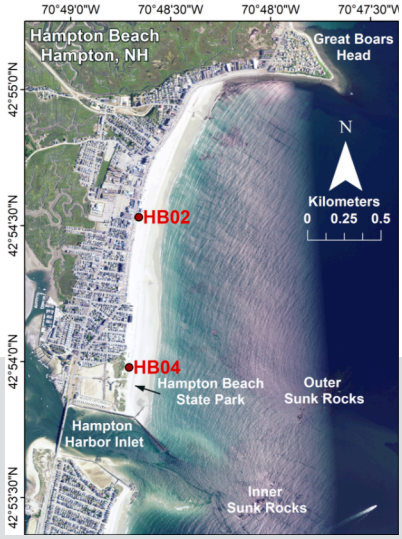
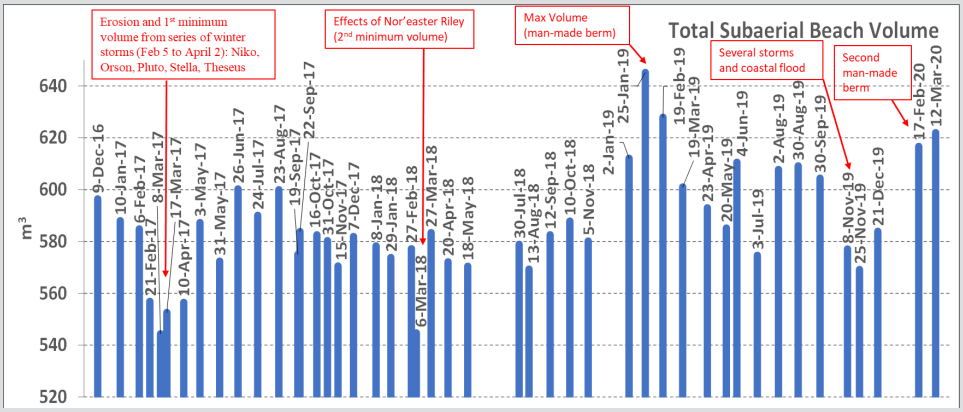
# NH Volunteer Beach Profiling Report 2020

## Hampton Beach, Hampton, NH

# HB 02 Overview

Profiling station HB02 has a wide and flat upper beach and a distinct low tide terrace (lower beach). HB02 also has a large volume of sand compared to other beaches in NH. The beach in the business district of Hampton Beach is backed by a long cement seawall for protection from storm surges; however, this area is nevertheless frequently flooded and overwashed with sand during storms. Large changes in beach profiles are caused primarily by storms and recovery, but changes can also be attributed to maintenance efforts including beach raking and reshaping during summer.



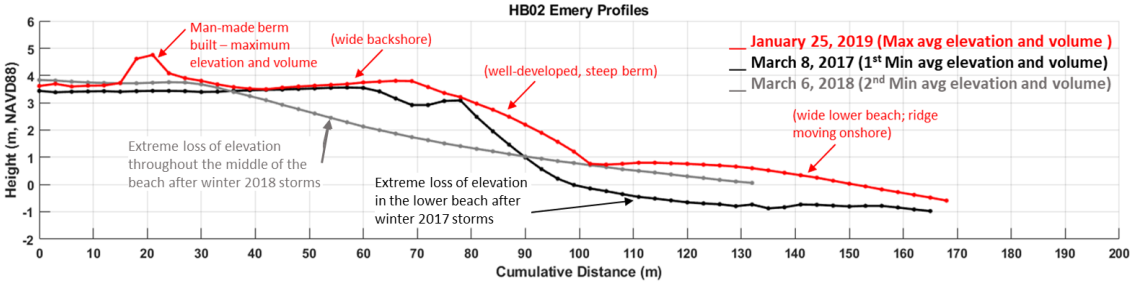




## Storm effects and recovery

: In the figure to the left, each blue column represents the estimated volume of sand above approximately mean low water along a 1-meter-wide swath of beach elevation profile for each measurement date. Major fluctuations in volume at HB02 were primarily related to storms. A series of winter storms in Feb and Mar 2017 caused significant erosion; beach recovery occurred in the following spring. Similarly, a series of severe nor'easters in March 2018 caused major erosion of the beach, with moderate recovery through the spring and summer. However, in winter 2019, the beach increased in elevation and volume. Several storms in fall 2019 also caused erosion, but the beach once again recovered late winter and early spring. During the study period, Hampton Beach was significantly eroded by winter storms, but tended to recover in spring and summer. However, this is a general trend and erosion or accretion can occur in any season as seen in winter 2019.

