Climate Change Adaptation Activities at the NASA John F. Kennedy Space Center, Fl., USA

Carlton Hall

Lynne Phillips

In 2010, the Office of Strategic Infrastructure and Earth Sciences established the Climate Adaptation Science Investigators (CASI) program to integrate climate change forecasts and knowledge into sustainable management of infrastructure and operations needed for the NASA mission. NASA operates 10 field centers valued at $32 billion dollars, occupies 191,000 acres and employs 58,000 people. CASI climate change and sea-level rise forecasts focus on the 2050 and 2080 time periods. At the 140,000 acre Kennedy Space Center (KSC) data are used to simulate impacts on infrastructure, operations, and unique natural resources. KSC launch and processing facilities represent a valued national asset located in an area with high biodiversity including 33 species of special management concern. Numerical and advanced Bayesian and Monte Carlo statistical modeling is being conducted using LiDAR digital elevation models coupled with relevant GIS layers to assess potential future conditions. Results are provided to the Environmental Management Branch, Master Planning, Construction of Facilities, Engineering Construction Innovation Committee and our regional partners to support Spaceport development, management, and adaptation planning and design. Potential impacts to natural resources include conversion of 50% of the Center to open water, elevation of the surficial aquifer, alterations of rainfall and evapotranspiration patterns, conversion of salt marsh to mangrove forest, reductions in distribution and extent of upland habitats, overwash of the barrier island dune system, increases in heat stress days, and releases of chemicals from legacy contamination sites. CASI has proven successful in bringing climate change planning to KSC including recognition of the need to increase resiliency and development of a green managed shoreline retreat approach to maintain coastal ecosystem services while maximizing life expectancy of Center launch and payload processing resources.

This presentation provides an update to the scientific work occurring over the last 6 years and how it is being integrated into the evolving management decision process at KSC. News stories covering the general topic of climate change and sea-level rise effects on KSC, Americas Space Port, have been published several times over the last 4 years in the national publications such as the New York Times, regional publications like Florida Today and the KSC Space Port Magazine. Past modeling results have been presented at AGU and recently (June) published on-line by the Hydrogeology Journal. The topic of marsh invasion by mangroves was published in Estuaries and Costs in 2015 and a manuscript on potential upland vegetation responses to a rising surficial aquifer is under review in Plos One. The goal of the presentation is to describe how this science based knowledge is being integrated into management decisions to build resiliency.