Site-Specific Calibration of the SBEACH Model for a Southeast Florida Beach

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ABSTRACT

A site-specific calibration of the cross-shore sediment transport model SBEACH was performed for the Broward County, Florida shoreline. Prior to the calibration described herein, the SBEACH model had not been rigorously calibrated for a site in southeast Florida due to lack of suitable storm-induced beach response data. The calibration is based upon well documented storm-induced beach profile changes associated with Hurricanes Dennis and Katrina that impacted the Broward County shoreline in 2005 and a hindcast of offshore wave conditions.

Use of the site-specific data to calibrate the SBEACH model at this location indicates that model calibration parameter settings differ from “recommended” default values. Most importantly, the calibrated value of the sediment transport rate, *K*, was found to be significantly lower than recommended values and falls just outside the lower end of the recommended range of values. Accordingly, it is recommended that the storm-induced beach change and offshore wave information as well as the calibration parameter settings presented in this paper be considered for other applications of the SBEACH model for beaches in southeast Florida.

Introduction

A site-specific calibration of the cross-shore sediment transport model SBEACH (Larson and Kraus, 1989; Larson, Kraus, and Byrnes 1990) was performed for the Broward County, Florida shoreline. The calibration was performed with well documented storm-induced beach profile changes that occurred as a result of the impacts of Hurricanes Dennis and Katrina upon the Broward County shoreline in 2005. Storm related beach changes associated with these two events were captured with immediate pre- and post-storm beach profile survey data collected during construction of the Broward County, Florida Federal Shore Protection Project (SPP) - Segment III. The surveys used for the calibration were performed at the same shoreline locations before and after storm passage in areas where the sand fill had not been placed. The surveys captured notable storm-induced upper beach/berm changes.

Background

The cross-shore sediment transport model SBEACH (Storm Induced BEAch CHange; Larson and Kraus, 1989) is a numerical model used to predict beach, berm, and dune erosion resulting from storm-induced winds, waves, water levels, over-wash, and dune lowering (Wise and Kraus, 1993). Beach profile changes include dune and berm recession and the formation and movement of major morphological features such as longshore bars and troughs. Required input to SBEACH includes (1) storm water levels and waves, (2) beach profile information, and (3) beach sediment conditions. The model is commonly used to simulate expected storm-induced beach berm and dune changes for the purposes of evaluating potential storm effects to the beach front and upland.

A basic assumption of the SBEACH model is that profile change is produced solely by cross-shore processes, resulting in a redistribution of sediment across the profile with no net gain or loss of material. Alongshore transport processes are assumed to be uniform and therefore neglected in the calculation of beach profile change. These assumptions are expected to be valid for short-term, storm-induced profile response on open coasts away from tidal inlets (Larson and Kraus, 1989).

To most accurately simulate cross-shore beach change at a particular site, it is recommended that the SBEACH model be calibrated and/or verified with site specific conditions, if available. This requires detailed pre- and post-storm beach profile surveys that represent a storm's effects upon cross-shore beach change and coincident information regarding the wind, wave and water level conditions.

To date, no storm-induced beach change data have been collected or compiled for a site in southeast Florida sufficient to adequately calibrate and/or verify the SBEACH model. Previous applications of the SBEACH model for southeast Florida beaches have relied upon general recommendations regarding calibration parameter settings and model sensitivity to variations in those parameters (USACE, 2003; Olsen Associates, Inc., 2004). The validity of this approach, however, has not been rigorously tested.

In 2005, five hurricanes affected south Florida with winds and waves that resulted in varying levels of beach change. Of these, Hurricanes Dennis and Katrina produced conditions that caused measurable beach profile changes that were captured by survey. In a separate study, a wave hindcast for conditions offshore of Broward County was formulated that generally described offshore wind, wave height, and wave periods for these storms (Buoy Weather, Inc., 2005). Water levels associated with these events were recorded at Virginia Key, Florida, about 21 miles south of the Broward County study area (see **Figure 1**). These measured beach profile changes, hindcast wave conditions, and documented water levels were used as input to the SBEACH model to establish calibration settings for the Broward County coastline.

2005 Hurricane Season in Broward County

The 2005 hurricane season was unusually active for the south Florida area and caused above average changes to beach conditions for that season. Between May 2005 and February 2006 there were eight (8) major coastal weather events that significantly affected the Broward County shoreline. These events are listed below.

- June 10-12, 2005 — Elevated offshore wave conditions
- July 10, 2005 — Hurricane Dennis
- August 25, 2005 — Hurricane Katrina
- September 6-10, 2005 — Hurricane Ophelia

- September 24, 2005 Hurricane Rita
- October 5, 2005 Nor'easter
- October 23, 2005 Hurricane Wilma
- November 1, 2005 Nor'easter

