Geospatial analysis to detect changes of Florida Bay islands due to Hurricane Irma

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Hurricane Irma

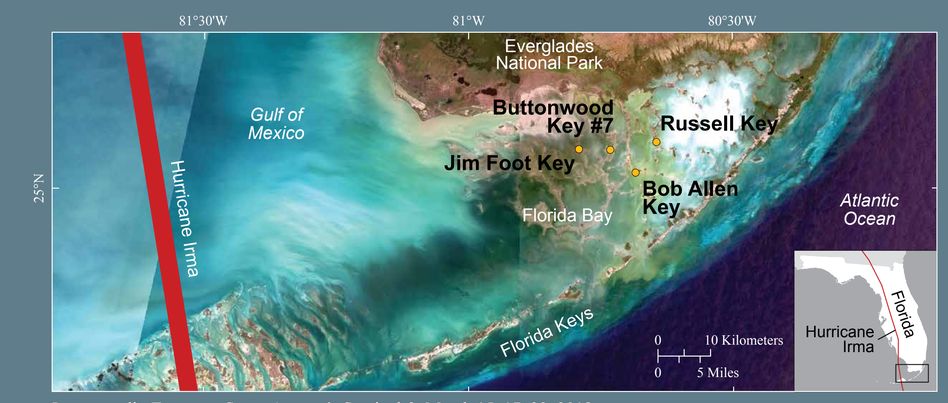


Image credit: European Space Agency's Sentinel-2, March 15, 17, 22, 2018

Hurricane Irma hit south Florida as a category 4 storm on September 10, 2017, significantly impacting Florida Bay, part of Everglades National Park. Cores had previously been collected (in 2014) from four islands in Florida Bay, the locations of which are shown on the map above, to gain insight into sea-level rise and island change, development, and resilience.

Satellite image analysis

To assess the geospatial impact of Hurricane Irma on the vegetated area of the four islands, high-resolution satellite imagery was obtained for August 13, 2017 and July 13, 2018. These images were manually interpreted within GIS to create digitized polygons of the vegetated areas of the islands. The polygons from the August 2017 imagery were compared with the ones from the July 2018 imagery to determine visible changes to the islands during that time. The images to the right depict changes to the islands of Jim Foot and Buttonwood #7 pre- and post Hurricane Irma with red circles and arrows.

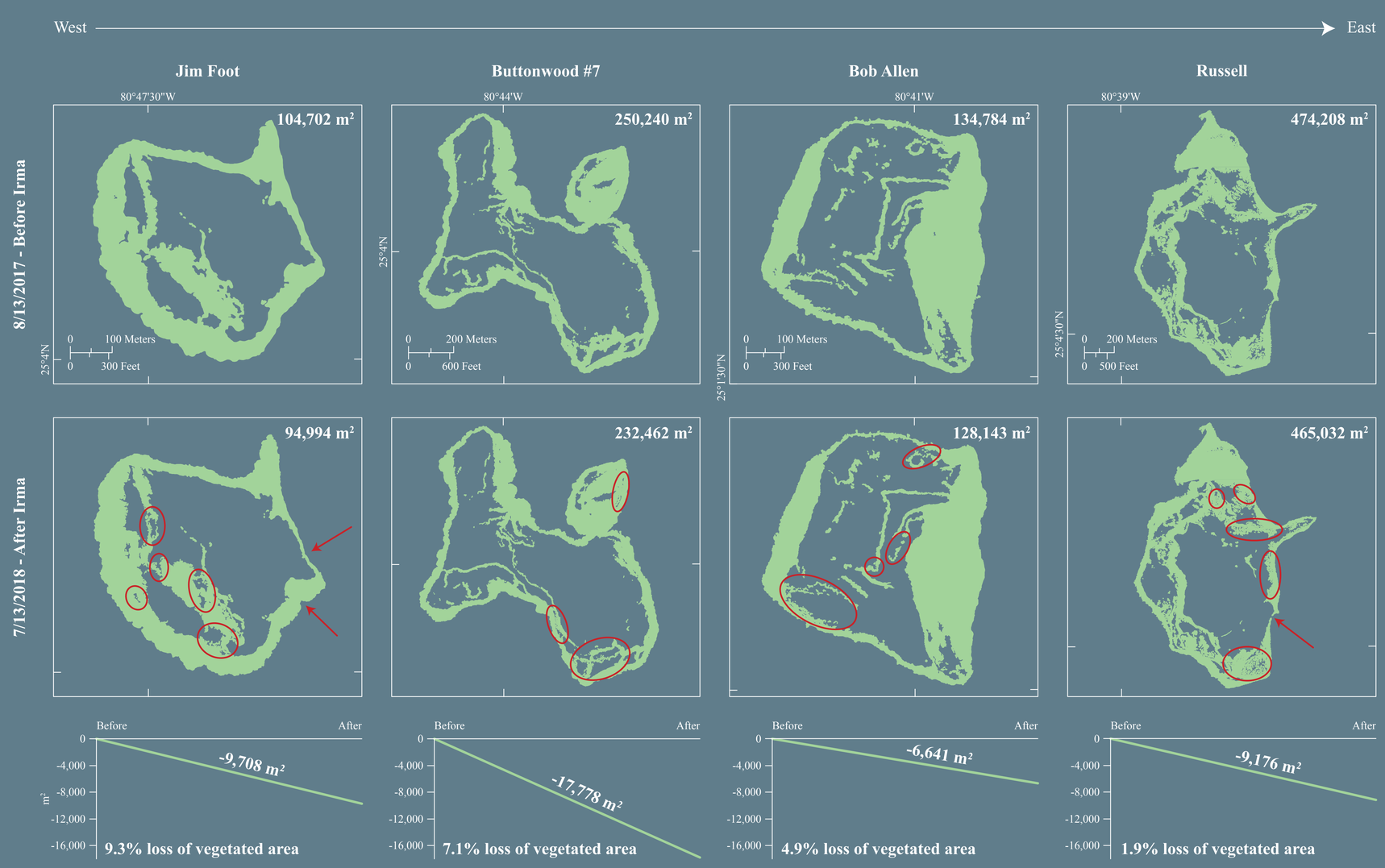
Image credit: DigitalGlobe's WorldView-2, August 13, 2017

Image credit: DigitalGlobe's WorldView-2, July 13, 2018

Pre- and post Hurricane Irma comparison

Image credit: European Space Agency's Sentinel-2, March 22, 2018

The analysis indicates that all four of the islands decreased in vegetated area following Irma. Jim Foot decreased by approximately 9.3%, Buttonwood #7 by 7.1%, Bob Allen by 4.9%, and Russell by 1.9%. Most of these changes occurred to the interiors of the islands, however Jim Foot and Russell experienced a loss of vegetated perimeter on their eastern sides. The figures to the right highlight several of the significant changes to the islands with red circles and arrows. The graphs below them show the loss of vegetated area in square meters. The two islands closest to the eye of the hurricane, Jim Foot and Buttonwood #7, had the greatest percentage loss in vegetated landmass.



Satellite imagery and fieldwork

Satellite image analysis serves as one method of studying changes to the islands, allowing for the depiction of visible changes in vegetated landmass due to Irma. The insight gathered was used in conjunction with post-Irma fieldwork done in January 2018 to gain a greater understanding of changes to the islands caused by the hurricane. The analysis informed fieldwork in terms of the timing and severity of the change, and fieldwork observations, photographs, and measurements (as depicted in the photos on the right) allowed for better interpretation of the satellite imagery.

Buttonwood #7, February 2, 2018

Buttonwood #7, February 2, 2018

Bob Allen, January 30, 2018

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