

# VISUALIZING INTERANNUAL TO DECADAL COASTAL VARIABILITY NEAR VULNERABLE NASA INFRASTRUCTURE UTILIZING VIDEOS PRODUCED FROM REMOTELY SENSED DATA AT CAPE CANAVERAL, FL AND WALLOPS ISLAND, VA

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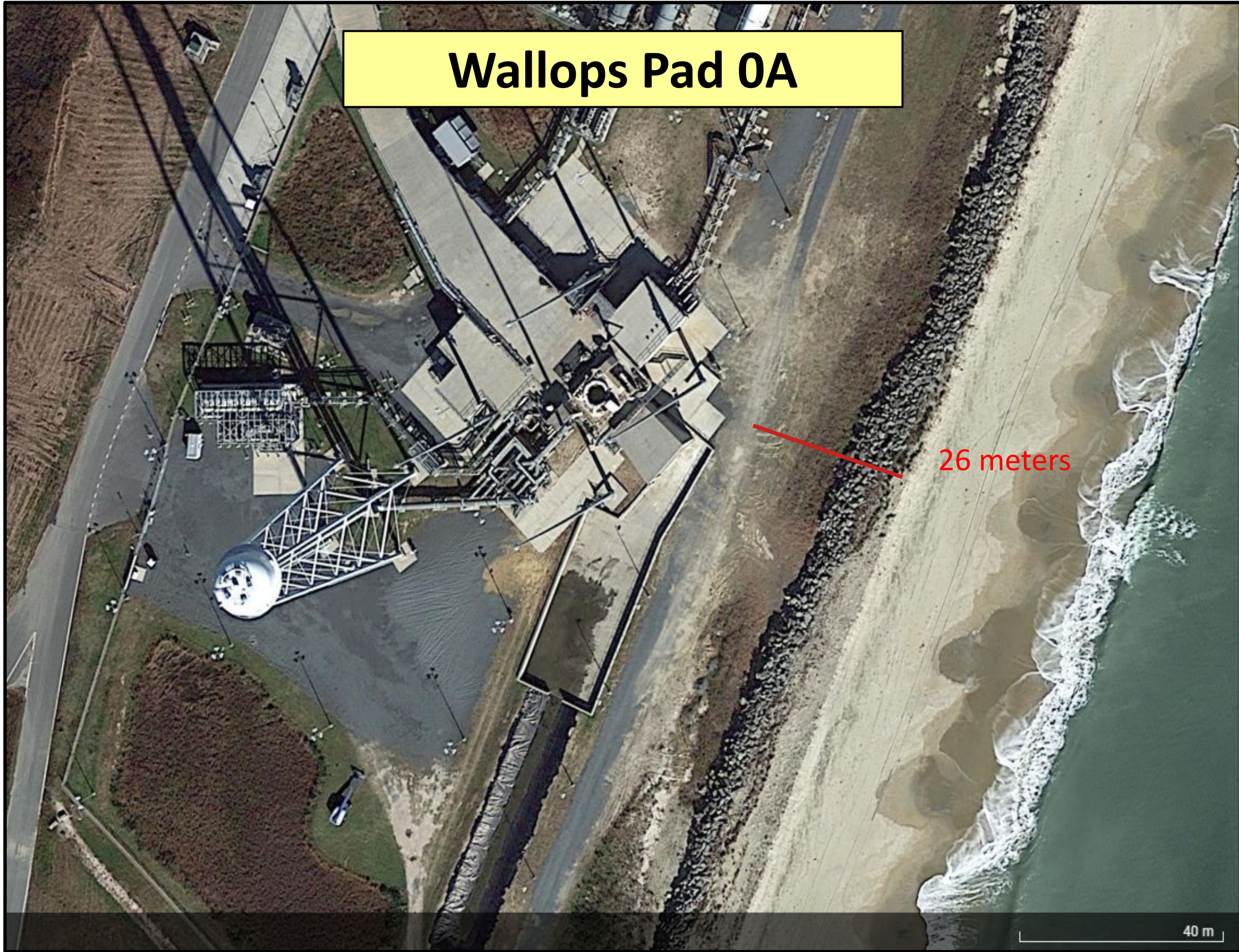
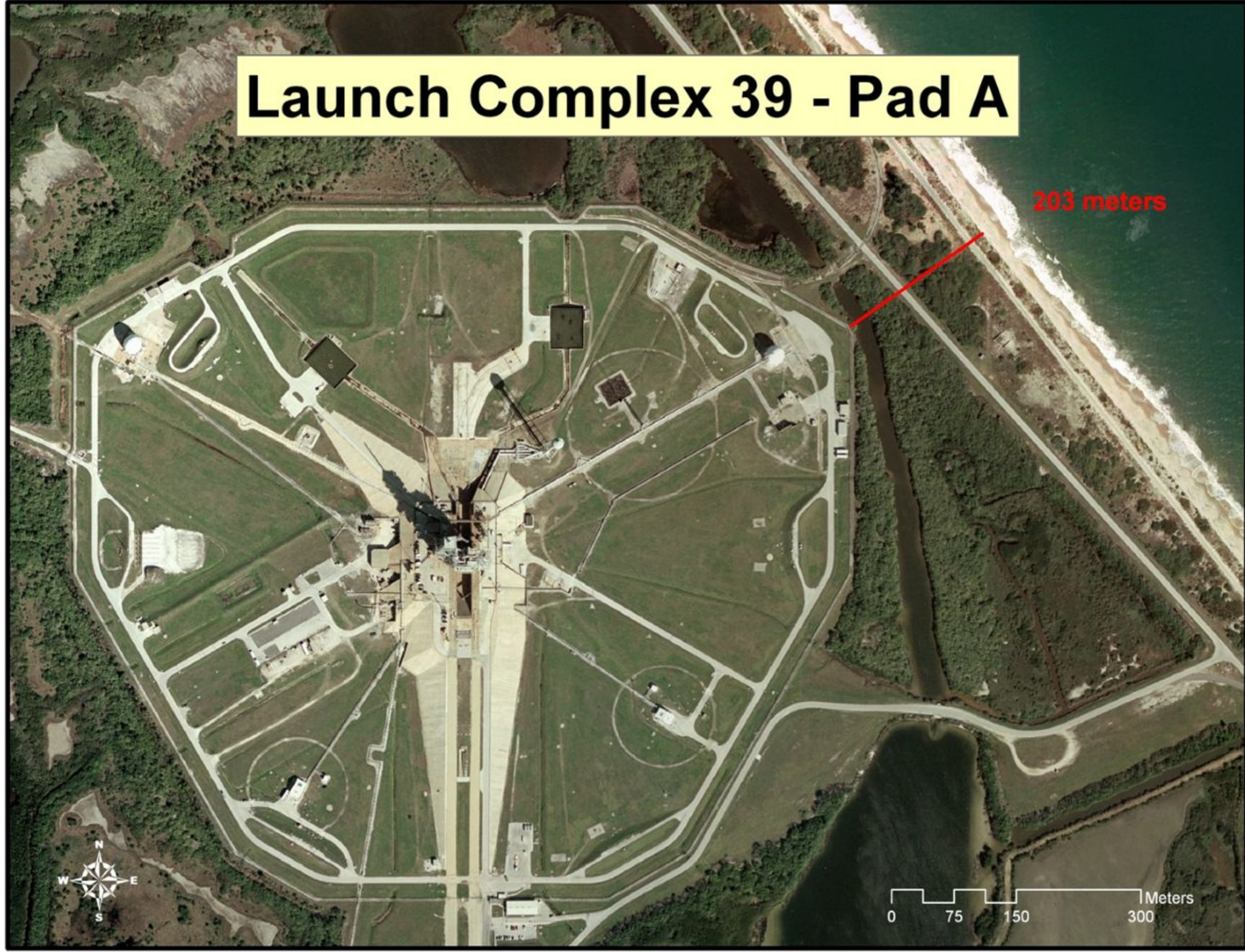
## Abstract

Coastlines represent an interesting convolution of intense anthropogenic development superimposed onto morphologies that are among the most dynamic on the planet. Two of NASA's critical facilities are particularly vulnerable to coastal change, Kennedy Space Center, Cape Canaveral, FL and Wallops Flight Facility, Wallops Island, VA. With continuing global sea level rise and increasing storminess coastal vulnerabilities at these facilities will only be exacerbated. These launch centers a subject to multiple coastal hazards including, flooding, episodic coastal erosion, saltwater intrusion, and coastal morphological changes. Although rapid change is readily observed during large storms or hurricanes, long term annual to decadal coastal change is much harder to visualize and conceptualize. The authors use videos developed from remotely sensed data to enhance conceptualization of coastal processes for planning and management stakeholders at these NASA facilities.

