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Abstract

TITLE: Building Climate Resilience at NASA Ames

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NASA Ames Research Center, located at the southern end of the San Francisco Bay (SFB) estuary has identified three primary vulnerabilities to changes in climate. The Ames Climate Adaptation Science Investigator (CASI) workgroup has studied each of these challenges to operations and the potential exposure of infrastructure and employees to an increased frequency of hazards.

Sea level rise inundation scenarios for the SFB Area generally refer to projected scenarios in mean sea level rather than changes in extreme tides that could occur during future storm conditions. In the Summer of 2014, high resolution 3-D mapping of the low lying portion of Ames was performed. Those data are integrated with improved sea level inundation scenarios to identify the buildings, basements and drainage systems potentially affected. We will also identify the impacts of sea level and storm surge effects on transportation to and from the Center. This information will help Center Management develop future Master Plans.

Climate change will also lead to changes in temperature, storm frequency and intensity. These changes have potential impacts on localized floods and ecosystems, as well as on electricity and water availability. Over the coming decades, these changes are going to be imposed on top of ongoing land use and land cover changes, especially those deriving from continued urbanization and increase in impervious surface areas. These coupled changes have the potential to create a series of cascading impacts on ecosystems, including changes in primary productivity and disturbance of hydrological properties and increased flood risk.

The majority of the electricity used at Ames is supplied by hydroelectric dams, which will be influenced by reductions in precipitation or changes in the timing or phase of precipitation which reduces snow pack. Coupled with increased demand for summertime air conditioning and other cooling needs, NASA Ames is at risk for electricity shortfalls. To assess the anticipated energy usage as climate changes, the Ames CASI team is collecting historical energy usage data from Ames facilities, historical weather data, and projected future weather parameters from the CASI Climate subgroup. This data will be incorporated into the RETScreen model to predict how energy usage at Ames will change over the coming century.