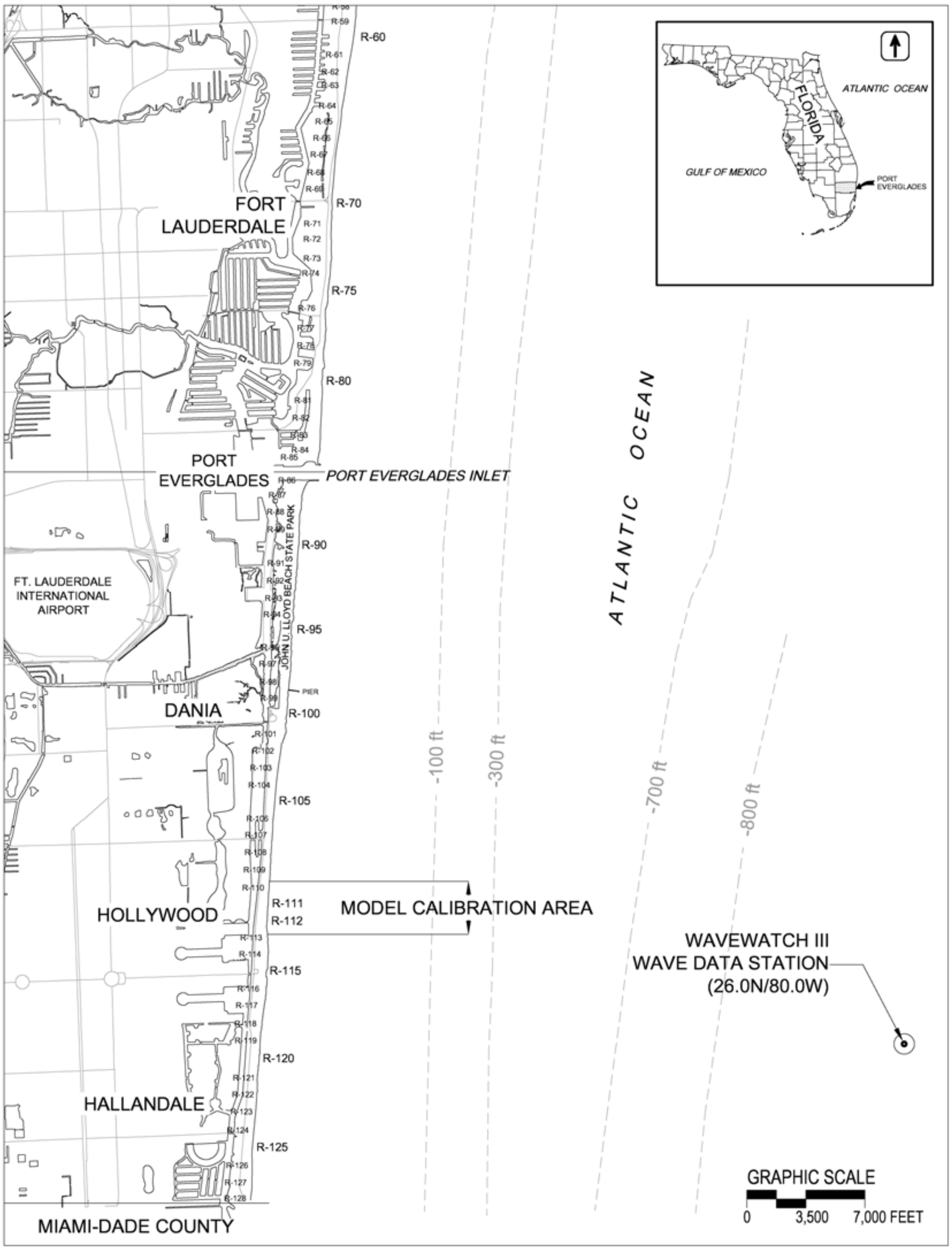

Figure 1: Location of SBEACH calibration/verification study area.

Five of these events were tropical hurricanes, the tracks of which are depicted in **Figure 2**. Two of the hurricanes, Dennis and Katrina, produced elevated wind, wave, and water level conditions along the Broward County shoreline that resulted in measureable cross-shore beach profile response.

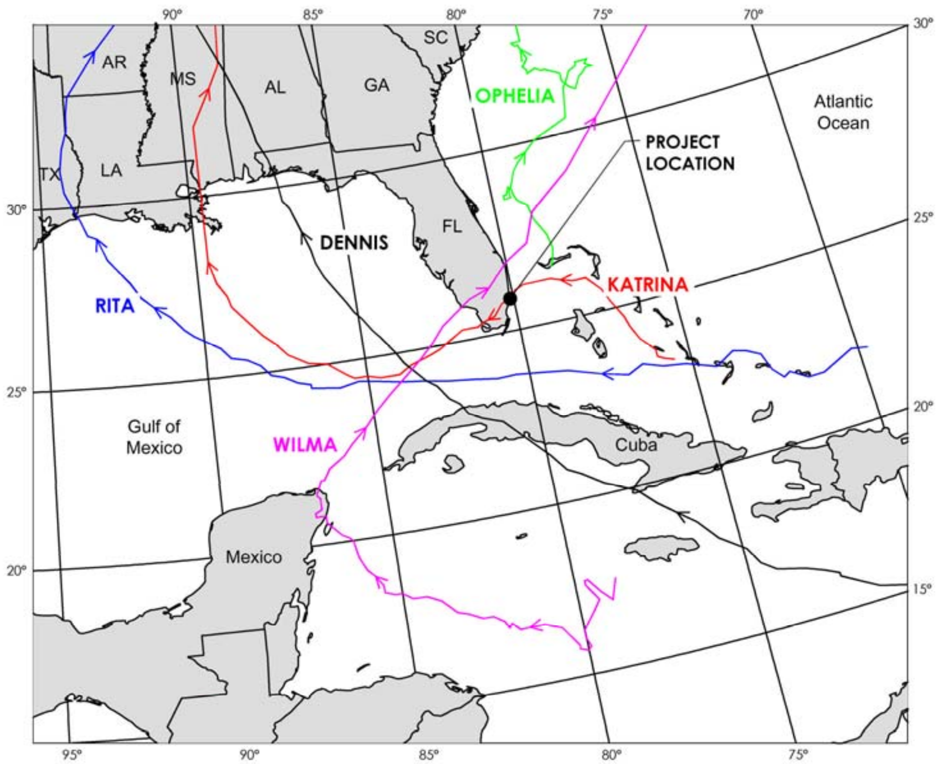

Figure 2: Graphical summary of the five 2005 hurricanes that affected Broward County.

Storm Effects and Conditions

Beach Profile Response. Storm-induced beach profile changes were documented for Hurricanes Dennis and Katrina along a section of Broward County shoreline during construction of the Broward County SPP - Segment III in 2005. The Segment III project included the placement of approximately 1.8 million cubic yards of beach fill along approximately 6.8 miles of Atlantic shoreline between Port Everglades inlet and the Miami-Dade County line and was constructed between May 2005 and February 2006. Typical to most beach fill projects, frequent surveys of the project shoreline were made immediately before, during, and immediately after construction of the project. On several occasions, multiple surveys of the same area of the project beach, where beach fill had not yet been placed, were made during construction due to the effects of passing Hurricanes.

For the purposes of this investigation, the inventory of beach profile survey data from the project was reviewed in an effort to identify surveys that were performed at common locations before and after the passage of a hurricane and for a section of beach that was not affected by fill placement activities. The search concluded that beach profile surveys at Florida Department of Environmental Protection (FDEP) R-monuments R-111 and R-112 (see **Figure 1**) before and after the passage of Hurricanes Dennis and Katrina captured natural beach response to these storms and were not affected by fill placement. It is noted that the typical condition of the beach at these two locations reasonably represent beach profile conditions -- shape, berm elevation, slope, etc. -- along the southern three-quarters of the Broward County shoreline, south if Hillsboro Inlet.

Figure 3 displays the temporal relationship of beach profile surveys and the occurrences of Hurricanes Dennis and Katrina. The occurrences of the storms are identified by the elevated wave conditions offshore of Broward County as represented in the hindcast wave height time series dataset presented on the same figure.

