

2019

Disaster Relief Act: *USGS Recovery Activities*

USGS Role in Recovery

The Additional Supplemental Appropriations for Disaster Relief Act of 2019 (H.R. 2157) was signed by the President on June 6, 2019. The U.S. Geological Survey (USGS) received \$98.5 million for repair and replacement of facilities and equipment, collection of high-resolution elevation data in affected areas, and scientific assessments to support recovery and rebuilding decisions for declared disasters in 2018 from the Kīlauea volcano eruption, Hurricanes Florence and Michael, the Anchorage earthquake, and California wildfires.

Kīlauea Volcano Eruption

New Hawaiian Volcano Observatory (HVO)

- The HVO, perched on the rim of Kīlauea Volcano's summit caldera in Hawai'i Volcanoes National Park, sustained damage owing to ground deformation and repeated earthquakes associated with the collapse of the summit crater during the eruptive activity at Kīlauea.
- The USGS will build a permanent HVO facility in Hilo based upon mission requirements, costs, benefits, and risks.
- Volcanic hazards for the new facility in Hilo will be much lower than reestablishment at Kīlauea's summit.



- The USGS will establish Unstaffed Aircraft Systems (UAS) capability to measure volcanic gas flux, conduct photo and other mapping surveys of volcanic features, and to help monitor the summit and rift zones for renewed volcanic activity. The USGS will

develop a response plan guide for UAS activities for future eruptions.

Response Activities, Equipment Repair, and Hardening

- The USGS will rebuild and harden HVO's telemetry network, communications network, and computing infrastructure.
- The USGS will reestablish the HVO network of real-time monitoring instruments at the summit and in critical rift zone areas to support early detection of magma returning to the shallow reservoirs and thus provide accurate hazards characterizations.

Geologic Investigations of Summit Collapse

- Scientific investigations of the current state of the summit of Kīlauea are needed to interpret monitoring network data and to characterize threats and hazards to the Hawaii Volcanoes National Park and surrounding area.
- Activities will include repeat gravity and other geophysical surveys (ground-based and airborne) of the volcano and geologic evaluation of new exposures in the expanded caldera walls. This work will improve our understanding of summit and rift zone structure and magmatic plumbing, as well as the history and likelihood of dangerous explosive eruptions from the summit region.



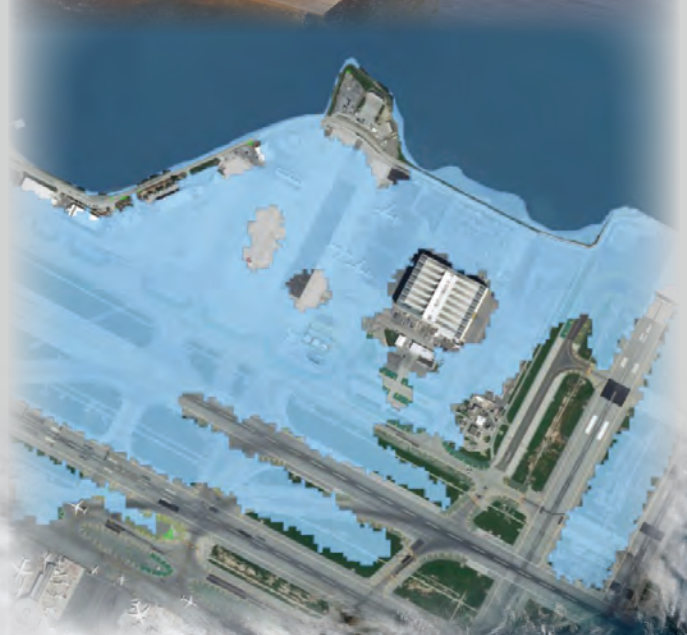
Hurricanes Florence and Michael

Equipment Repair and Replacement

- The USGS streamgage network provides critical information about flood stage and streamflow.
- Hurricanes Florence and Michael damaged or destroyed 13 gages, 4 storm tide sensors, 9 vehicles and boats, 3 telemetry stations, and various deployed field station equipment.
- Equipment will be repaired and replaced.

Coastal Hazard Assessments and Forecasts

- Extensive hurricane damage to beaches, dunes, and other coastal ecosystems from flooding and erosion increases immediate and long-term hazards to shorelines (including densely populated regions, U.S. Department of Defense assets, and National Seashores), putting critical infrastructure at risk to future flooding and erosion and causing economic losses.
- The USGS will develop products including coastal flood maps for a range of storm scenarios to support real-time hazard guidance during storms, emergency preparedness, and long-term management of existing or proposed engineering, infrastructure, and coastal protection systems.
- This work will aid post-storm repair and recovery efforts by improving hurricane impact models for coastlines and updating assessments and models of coastal vulnerability to future storms.