## Maximum and minimum beach profiles

The figure below is a beach elevation profile that extends from the seawall to the low tide line at profiling station HB02. When comparing the maximum elevation profile from the study period (Jan 2019) with the post-storm minimum profiles from Mar 2017 and 2018, we see different patterns but extreme losses of elevation in both cases. The Jan 2019 profile has the highest average elevation (the berm close to the seawall was man-made for storm protection). Comparatively, the post-storm beach in Mar 2017 showed a very eroded lower beach. Alternatively, the post-storm beach in Mar 2018 showed a flattened mid-beach that began ~40 m closer to the seawall than the Jan 2019 profile. The differences in patterns show the dynamic sediment movement at station HB02.

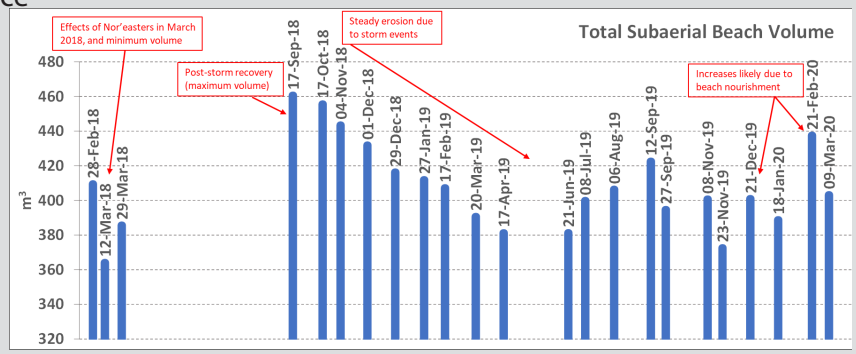


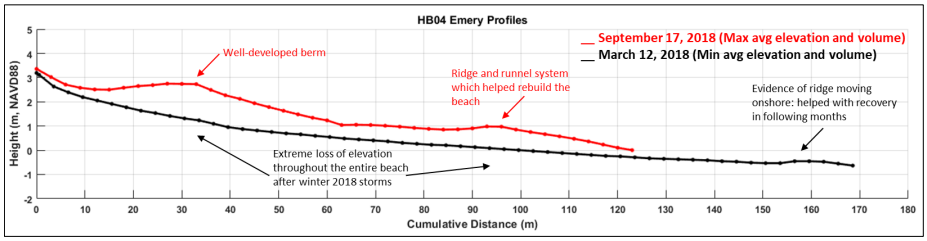
# HB 04 Overview

The station at the southern end of Hampton Beach (HB04) or Hampton Beach State Park is generally wider and relatively flat in contrast to the mid and northern parts of Hampton Beach. HB04 consists of a large dune system and was recently nourished with sediment from Hampton-Seabrook Harbor in Nov 2019. After stormy periods, the sediments are primarily sandy with scattered pebbles. Unfortunately, some data gaps exist in the HB04 profile record, but trends are still generally consistent with HB02 and with the storm record.

A series of nor'easters in Mar 2018 caused significant erosion along the length of an already low and flat beach. Evidence of initial recovery could be seen in the profile taken in late Mar, but due to a gap in the data record between Apr and Sep, the timing of recovery is unknown. By mid-Sep, the beach had regained a lot of the sediment volume lost during the Mar storms. A very consistent decline in volume followed, with storms and nor'easters causing continuous erosion through summer 2019. Several periods of erosion and accretion occurred in the rest of 2019 and into early 2020, but the beach at HB04 never regained the volume seen in fall 2018 during this study. In Nov 2019, the beach just south of HB04 was nourished with sand dredged from Hampton-Seabrook Harbor (approx. 32,000 yds3). An increase in volume was seen in the Dec 2019 and Feb 2020 profiles, likely a result of the nourishment, but the volumes decreased once again in Mar.

## Changes in sand volume at NB02




## Max and min beach profiles

The difference between the maximum and minimum beach elevation profiles at HB04 is significant and reflects large changes in erosion and recovery, especially when considering how flat the beach often is at this location. Comparing the minimum (Mar 12, 2018) with the maximum average elevation profile (Sep 17, 2018) shows an difference of ~0.7 m. At the lower elevation, the entire intertidal beach would likely be inundated leading to beach and dune erosion as observed following the series of severe winter storms in Mar 2018.

**WHAT'S NEXT?**

## Hampton Beach management options

- Restore or construct living shorelines, or nature-based approaches to shoreline stabilization
- Construct raised walkways to allow sand movement and reconnect fragmented dunes
- Monitor sand replenishment (nourishment) projects to evaluate the movement of sand and effectiveness of the project
- Allow seaweed deposited by tides to remain to aid in building sand on the beach
- Conduct outreach on the importance of beaches and dunes in protecting the coast
- Explore the ecological history of the area to understand what landforms previously existed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