Beach profile changes at R-111 and R-112 due to the effects of Hurricane Dennis were captured with a March 2005 “pre-construction” survey and a “before dredge” (BD) or pre-fill placement survey. The pre-construction survey was part of a county-wide beach survey performed prior to the start of construction for the purposes of documenting project beach conditions. This survey, however, occurred approximately 5 months prior to the passage of Hurricane Dennis. The post-Dennis conditions are represented by an initial “before-dredge” (BD1) or pre-fill survey performed by the project contractor[1]. The BD surveys are used to document pre-fill conditions and are compared to “after-dredge” (AD) or post-placement surveys to determine the quantity of beach fill that qualifies for payment. BD and AD surveys are performed typically every 100 feet along the project shoreline within about 5 days before and 1-2 days after beach fill placement, respectively, at a particular location. The initial BD surveys at R-111 and R-112 were performed about one month following Hurricane Dennis. Beach fill construction at the time of Hurricane Dennis was over two miles south of R-111 and R-112. It does not appear from the hindcast wave record (**Figure 3**) that there were any significant wave events between the March 2005 and initial BD surveys other than Hurricane Dennis. Therefore, the documented upper beach/berm changes at this location are considered to be mostly related to the effects of Hurricane Dennis.

Figure 4 depicts the March 2005 and initial BD surveys at FDEP monuments R-111 and R-112. These surveys represent pre- and post-Hurricane Dennis beach conditions at these locations. Comparison of the surveys indicates a significant loss of beach volume from across the upper areas of the beach profile at both locations. Furthermore, it appears that some overtopping may have occurred at R-111 where the upper dune elevation is relatively low compared to R-112. At R-112, sand losses occurred from elevations up to +8.5 ft, NAVD[2]. Sand losses from the upper dune

1 Multiple BD surveys were required at R-111 and R-112 due to the passage of Hurricane Katrina. The storm affected that area after the initial BD survey was performed at R-111 and R-112 but prior to fill placement. Due to the beach changes at this location during Katrina, the BD surveys were updated following Katrina to more accurately represent the amount of fill that was ultimately placed at R-111 and R-112. The initial BD and post-Katrina updated BD at R-111 and R-112 are the surveys that captured the storm induced changes to the beach from that storm event.

2 All elevations discussed in this Appendix are relative to the North American Vertical Datum of 1988 (NAVD88). In this area of Broward County, the NAVD88 datum is approximately +1.6 ft above NGVD29.

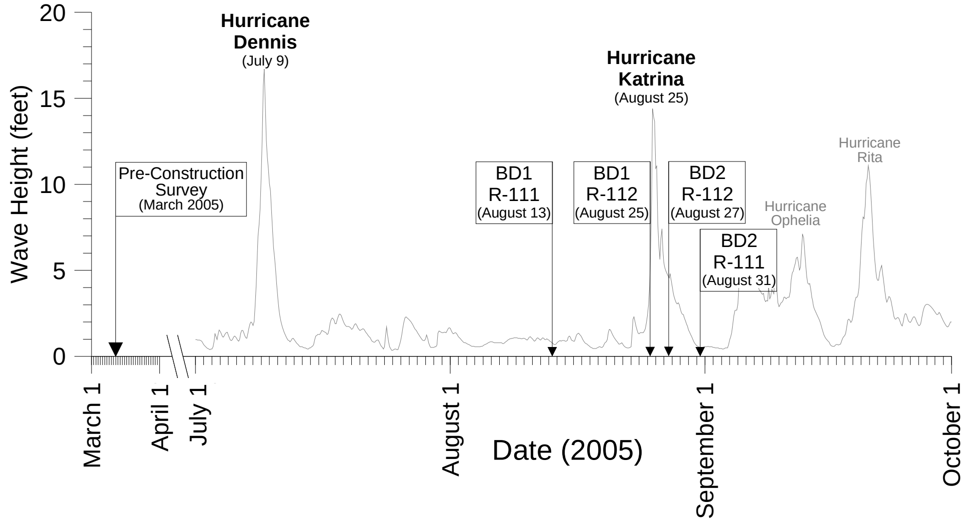

Figure 3: Timeline of beach profile surveys at R-111 and R-112 before and after Hurricanes Dennis and Katrian. The occurrence of the storms is represented by the time series of offshore hindcast wave heights.

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elevations and apparent wave overtopping at R-111 suggest that the beach may have been impacted by a high water event or long period wave run-up event. Review of wave information for Hurricane Dennis suggests that the waves had relatively long periods compared to other storms during the 2005 season. Also, since Dennis passed well south of Broward County, storm induced water level increases were minimal. Water level and offshore wave conditions are discussed in a subsequent section.

Although beach profile changes occurred at R-111 and R-112 during the passage of Hurricane Dennis, it does not appear that all changes were limited strictly to cross-shore processes. That is, there was a net loss of sand from the beach at R-111 and R-112 between the pre- and post-Hurricane Dennis surveys. This would suggest that there were sand losses from the beach in this area due to alongshore transport either during the storm or during the periods between profile surveys and the storm event. Considering the relatively long duration between the pre- and post-storm surveys and the storm, it is possible that beach changes represented by the surveys are not completely storm related.

The effects of Hurricane Katrina at R-111 and R-112 were captured with the initial before-dredge (BD1) surveys -- also used to represent post-Dennis conditions noted above -- and a post-Katrina resurvey (BD2) of the same stations prior to fill placement. The post-Katrina resurveys were required to accurately represent pre-fill conditions following the passage of that storm.

