

TOWN OF DUCK

2019 SHORELINE & VOLUME MONITORING REPORT

I. INTRODUCTION

The Town of Duck is focused on a long-term shoreline management program that will serve to sustain the beaches that support a significant portion of their local economy, maintain the tax base of the Town, retain existing recreational resources, and protect existing natural resources. In order to accomplish these stated goals, the Town is taking steps to maintain and monitor its oceanfront beach and dune to a configuration that provides a reasonable level of storm damage reduction to public and private development and mitigates long-term erosion impacts.

As part of the long-term shoreline management program, the Town of Duck, in cooperation with Dare County, constructed a large beach nourishment project in 2017 that placed approximately 1.26 million cy of sand along approximately 1.6 miles of the Town's shoreline. The project extends from profile station D-10 in the north, which is located near 140 Skimmer Way, to station D-19 in the south, which is located at the south property line of 137 Spindrift Lane (northern boundary of the USACE FRF property). The beach fill design for the Town of Duck included a 20-foot wide dune at elevation +20.0 feet NAVD fronted by a variable width berm at elevation +6.0 feet NAVD.

The Town has implemented a beach monitoring program to track both the performance of the beach fill project constructed in 2017 and the overall health of the beach along the entire Town. This monitoring report describes shoreline changes and volume changes measured along the Town's oceanfront shoreline as well as the results of a detailed nearshore bathymetric survey. The monitoring report also includes the results of an updated storm damage vulnerability analysis using the latest May 2019 beach profile conditions.

The shoreline change analysis evaluated changes between profile surveys conducted by APTIM in September 2013, May 2015, December 2017, June 2018, and May 2019. Volumetric changes were evaluated by comparing beach profile surveys collected in September 2013, May 2015, December 2017, June 2018, and May 2019. A nearshore bathymetric survey was conducted in May 2019 to determine the presence or absence of deep depressions or troughs and shore oblique sandbars that have been observed offshore of the Kitty Hawk and Kill Devil Hills projects. The nearshore survey was designed to cover primarily the beach nourishment project area and extended from baseline station D-08 (south end of Blue Heron Lane) to baseline station D-19 (the northern boundary of the USACE FRF property).

II. PROJECT LOCATION

The Town of Duck is located on the Outer Banks of North Carolina roughly 27 miles south-southeast of the North Carolina and Virginia border. The Town encompasses 5.5 square miles extending along 5.9 miles of Atlantic Ocean shoreline from the Dare County and Currituck County line south-southeast to the Town of Southern Shores. The USACE FRF is located within the Town limits near profile station D-21 and is approximately 2.3 miles north of the southern limit and 3.6 miles south of the northern limit. A Location Map is provided in Figure 1. This location map also shows the limits of the nourishment project built along a 1.6-mile section of the Town's oceanfront

shoreline between May 23 and June 29, 2017, and the two Outer Continental Shelf (OCS) borrow areas located in Federal waters offshore of Dare County.

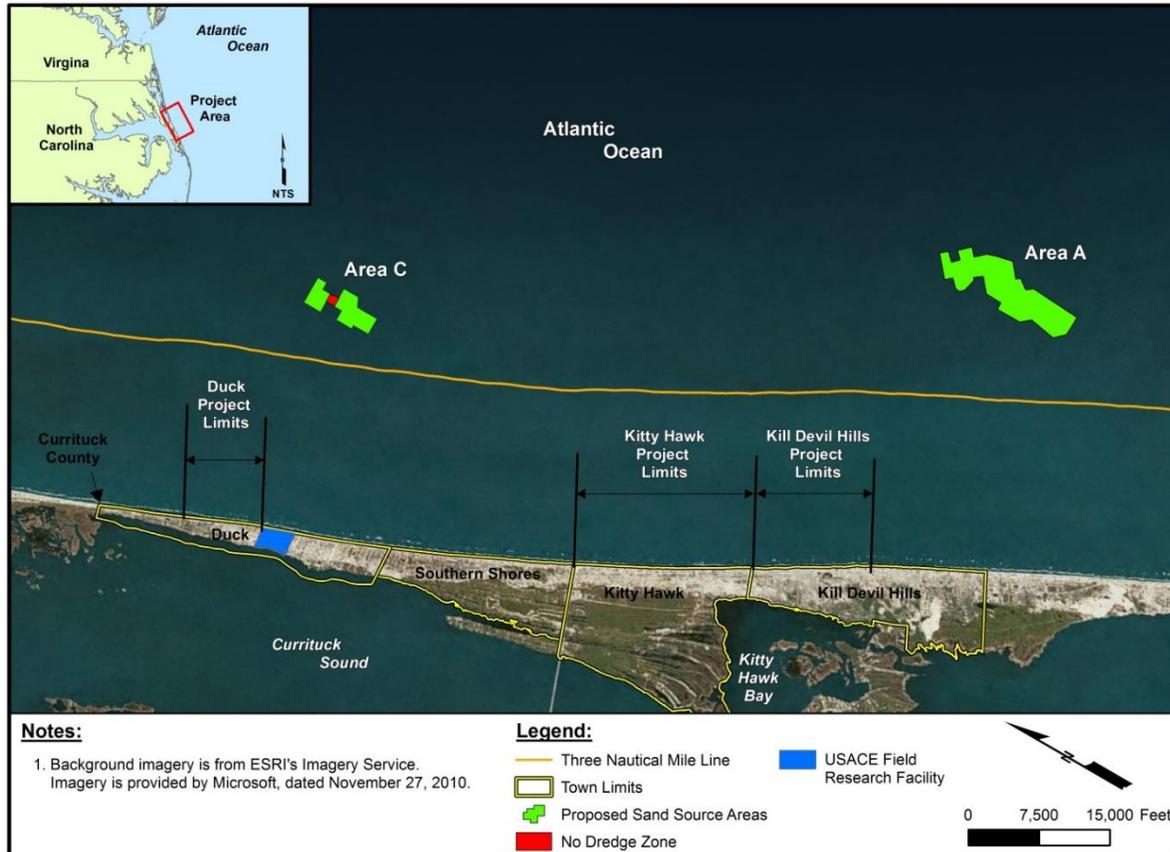


Figure 1. Project Location Map.

For the purpose of monitoring, this report has separated the oceanfront beach of Duck into three areas: namely, the Project Area and the areas North of the Project and South of the Project. These areas are depicted on Figure 2. The Project Area includes the beach between the northern FRF property line, located near station D-19, through station D-10, which is near the northern end of Skimmer Way. The section referred to as North of the Project extends from station D-10 (northern end of Skimmer Way) north to the Duck town limits (station D-01). The area designated South of the Project extends from station D-19 south to D-34 and includes the shoreline along the USACE FRF property. Profile D-34 is located near the Duck town boundary with the Town of Southern Shores. Changes on the profiles at stations PI-17 and PI-18 in Pine Island and SS-01 and SS-02 in the Town Southern Shores will be addressed separately in the shoreline and volume changes measured outside of the project area.

The map shown in Figure 2, also depicts the stations at which beach profile surveys were conducted, and the bathymetric survey of the nearshore area. The bathymetric survey of the nearshore area was conducted between station D-08 (south end of Blue Heron Lane) and station D-19 (the northern boundary of the USACE FRF property). The purpose of the survey was to determine whether features similar to those observed offshore of the Kitty Hawk and Kill Devil Hills were present in the vicinity of the Duck beach nourishment project area.



Figure 2. Detailed project area map showing the Project Area, North Monitoring Area, South Monitoring and the location of the monitoring profiles.