Hurricane Michael, October 2018.
Photograph by National Oceanic and Atmospheric Administration.

California Wildfires

Assessment of Landslide and Debris-Flow Impacts

- Wildfire increases the susceptibility of steep slopes to landslides and debris flows. A tragic recent example occurred in Montecito, California, where heavy rainfall on the Thomas fire triggered debris flows that killed 23 people and damaged or destroyed over 400 homes.
- The USGS will use data from the Thomas and Carr wildfires to deliver tools for predicting post-fire debris-flow inundation and downstream impacts to inform mitigation and evacuation plans.
- Data from wildfires will be used to refine USGS models for hazard assessments, increasing their utility for hazard management in temperate environments and post-fire recovery, as well as to improve rainfall criteria for debris-flow warnings issued by the National Weather Service.

Fire Behavior Models: Enhanced Support for Recovery of U.S. Department of the Interior (DOI) Lands

- The severity of fires in disaster-declared areas of California during 2018 resulted in unprecedented impacts to resources important to communities and DOI lands (people, homes, infrastructure, water quality, fish and wildlife habitats, and recreational and other land uses).
- The USGS will update models of fire behavior and effects to include drivers of drought and wind, vegetation recovery, and indirect effects (sedimentation and water quality) and will provide information and scenario planning tools for communities and natural resources at risk on DOI lands.
- Updated models will aid land managers and communities to minimize fire effects on recovering communities and habitats and future fire risk.



Anchorage (Alaska) Earthquake

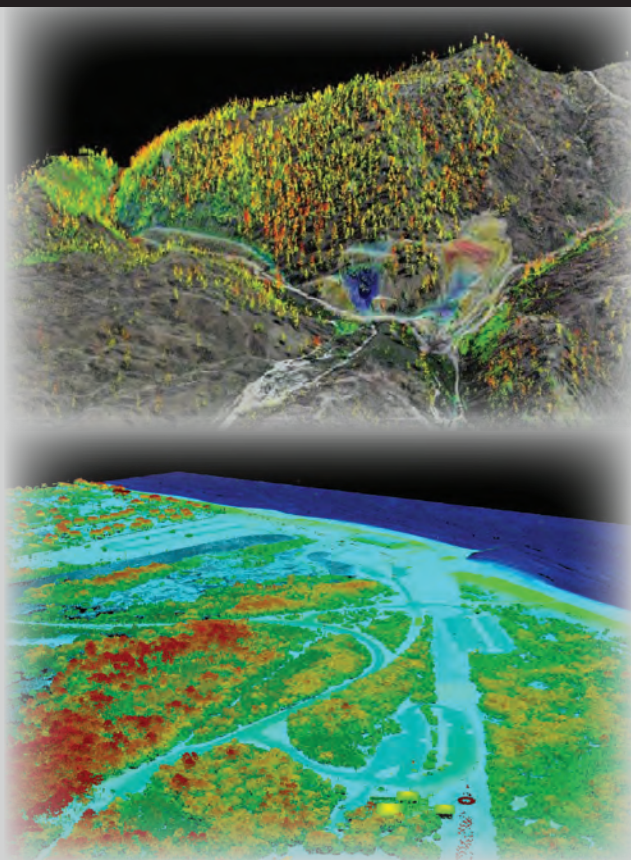
Equipment Replacement and Geologic Investigations

- On November 30, 2018, a magnitude 7.1 earthquake caused widespread damage to infrastructure and property in the Anchorage area.
- The USGS will harden the Alaska Volcano Observatory (AVO) network instrumentation and repair facility damages and telecommunications equipment to reduce the vulnerability of the AVO from future natural disasters and maintain its capabilities to monitor Alaskan volcanoes and warn of volcanic activity.
- The USGS will deliver post-earthquake investigations under the National Earthquake Hazards Reduction Program to support future earthquake hazard response and risk reduction by emergency managers and State and local governments. These will include descriptions of seismological characteristics of the earthquake and associated ground failure and investigations of building and civil infrastructure performance.



Acquisition and Publication of 3D Elevation Program (3DEP) Lidar Data

- The goal of 3DEP is to complete by 2023 the first-ever national baseline of consistent high-resolution elevation data to support a range of critical applications including hazards response, recovery, and mitigation.
- The USGS will collect and process light detection and ranging (lidar) data at priority locations affected by hurricanes (Florida, Georgia, North Carolina, and South Carolina) and wildfires (California). Additional funding from partner agencies is also being used to complete data coverage of the impacted areas.
- Lidar data will be used in assessments of landslide and debris flow and coastal impacts, reconstruction of infrastructure (for example, permit applications, construction plan development, and drainage requirements), updating fuel models for wildfire, and other recovery efforts.



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