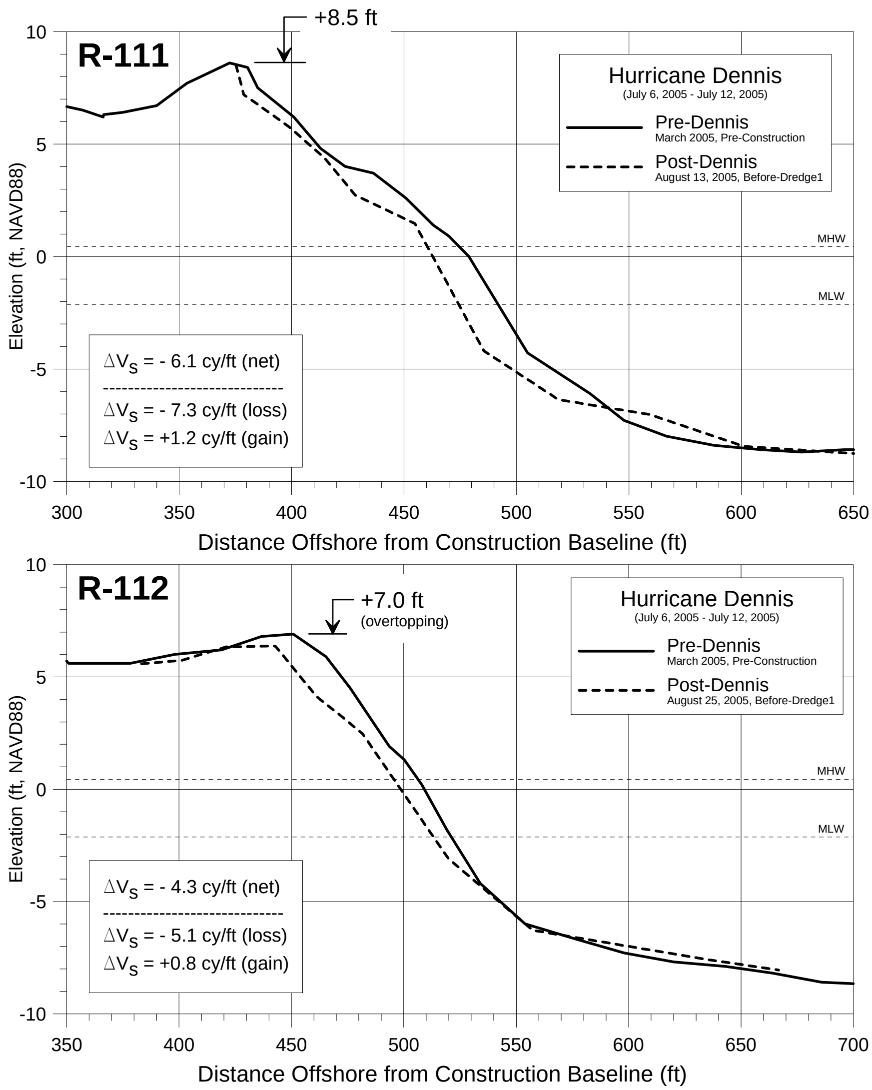

Figure 4: Pre- and Post-storm profile for R-111 and R-112 in Broward County, FL due to Hurricane Dennis.

While beach fill activities were relatively close to R-111 and R-112 at the time of Hurricane Katrina, it is not believed that storm related beach changes were significantly affected by the presence of beach fill sand and project construction activities. As Katrina approached Broward County and fill operations halted in preparation of the storm, the dredge pipeline discharge was approximately 1,500 feet south of R-112 -- fill construction was progressing from south to north toward R-112 at the time[3]. Although fill containment dikes were within 500 feet of R-112 at the time Katrina passed Broward County, there had been no sand fill placement with 1,500 feet of R-112.

Figure 5 depicts the pre- and post-Hurricane Katrina beach profiles at FDEP monuments R-111 and R-112 -- BD1 and BD2, respectively. Unlike the beach profiles

3 Note: R-112 is south of R-111.

representing changes from Hurricane Dennis, the BD1 and BD2 profiles at R-111 and R-112 were collected almost immediately before and after the passage of Hurricane Katrina. Accordingly, there is a high level of confidence that these beach profile surveys represent beach changes that were due entirely to the effects of Hurricane Katrina. Furthermore, there is essentially a complete conservation of sand volume in the documented profile change which suggests that storm related effects to beach profile changes were cross-shore dominant. The documented beach profile changes at R-111 and R-112 for Hurricane Katrina are considered very applicable for the purposes of SBEACH model calibration.

Wind and Wave Conditions. Calibration of the SBEACH model requires a time series of wind and wave conditions coincident with the storm as well as representative beach profiles surveys. Actual measurements of offshore wind and wave conditions, however, were not made offshore of Broward County during the 2005 hurricane season. Rather, conditions were estimated from a hindcast performed in support of post-hurricane beach impact studies conducted by the US Army Corps of Engineers -- Jacksonville District (Buoy Weather, Inc., 2005). Specifically, the hindcast reported wave height, wave period, wave direction, wind speed, and wind direction for a location offshore of Broward County for the period between June 1 and November 1, 2005. Offshore wave heights from the hindcast are depicted in **Figure 6**. Wave predictions were made using the WAVEWATCH III model (Tolman, 1999). The hindcast data represent conditions at a "virtual buoy" location offshore of southern Broward County specifically at 26.0^{o}N/80.0^{o}W. This "virtual buoy" is located approximately 6.5 nautical miles east-southeast of the model calibration study area in about 1,200 feet of water (see **Figure 1**).

Water Level Conditions. Water level data was collected from a NOAA tide station located approximately 21 miles south of the calibration area. The tide station is located just offshore of Virginia Key, FL (NOAA ID: 8723214) and collects water level data at a frequency of six minutes. This tide station was chosen for its continuous real-time data set and its nearly open-ocean location. It is noted that the observations at Virginia Key were the closest to the calibration area of any made during Hurricanes Dennis and Katrina. It is possible actual water levels conditions along the Segment III shoreline varied slightly from those observed at Virginia Key during these two events.

Wave and Water Level Conditions for Hurricanes Dennis and Katrina. **Figures 7** and **8** display the time-series of wave height, wave period, and water level for Hurricanes Dennis and Katrina, respectively. The time periods depicted in the figure for each event -- six days for Dennis and seven days for Katrina -- were used as input to the SBEACH model to represent the effects of the storms upon beach conditions.

SBEACH Model Setup and Calibration/Verification

In general, the SBEACH model is calibrated through the adjustment of two parameters, the transport rate coefficient, K, and the coefficient for slope dependent term, ε. The recommended appropriate ranges for these adjustable parameters are as follows:

$$K = 0.5\text{ E-06 to } 2.5\text{ E-06 m}^4/\text{N (Default} = 1.75\text{ E-06 m}^4/\text{N)}$$
$$\varepsilon = 0.001 \text{ to } 0.003\text{ m}^2/\text{sec (Default} = 0.002\text{ m}^2/\text{sec)}$$