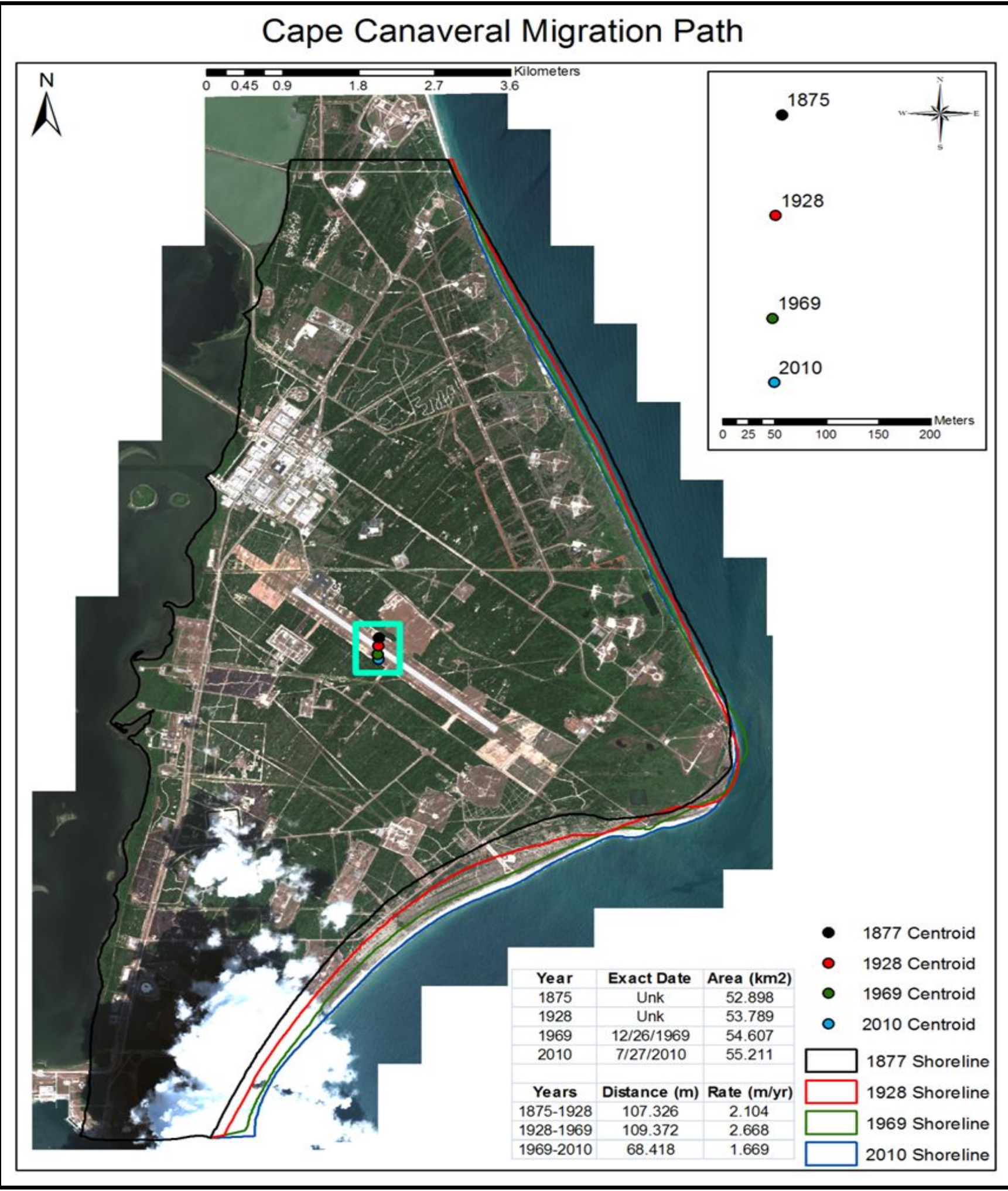
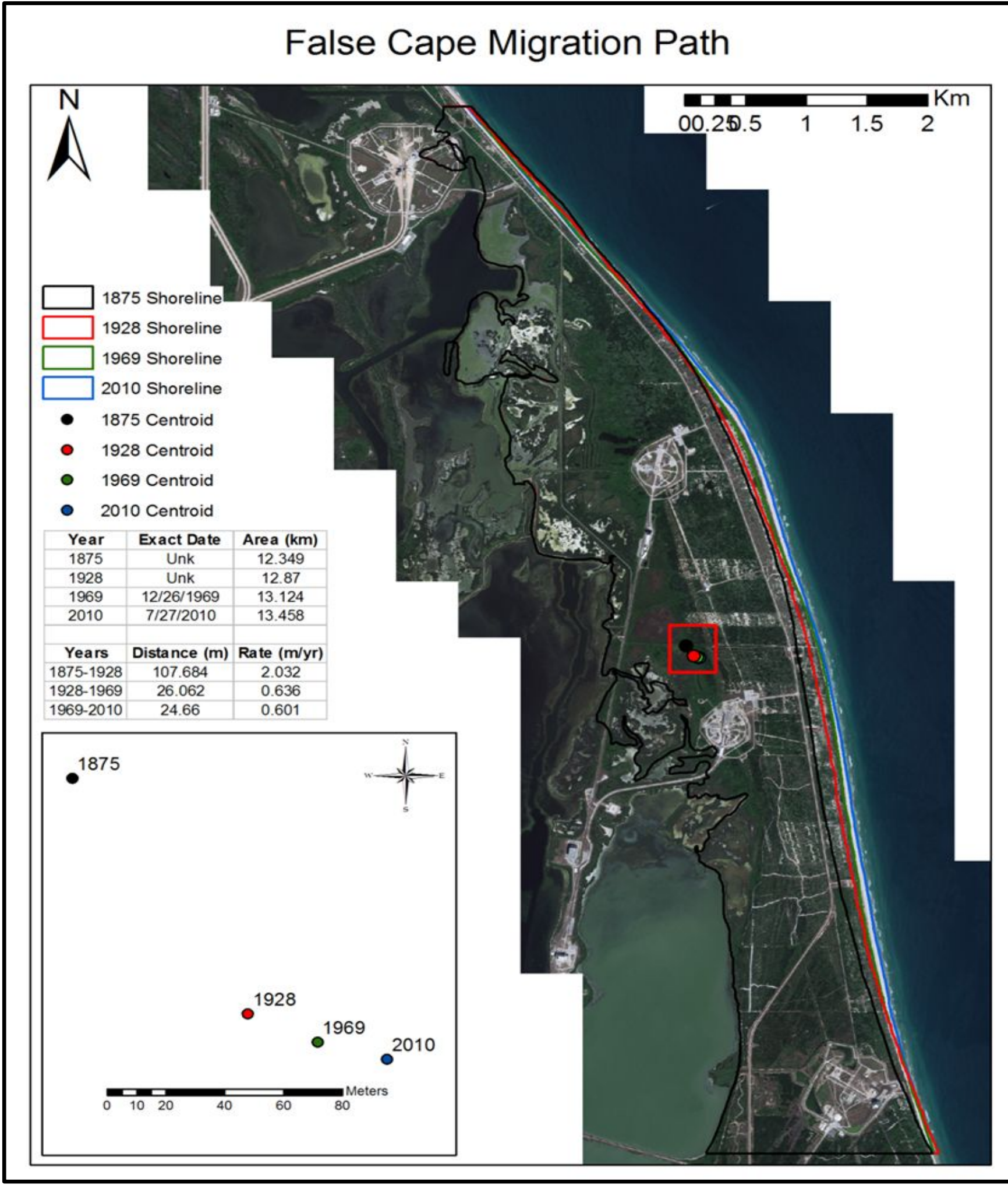
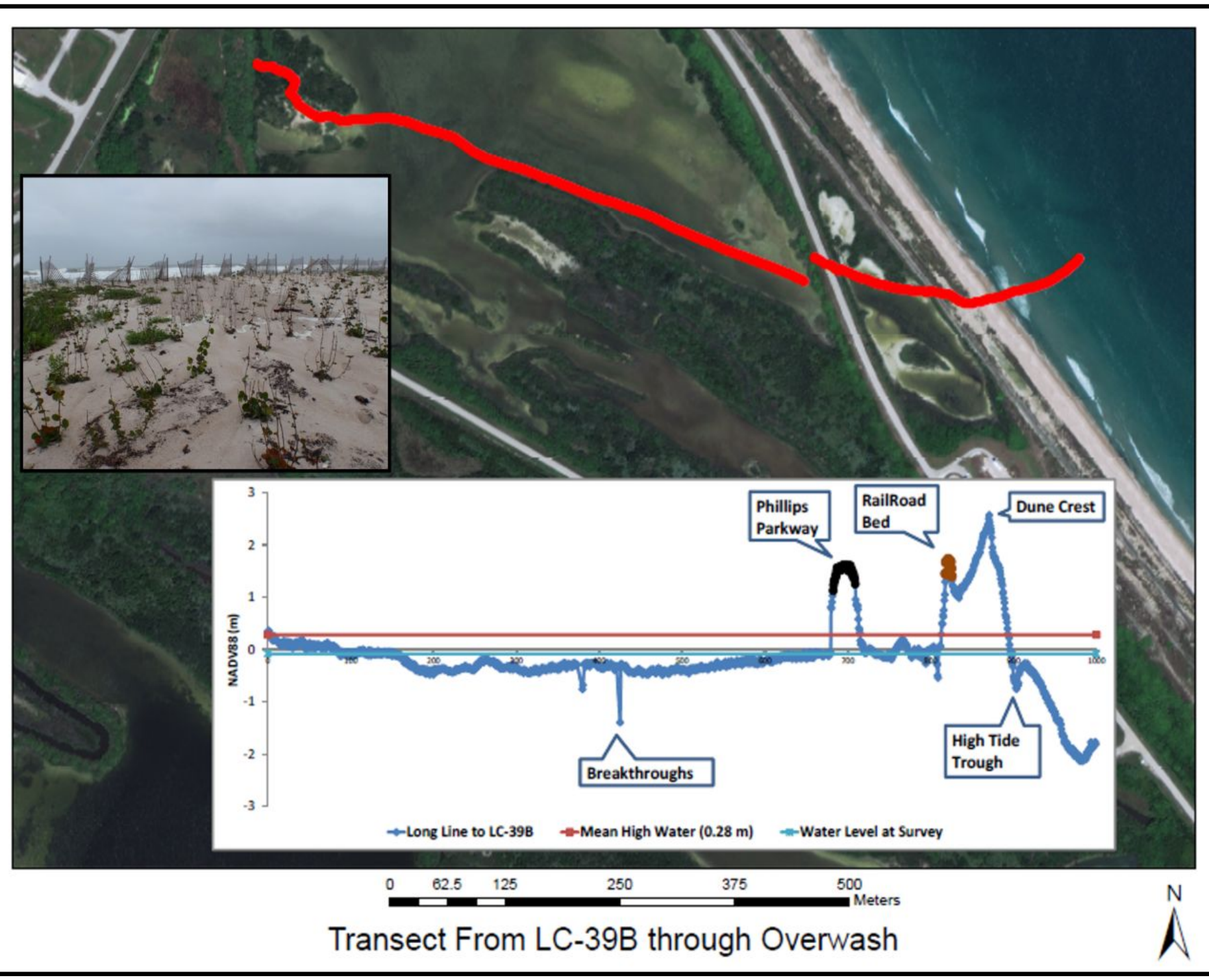
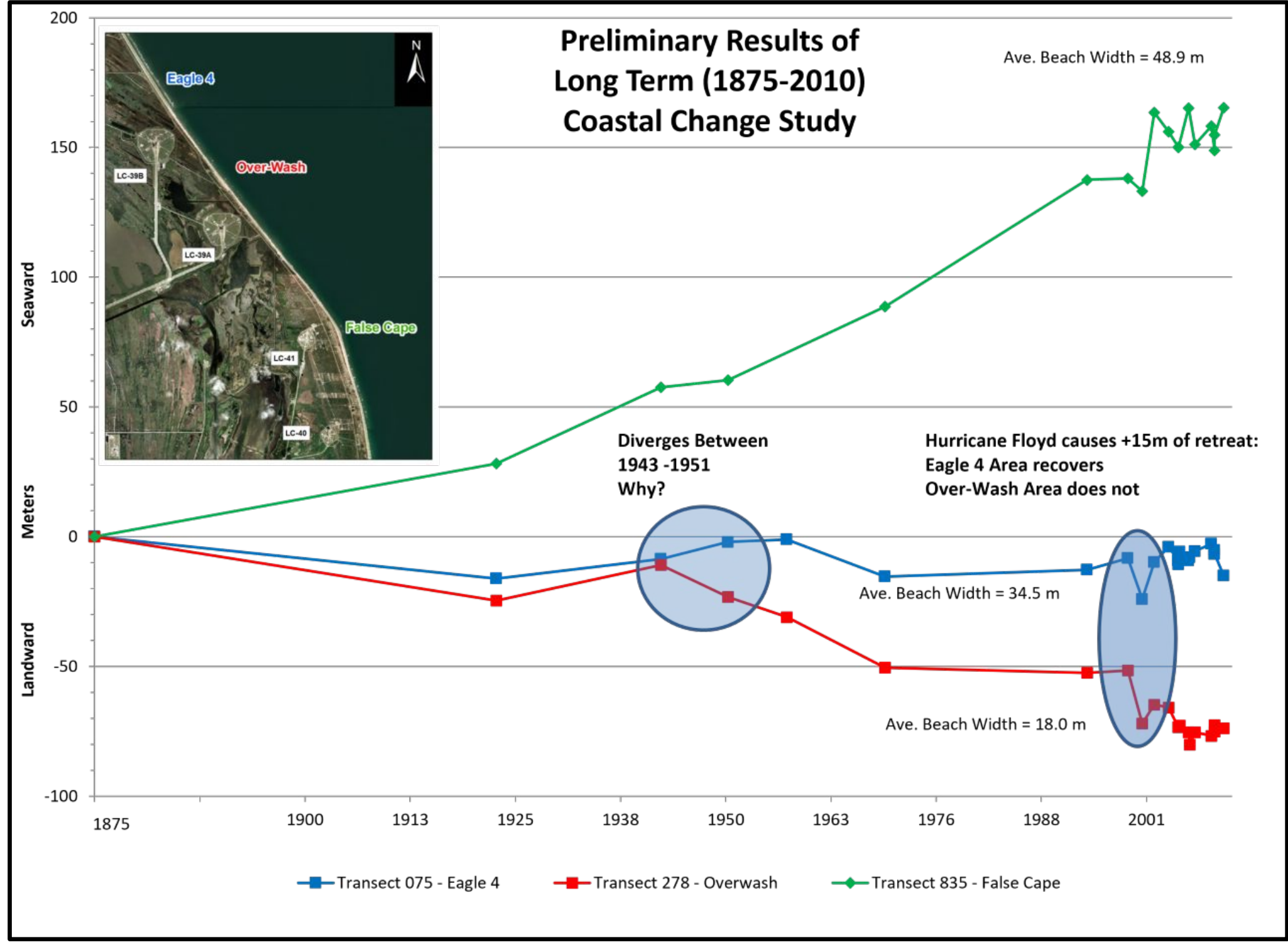
Near or better than decadal coastal imagery has been available through high altitude photogrammetry efforts since the 1930's. A significant amount of additional imagery was acquired through other federal, state, and local government agencies such as the USGS, NOAA, State DOT, and local Assessors Offices providing annual and inter annual images at spatial resolutions of 10cm – 1m. With the advent of GIS systems these images could be rectified and then layered to better understand change through time using a multitude of visual base shoreline proxies.

With the increased awareness and use of video editing software the rectified images can be used to create videos. These videos can then be used to conceptualize a multitude of coastal processes including: performance of coastal restoration efforts, rapid change in sedimentation rates due to storms or other geomorphic processes, loss of protective barrier islands as sea level rises and lower sedimentation rates occur. The videos are also useful as a tool for verification and comparison to coastal models and provide an easy to understand educational resource for stakeholder engagement at these NASA centers, and other vulnerable coastal populations.

