may impede the down drift flow of sand and starve the beaches to the south. Permeable versus non-permeable groins may need to be evaluated to mitigate this impact of the groins. The end effects on Ted Sperling Park need to be better understood. It is not clear to us why the terminal groin was removed.

2. Navigation of Big Sarasota Pass – Based on the analysis performed in the Mining Alternatives report, the apparent preferred alternative of dredging the ebb shoal for navigation purposes is D3*+C+B (both channels). This alternative through the Flood Marginal Channel provides a shorter route to open water through Channel C and indicates minimal shoaling in the Main Ebb Channel B. The analysis performed is qualitative in nature as the CMS model was not verified and; therefore, we believe that the conclusions contain risk when interpreting outcomes regarding impacts.

3. Down drift Shorelines –The report documents no adverse impacts however the deficiencies in the documentation of the data and model create uncertainty in this regard. Without understanding the limitations of the data and modeling efforts we find it difficult to accept the conclusions provided by the USACE without the appropriate documentation or conducting their studies using more resolved models with adequate calibration and validation. After the tools to assess impacts are tested we also suggest that there may be alternative mining sites and configurations.

4. No-Action Alternative – With no nourishment it would be expected that Lido Key (R-32 to R-44) and Ted Sperling Park would continue to experience erosion. Nourishment of Lido Key and potential shoreline structural components are required to abate the continual erosion on the Key. The reports reviewed are incomplete. Some of the information may be available in companion documents not provided however critical features of those reports should be reproduced as they are the basis of decisions for the project recommended by the USACE. The risk of impacts to down drift beaches and subsequent physical, social and economic losses warrant quantitatively verified studies if the County wants to be assured that dredging the ebb shoal is appropriate.

The County may want to consider support of an intermediate step in the implementation of the project as long as a long-term project is further studied. When appropriate current and sediment transport modeling is documented and/or accomplished and the results show no impact of the groins on the delay of sand to the down drift system or diversion of sand from the natural sediment bypassing system, these options may supplement the holding of sand in this reach. Using an offshore sand source or even potentially a significantly smaller amount of sand from Big Sarasota Pass ebb shoal complex for nourishment could prove advantageous. The County should encourage monitoring and evaluate impacts

the groins may have on the ebb shoal and down drift beaches before supporting additional future ebb shoal sand mining.

A detailed plan of project monitoring covering the concerned beaches on Lido Key and Siesta Key, as well as the entire ebb shoal and accreting flood shoal area of Big Sarasota Pass should be required. Surveying of pre-project conditions should commence prior to project implementation.

Previous nourishment of Lido Key has been conducted using sand from New Pass which, in effect, is consistent with the natural southerly transport. Back passing from Big Sarasota pass is contrary to this natural flow and while we believe that there are significant sand resources in the ebb shoal, the mining of these resources should be conducted to marginalize any down drift impacts and look at alternatives until those impacts can be more accurately quantified.