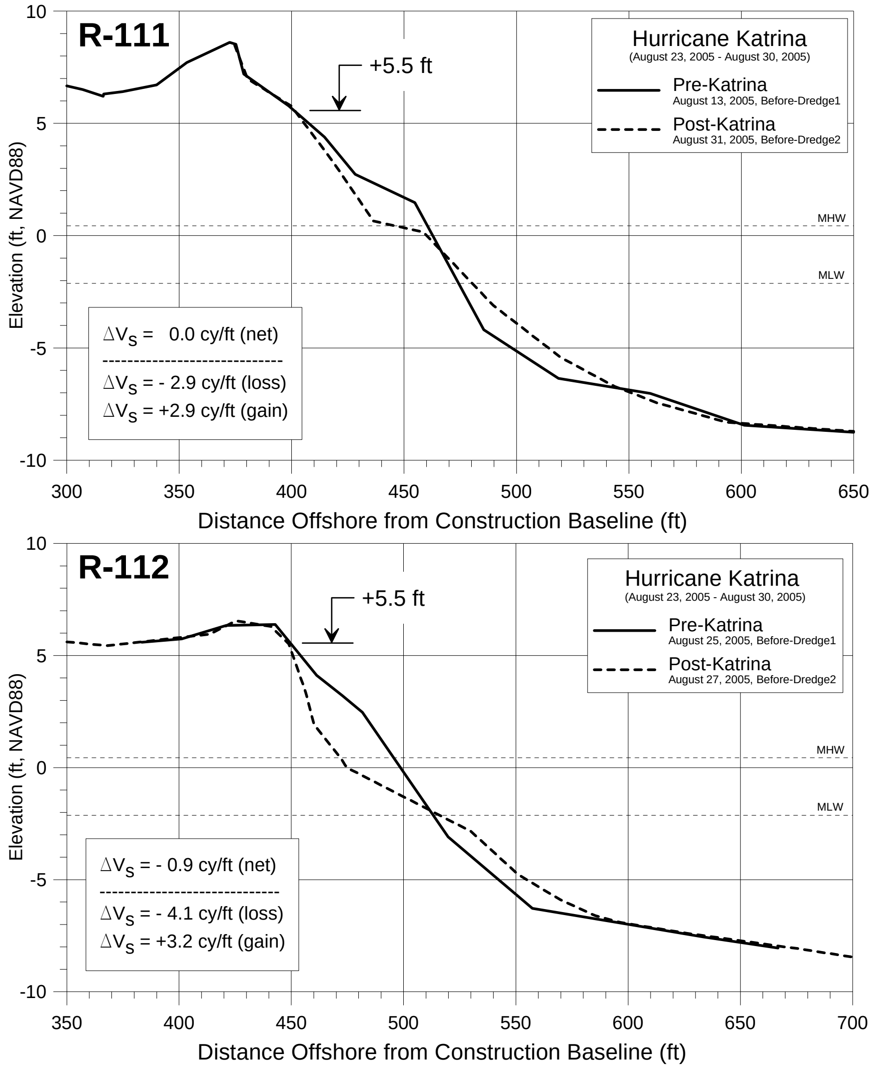

Figure 5: Pre- and Post-storm profile for R-111 and R-112 in Broward County, FL due to Hurricane Katrina.

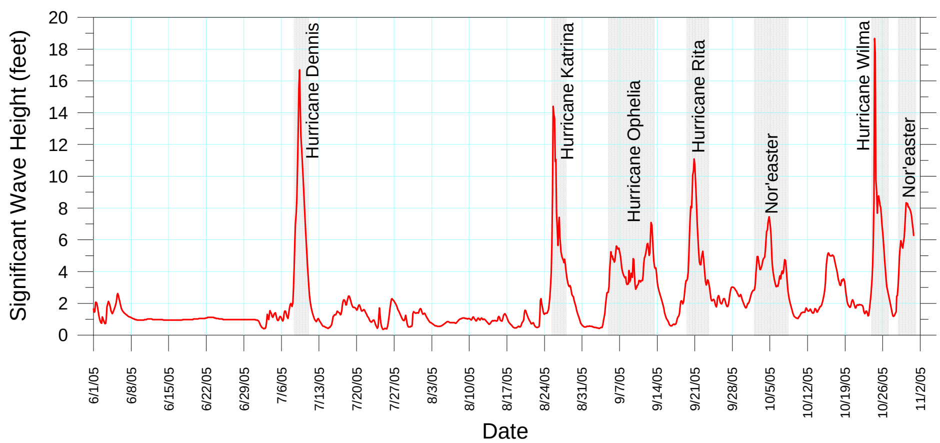

Figure 6: Hindcast of June to Nov. 2005 wave heights offshore of Broward County, Florida.

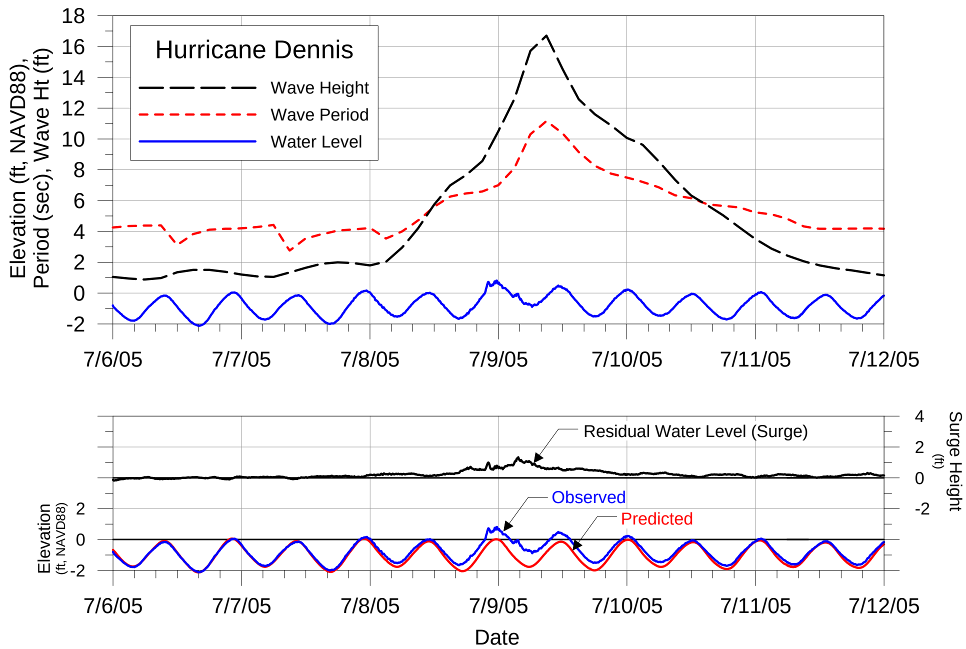

Figure 7: Hindcast wave heights and periods offshore of Broward County during Hurricane Dennis. Measured water level conditions recorded at Virginia Key, Miami-Dade County during the passage of Dennis.

