

## South Padre Island Beach and Dune Assessment Project

### January 2021 Progress Update

#### Integral Project Managers:

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#### Summary Overview:

##### Subcontracts

- Work order for beach profile survey issued to Naismith
- Notice to Proceed from March 20 2021 issued to Naismith on 1/21/2021
- Work Order BIO-West – in progress

##### Task 1

- Lidar and other data requested GLO and BEG
- Additional beach profile survey data requested Naismith – received
- Beach profile data prioritized for analysis - completed
- Literature review, beach and dunes: historical response & state – in progress
- Initial analysis of wave data – completed

#### **Progress Narrative: Subcontracts**

Subcontracts were established with Naismith and BIO-West in January. Kick-off meetings were held with both subcontractors, and it was determined to move quickly with issuance of work order to Naismith Surveys, as the window for surveying onshore-offshore profiles is relatively short, March – June, due to weather conditions and tourism-related crowds. We ideally would like the project survey to capture the state of the beach in a somewhat “average” state: some recovery from winter cold front-related erosion but before tropical storm season. It was agreed that the survey would be conducted during the first optimal weather conditions following March 20, 2021. The BIO-West work order is currently in progress and does not have the time restrictions, as that work is not scheduled to begin until December 2021.

#### **Progress Narrative: Beach and Dune Data Compilation**

Forty-five beach profile data sets spanning twenty-seven years were downloaded and/or otherwise obtained for South Padre Island from sources such as Shiner Moseley, USACE, Texas A&M, HDR, and Naismith. The beach profiles are perpendicular to the orientation of the shoreline, and extend across the primary dune, the beach, and offshore to water depths of 30-40 ft. In order to stay within the scope of the project, we filtered the data that will be analyze to ten surveys, providing a time series of twenty-five years. These are in addition to the 2021 survey planned by Naismith. The time series is provided in Table 1 and data were chosen to include historical representation (1995), and then approximately every 3-4 years unless a major storm occurred, in which we attempted to select data sets that would capture before and after storm conditions of the beaches and dunes. We also attempted to select surveys from approximately the same time of year so seasonal changes were less likely to bias the data.

Table 1. Historical Beach Profile data obtained for analysis.

Survey Date	Surveyor
Feb-95	Conrad Blucher Institute
Jun-02	Texas A&M
Jun-05	Shiner + Texas A&M
Jun-06	HDR/Shiner Moseley/Frontier
Jul-07	Terrasond
Jul-08	Naismith
Aug-11	Naismith
Jul-14	Naismith
Dec-18	Naismith
May-20	Naismith

All beach profile datasets were formatted for consistency, QA/QC'd and imported into ArcGIS for geospatial analysis. In analyzing the data, it became evident that the original surveys were conducted on a set of lines spaced approximately 1000' (herein CBI profiles), located by a series of survey monuments, and repeated throughout the entire time series. However, in the earlier part of the time series, a new survey strategy was developed with more closely spaced profiles based on a linear distance from a starting point adjacent to Brazos Santiago Pass. Fortunately, the surveys also continued to include the CBI profiles, and this analysis will focus on those 25 profiles that are consistent throughout the time series (Figure 1). In addition, the 2021 Naismith survey will only be collected on the 25 CBI profiles.