## Impacts to Critical Infrastructure

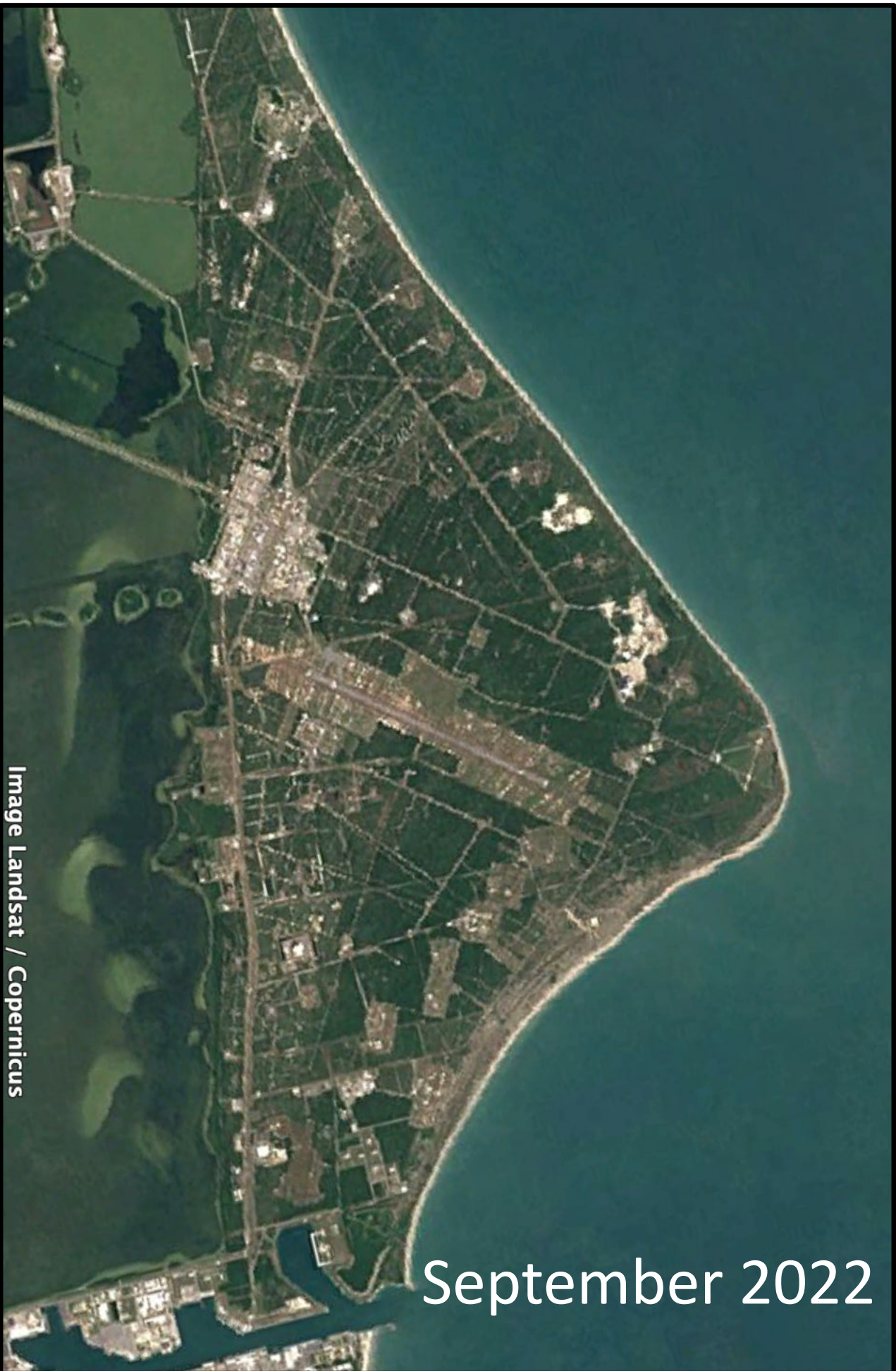
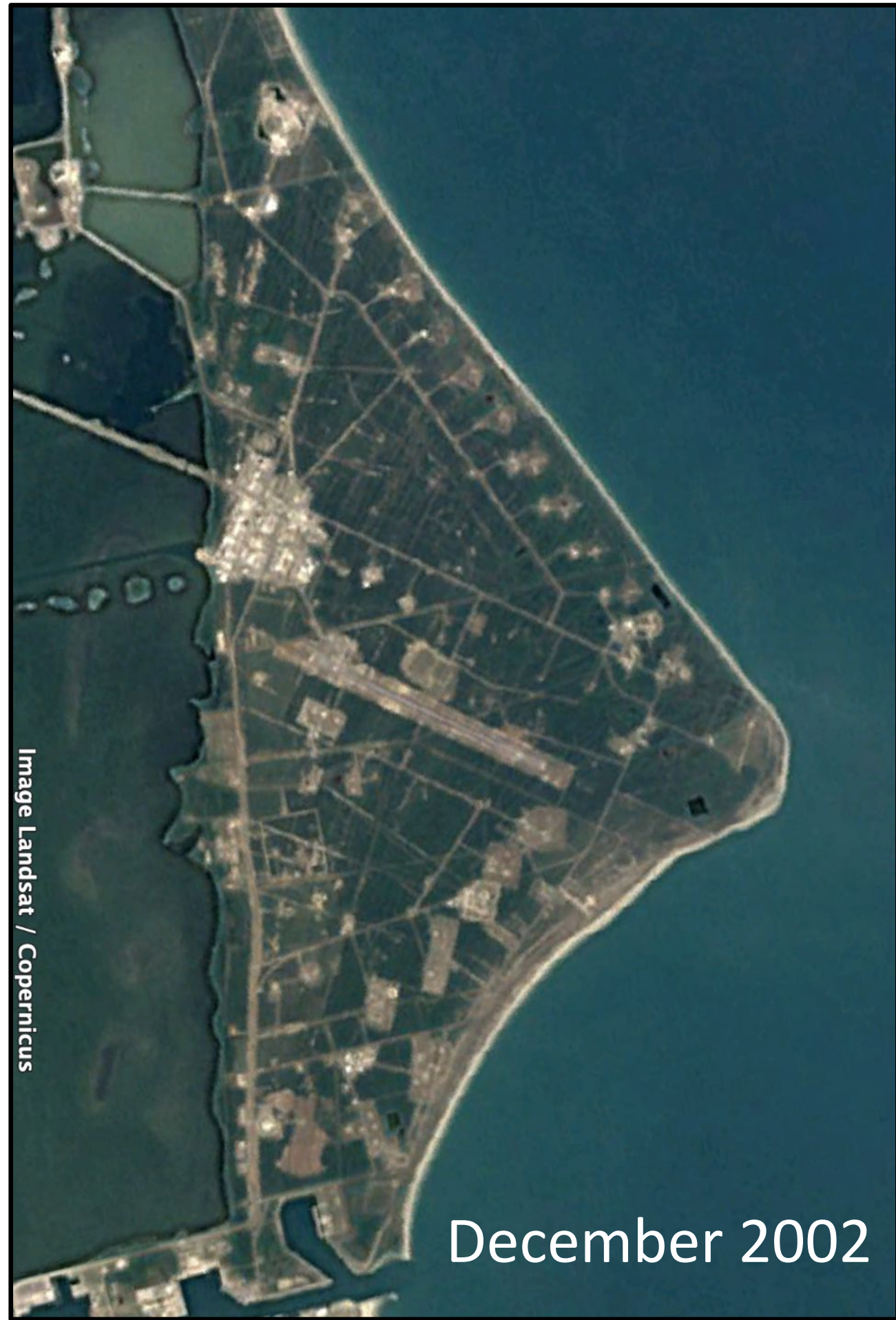


## Early Assessment and Decisions and the Long-Term Consequences

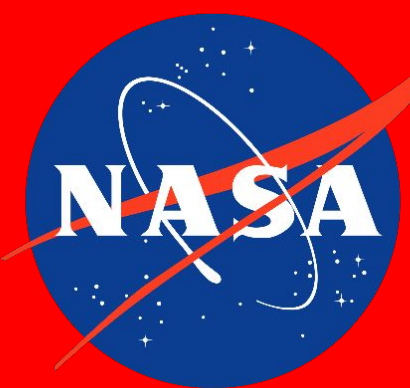


## Preliminary Video Frames

In the video sand “waves can be seen migrating along and around the tip of the cape. Sediment transport is from the N to the S and follows the pattern of the cape. The video also shows that sand piles up along the jetty to the south, but during high wave events (>3m) much of the sediment bypasses and is moved offshore along the cape shoals. The preliminary test video of the cape provides easy to view evidence of how cape sediments are moving and how much sediment is moving. The video also provides visual evidence of how the sediments from the cape and cape shoals systems interact with each other.



# Wallops Island Coastal Vulnerability



## Early Assessment and Decisions and the Long-Term Consequences



## Preliminary Video Frames – Wallops Island