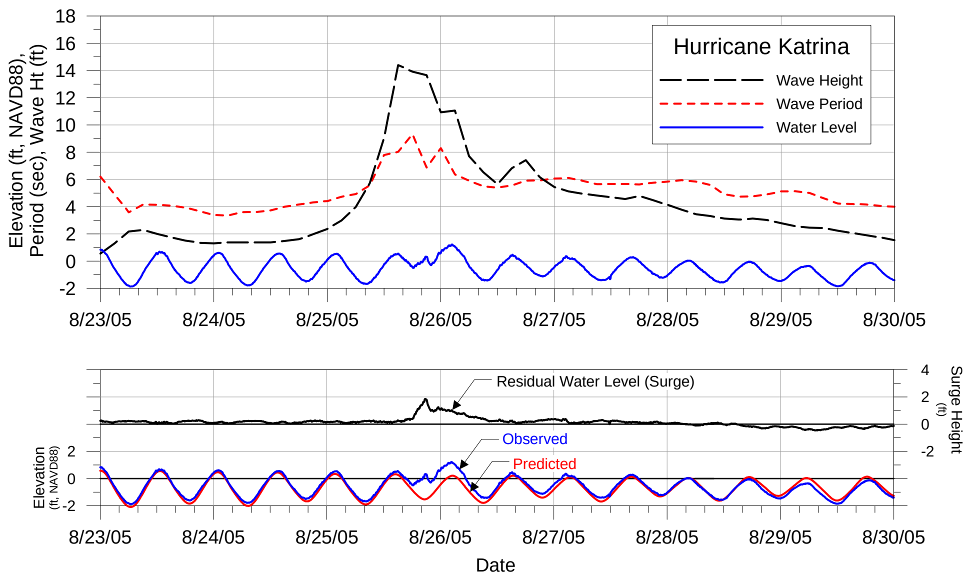

Figure 8: Hindcast wave heights and periods offshore of Broward County during Hurricane Katrina. Measured water level conditions recorded at Virginia Key, Miami-Dade County during the passage of Katrina.

Additional model parameters that require specification include the transport rate decay coefficient multiplier, λ, landward surf zone depth, maximum slope prior to avalanching, and effective median sediment grain size. These parameters are typically determined from physical characteristics of the beach for which the calibration is being performed. In this investigation, the transport decay factor, λ, is set to 0.1,which is within the recommended range, the landward surf zone depth is set to 1.0 ft (0.3 meters), and the maximum slope prior to avalanching to 30 degrees, the maximum recommended value. It is noted, however, that the model calculations are not highly sensitive to variations in the values of these two latter parameters (Rosati et al. 1993).

The model was set up to represent beach profile conditions from the back beach/dune out to a depth of about -30 ft, NAVD, approximately 5,000 ft offshore. Bathymetric conditions seaward of those measured during the pre- and post-storm beach profile surveys and out to the seaward limit of the model boundary were represented with hydrographic survey data from the pre-project monitoring survey (March 2005) and a 2001 county-wide LADS survey (Tenix, 2001).

The beach profiles were represented in the model using a variable grid scheme with grid cell spacings from 5 to 20 feet. The grid spacing is smallest (i.e., 5-ft) across the active beach profile. The model grid spacing is larger across the landward portion (10-ft spacing) and the deeper part of the profile (20-ft spacing) to reduce simulation time. Seaward of the active beach profile, the offshore bottom is comprised mostly of rock hardbottom and is represented in the model setup. **Figure 9** depicts a typical input beach profile from this investigation.

For the purposes of this exercise wind speed and direction and wave direction data were not included as input to the model. Furthermore, the wave heights represented at the offshore hindcast location were reduced by 30 percent reduction to represent conditions at the offshore model boundary. Previous comparisons between deepwater hindcast data offshore of Broward County and actual wave measurements inside the nearshore reef system indicates significant damping between the two locations (Olsen Associates, Inc., 2002). The comparisons were made with nearshore wave measurements by Dompe and Hanes (1992). Since a direct comparison could not be made between actual measurements and the 2005 hindcast, the noted adjustment to input wave conditions were made based upon the information from the previous comparison. It is acknowledged that a more rigorous analysis of the transformation of the offshore hindcast data to the offshore model boundary may also be beneficial to this investigation.

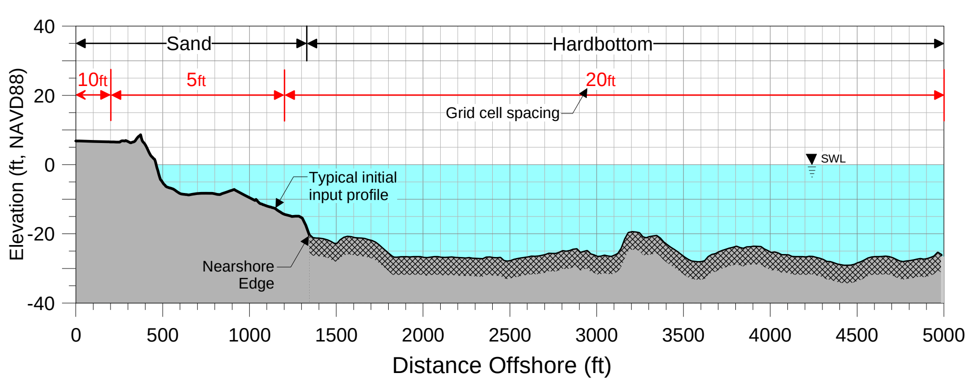

Figure 9: Typical profile conditions across SBEACH model domain used in this investigation.

Model parameters that are established from environmental or physical conditions include the landward surf zone depth, median grain size (d_{50}) of the beach sediments, typical maximum slope prior to avalanching of sediment during the erosion process, and water temperature.

Sediment grain size information was obtained from a comprehensive investigation of the Segment III beach sediments in support of the Shore Protection Project design (USACE, 2003). It is noted that sediment sizes vary significantly across the beach profile along the Segment III shoreline from very fine sands across the lower reaches of the profile to large gravel-size shell hash in the surf zone and typical wave plunge-point. For the purposes of this study, the median sediment grain size represents those sediments typical to the upper areas of the beach and dune. It is noted that the sediments along the project shoreline consist of 70 to 80 percent calcium carbonate material that include broken shells and skeletal remains of marine organisms. The sediment transport models used in the SBEACH model are based upon the assumption that sand grains are relatively uniform in size and comprised entirely of quartz materials. It is possible that the difference between the Broward County sediments and those assumed in the model formulation may affect model performance for this area. The potential effects of sediment difference, however, were not investigation in this study.