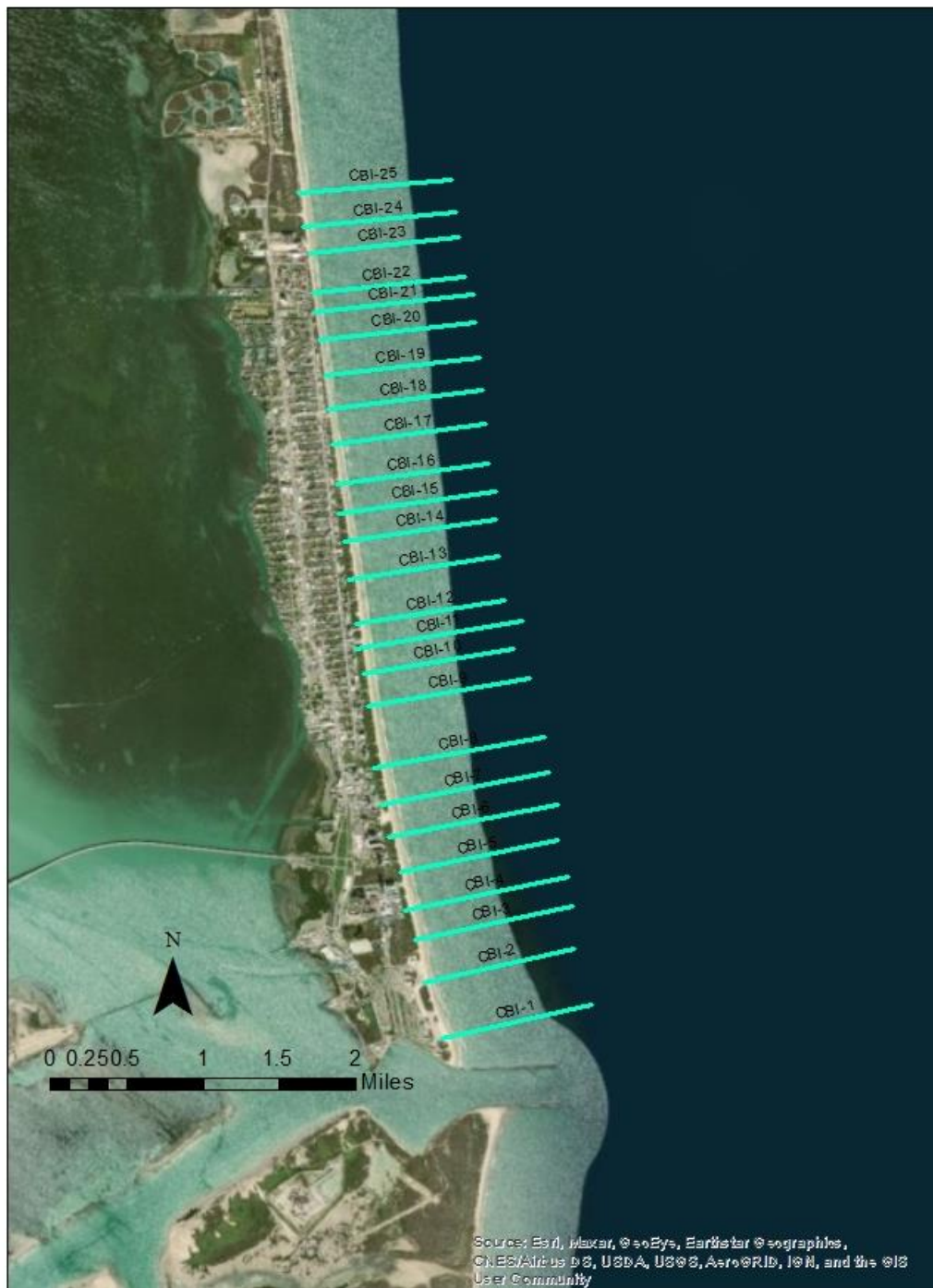


Figure 1. Location of 25 CBI profiles that will be analyzed for the SPI Beach and Dune Assessment project.

The data for the 10 chosen profile dates has also been imported into Excel spreadsheets to provide a visual representation of the time series of profiles through time. Analysis of the profiles is just beginning as of February 2021, and an example of a time series for one of the profiles is shown in Figure 2.

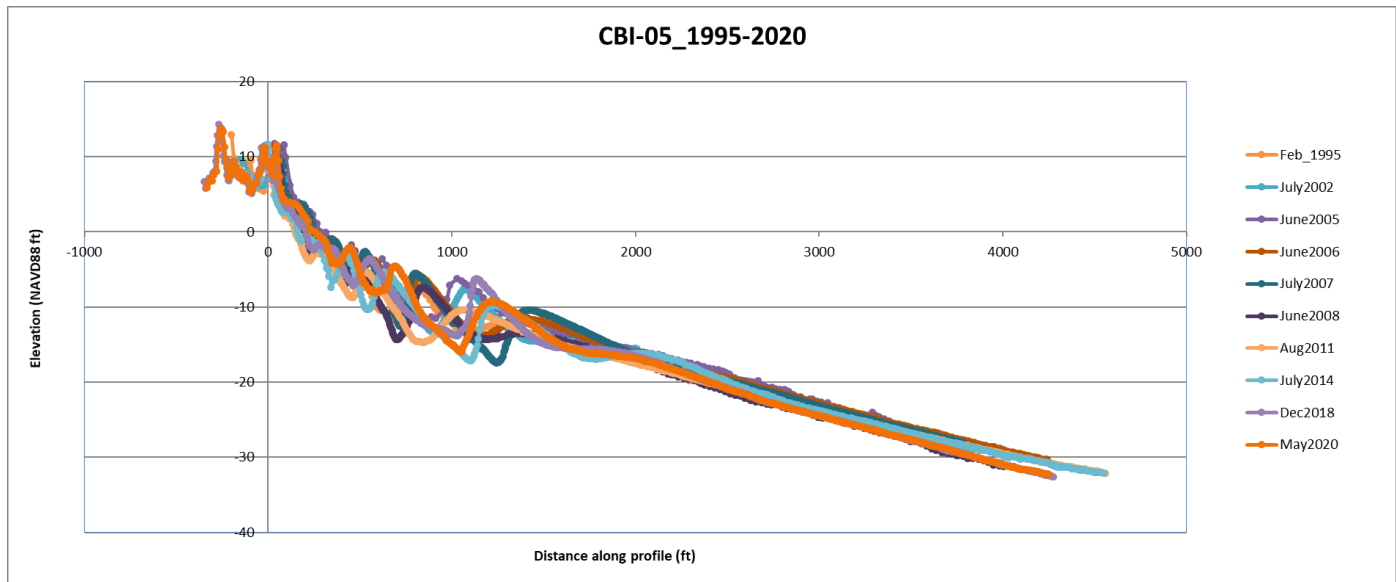


Figure 2. Example of a time series of 10 beach and dune profiles from survey line CBI-5, which can be referenced in the map in Figure 1.