As is typical, the SBEACH model was calibrated to a set of data for which there is a high level of confidence in quality and then verified to one or more alternate data sets. In this instance, the model calibration parameters were determined to best replicate observed beach profile change at R-111 and R-112 due to the effects of Hurricane Katrina. Documented beach profile changes at R-111 and R-112 during Dennis were used to verify the model calibration setting. Also, particular interest is placed upon beach profile changes along the upper areas of the beach profile. Therefore, comparison between measured and predicted changes in determining appropriate calibration settings were limited to the area of the beach profile above mean low water (MLW) (-2.1 ft, NAVD).

The measured changes due to Hurricane Katrina at R-111 were used as the principle basis for determining the calibration parameter settings. Measured changes at R-112 were also considered. A range of values for each calibration parameter was considered starting with the default settings. Values of the transport rate coefficient, K, and coefficient for the slope-dependent term, ε, were adjusted individually until reasonable agreement with the measured conditions above MLW was achieved. It was not possible to adjust model parameters to achieve perfect agreement. Variations in calibration parameters intended to correct the agreement at either R-111 or R-112 resulted in greater discrepancies for one location or the other. Therefore, the final calibration settings were selected as those which provided the best representation of measured conditions across the upper contours at both locations. The final values resulting from the model calibration are summarized in **Table 1**.

Figure 10 depicts the measured and predicted beach profile response to Hurricane Katrina at monuments R-111 and R-112 using the final calibration parameters. In the figure, beach profiles are depicted on the left hand side and differences between pre-storm and post-storm profile conditions for both measured and predicted profiles are depicted on the right hand side.

Table 1: Calibrated settings of SBEACH model control parameters for the site in southern Broward County, Florida and recommended default values.

Parameter	Units	Calibration Values	Default Values
Transport Rate Coefficient (K):	m^4/N	0.30 E-06	1.75 E-06
Coefficient for Slope-Dependent Term (ε):	m^2/s	0.005	0.002
Transport Rate Decay Coefficient Multiplier (λ):	m^-1	0.5	0.5
Landward Surf Zone Depth:	ft	1.0	1.0
Median Grain Size (d_{50}):	mm	0.40	0.40
Maximum Slope Prior to Avalanching:	degrees	30	30
Water Temp:	C	24	24

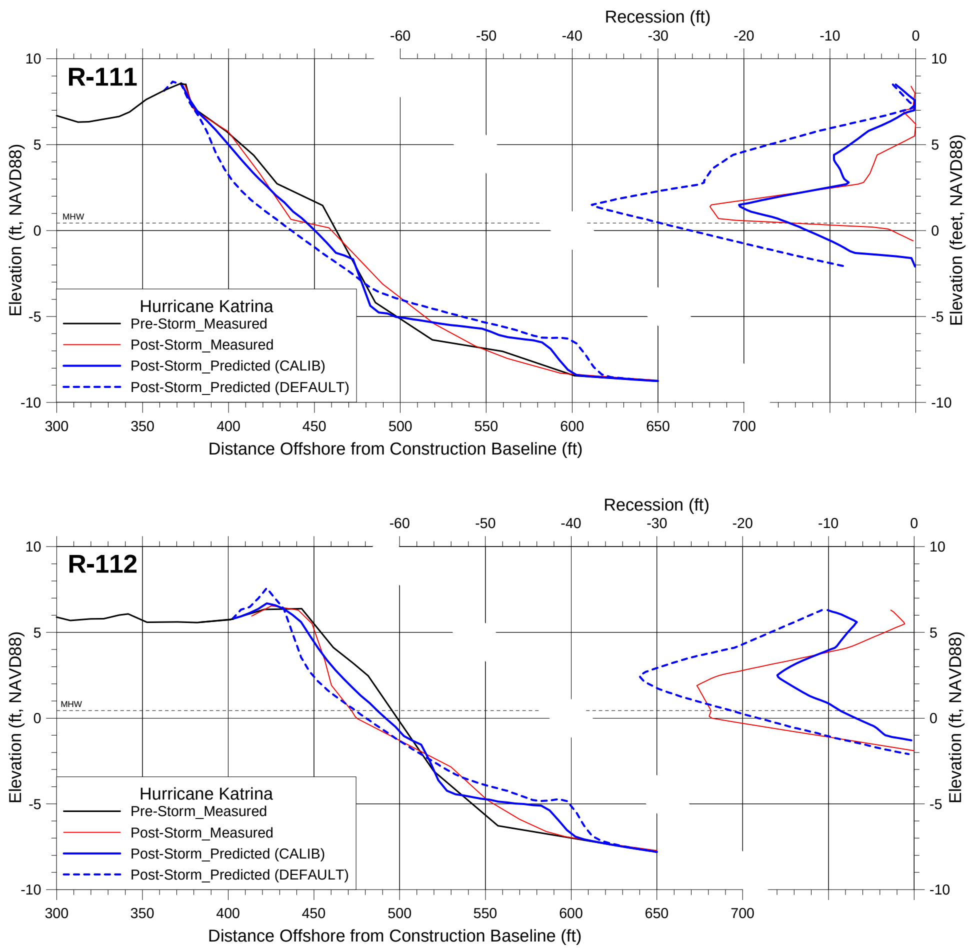

Figure 10: Comparison of measured and predicted beach response to Hurricane Dennis at R-111 and R-112 using calibration parameters developed in this investigation and default SBEACH parameters. Measured and predicted contour changes from the pre-strom condition are indicated on the righthand side of the graphic.

The predicted beach profile response at R-111 with the selected calibration settings agrees well with measured conditions across most of the upper areas of the beach profile (i.e., above about mean low water (MLW) or -2.1 ft, NAVD). The average difference between measured and predicted recession is less than 5 feet. Since Katrina passed directly over this study area, actual water levels at the site may have been slightly higher than those at Virginia Key. As expected, variation in model calibration parameters did not significantly improve agreement of predicted and measured beach change below the MLW elevation.

The SBEACH results for profile R-112, however, appear to slightly over-predict the recession in the uppermost contours and under-predict recession between about +3 and -1 ft NAVD. This is due primarily to the steepness of the foreshore slope in the measured post-storm profile. The model was unable to predict this slope and this overall shape of the post-storm beach profile at R-112. Nonetheless, the general magnitude of storm induced recession was predicted relatively well.

Verification. To verify the calibration parameter settings, simulations were run for documented Hurricane Dennis beach profile changes at R-111 and R-112. No adjustments were made to the calibrated model settings. **Figure 11** presents the pre-Dennis, measured post-Dennis, and predicted beach profile changes for R-111 and R-112. Beach profile changes represented by the pre- and post- Hurricane Dennis surveys were difficult to replicate completely with the SBEACH simulation as there was a net loss of sand from the beach. As mentioned previously, the SBEACH model operates under the basic assumption that profile change is produced solely by cross-shore processes with no net gain or loss of material.

Although sand volume was not conserved during the measured profile changes at these two locations, predictions made with the calibrated SBEACH model were generally representative of measured changes across the upper areas of the profile. Changes on the uppermost elevations at R-111 were under-predicted which could be partially related to differences in water level conditions between the study site and Virginia Key.

Comparison of Predictions with Calibration and Recommended Default Settings. In addition to the calibration parameter settings developed in this investigation, the default parameters recommended in the SBEACH user manuals are summarized in **Table 1**. In instances where data is not available to calibrate the SBEACH model, developers recommend using default settings (Rosati et al. 1993). The default settings were established from tests of the SBEACH model against well documented measured laboratory and proto-type beach profile changes. To-date, however, the default values have not been tested against well documented storm-induced beach change conditions in southeast Florida.

In the event no data were available for Broward County, or any other place for that matter, the default values would be the only reliable option for a model user. As such, it is of interest to investigate model predictions using the default values and how they compare to the results using the calibrated settings described herein.

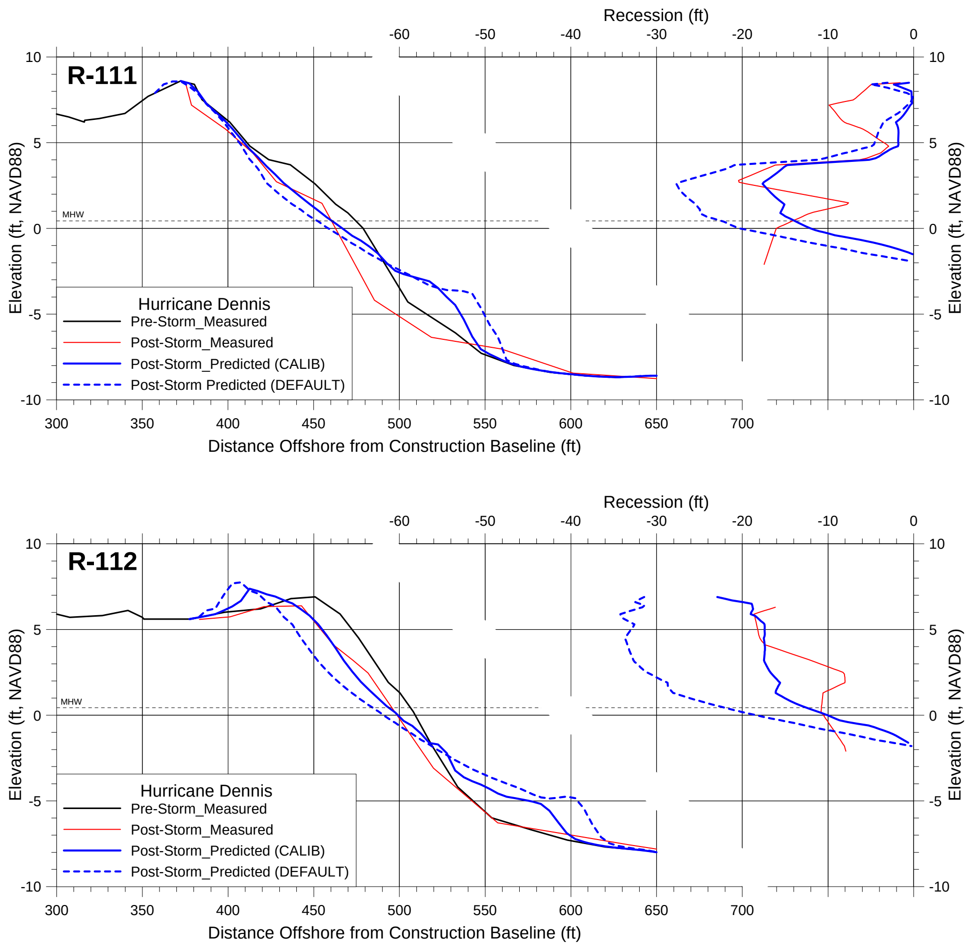

Figure 11: Comparison of measured and predicted beach response to Hurricane Dennis at R-111 and R-112 using calibration parameters developed in this investigation and default SBEACH parameters. Measured and predicted contour changes from the pre-strom condition are indicated on the righthand side of the graphic.

Figures 11 and **12** also present the SBEACH model predictions at R-111 and R-112 for Hurricanes Katrina and Dennis, respectively, using the recommended default parameter settings. Comparison of the predictions suggests that use of the default settings with the SBEACH model, specifically the sediment transport rate, *K*, would significantly over-predict beach profile response to Hurricanes Dennis and Katrina. In the most extreme example, use of the default values would over-predict upper beach recession at R-111 -- between about +2 and +5 ft, NAVD, for Hurricane Katrina of between 10 and 15 feet, which is about 100 percent more than the measured change and the change predicted with the calibrated values. With the default settings, the model over-predicts recession for all four datasets evaluated in this investigation. This suggests that calibration of the model is necessary at this location.

Summary and Conclusions

This paper describes a site-specific calibration of the cross-shore sediment transport model SBEACH for a Broward County, Florida beach. Prior to the calibration described herein, the SBEACH model had not been rigorously calibrated for a site in southeast Florida due to the absence of suitable storm-induced beach response data. The calibration was possible due to an opportunistic storm-induced beach profile change dataset collected during construction the Broward County Florida Federal Shore Protection Project Segment III between May 2005 and February 2006. Hurricanes Dennis and Katrina impacted the Broward County shoreline in the summer of 2005 and caused notable changes to areas of the Segment III shoreline that were captured by survey. Also, a hindcast of wave conditions offshore of Broward County was available for the USACE-Jacksonville District.

Use of beach profile change and hindcast wave condition data to calibrate the SBEACH model indicates that model calibration parameter settings differ from "recommended" default values. Most importantly, the calibrated value of the sediment transport rate, *K*, was found to be significantly lower than recommended values and falls just outside the lower end of the recommended range of values. Use of the default calibration parameter setting, specifically the sediment transport rate, *K*, was shown to significantly over-predict upper beach berm and dune recession for these two hurricane events. Accordingly, it is recommended that the storm-induced beach change and offshore wave information as well as the calibration results presented in this paper be considered for other applications of the SBEACH model in Broward County. Moreover, where site specific data are not available for model calibration in other areas of southeast Florida, the data and calibration results described herein should be considered.

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