### **Progress Narrative: Wave Data Analysis**

The wave data time series from the closest directional wave buoy to SPI, NDBC 42020, located 60 NM SSE of Corpus Christi was downloaded to begin the extreme value analysis and investigate wave conditions associated with significant changes to the beach and dunes. The significant wave height, wave period and wave directions are shown on Figure 3a and b. There are nine events during which significant wave heights at the offshore buoy exceeded 6 m (~20 ft), and the expectation is that these events caused measurable changes to the beaches and dunes at SPI.

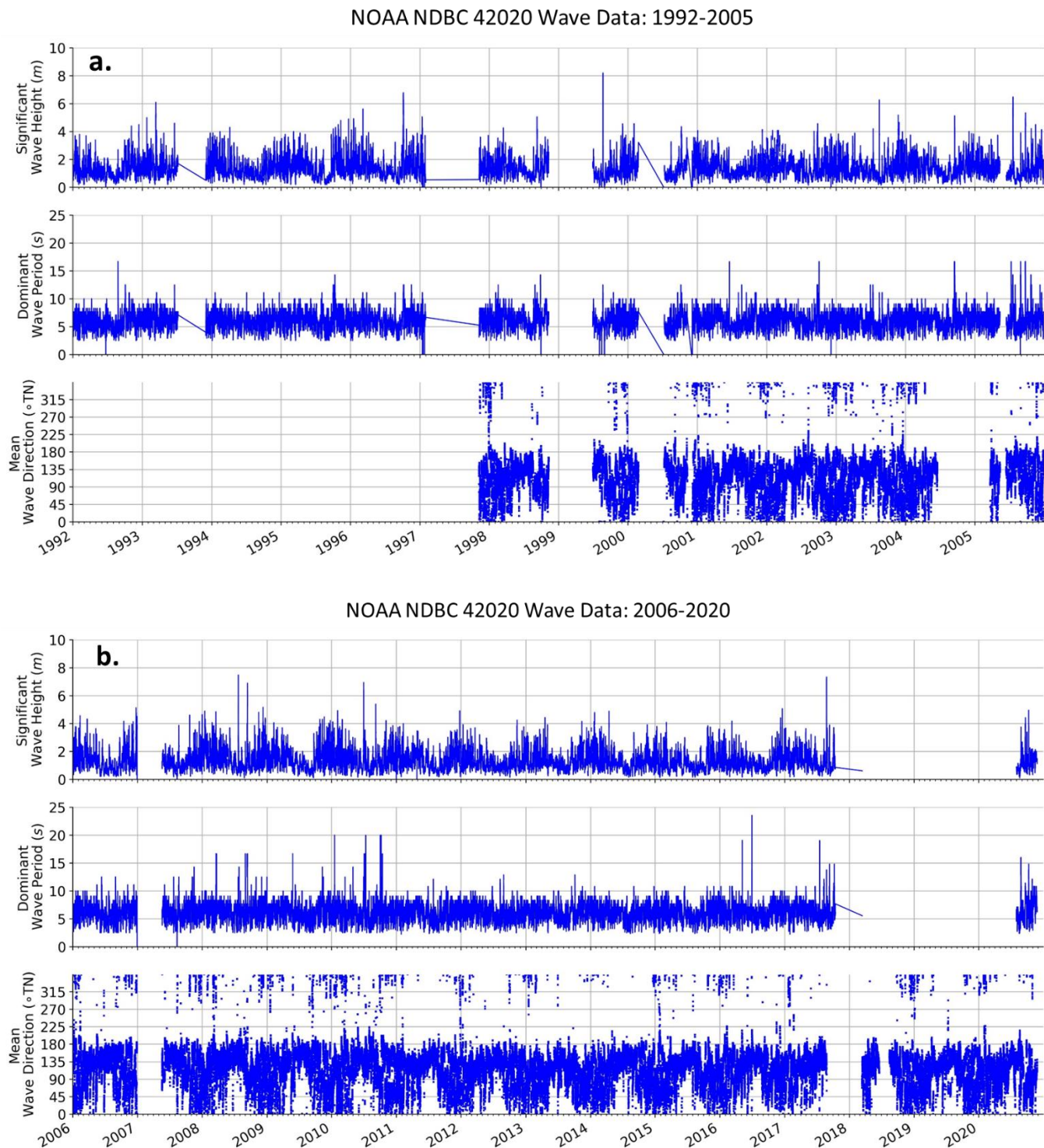


Figure 3. Wave data from the closest directional wave buoy to South Padre Island. The time series is separated into separate plots for 1992-2005 (a); and 2006-2020 (b) in order to better resolve individual events.