

Consolidated Appropriations Act, 2023— USGS Disaster Emergency Recovery Activities

USGS Role in Recovery

Title VII of Division N in the Consolidated Appropriations Act, 2023 (Public Law 117–328), was enacted on December 29, 2022. The U.S. Geological Survey (USGS) received \$41.04 million (M) in disaster emergency supplemental funding for repairing and replacing facilities and equipment, collecting high-resolution elevation data in affected areas, and completing scientific assessments to support direct recovery and rebuilding decisions in the wake of declared disasters related to hurricanes and typhoons in 2022.

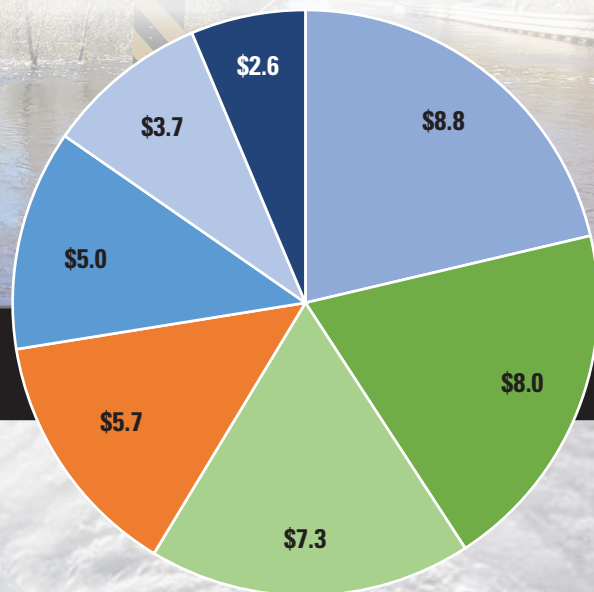
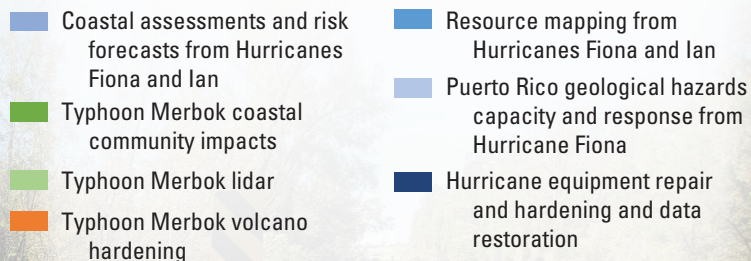


Hurricane (Fiona and Ian) Response (\$21.0M) Equipment Repair and Hardening and Data Restoration

- Hurricanes Fiona and Ian damaged or destroyed facilities, water gages, and seismic monitoring stations in Florida and Puerto Rico. Equipment reserves were depleted to return impacted gages to operational status. Funding will be used to repair and harden the USGS San Juan Magnetic Observatory facility; replenish equipment reserves and repair specific water gages and seismic stations; harden communications and backup power systems at seismic stations; and harden communications for the national magnetic observatory network.
- Flooding caused channel alterations or service degradation at sites in Florida. Funding will be used to update hydraulic-modeling metrics to determine the impacts of flooding on infrastructure (bridges, dams, and levees) recovery activities. Flooding can also lead to saltwater intrusion into aquifers in Puerto Rico. Funding will be used to add an additional salinity monitoring well to the Puerto Rico network.
- These data restoration efforts are critical to ensure proper and timely forecasts to protect lives and property and to track recovery of the storm-altered watersheds.

EXPLANATION

Supplemental activities, in millions of dollars



Coastal Assessments and Risk Forecasts from Hurricanes Fiona and Ian

- Hurricanes Ian and Fiona, which caused major damage (\$50–65 billion) during the 2022 hurricane season, demonstrated increased stakeholder needs for data and tools to prepare for severe events.
- Funding will be used to produce risk models in coastal environments arising from changed elevations and multihazard threat sources including coastal and inland flooding affected by hurricanes, other major storms, and climate change.
- This work will address needs that extend across coastal settings such as barrier islands, coral reefs, and highly populated estuaries (such as Tampa Bay and Charlotte Harbor, Florida, and San Juan, Puerto Rico) to support recovery, help mitigate risk, and improve long-term risk management.



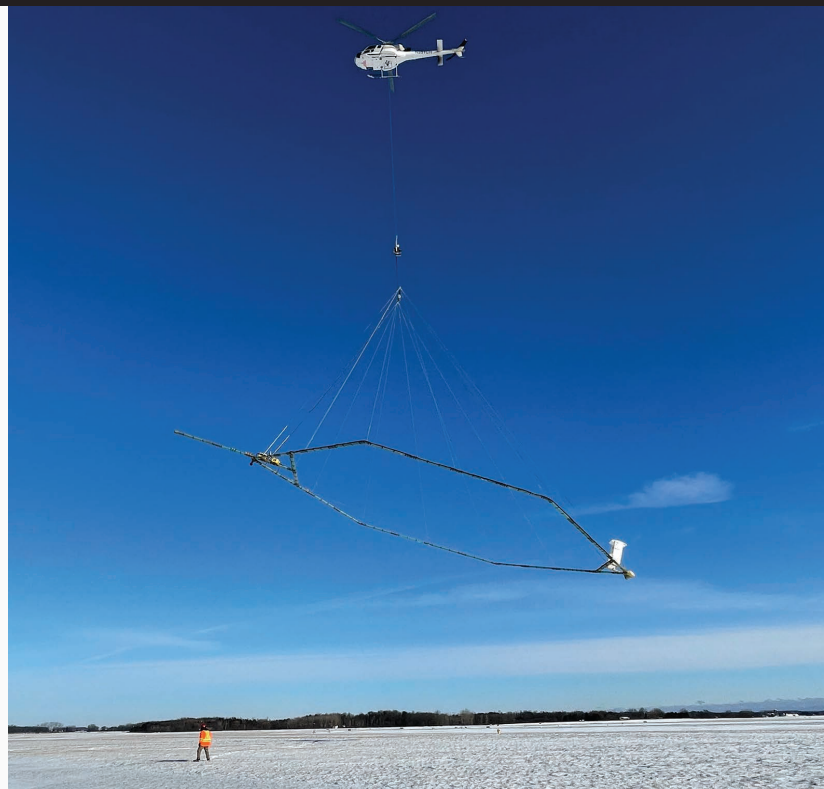
Puerto Rico Geological Hazards Capacity and Response



- In the wake of Hurricane Fiona, Puerto Rico dealt with damage from flooding and landslides that resulted in island-wide power outages, casualties, and destroyed or threatened homes, roads, and other infrastructure.
- Funding will be used to build new capacity in Puerto Rico to assess after-storm conditions and impacts from the 2022 hurricane season and to identify consequent and ongoing threats through landslide and coastal hazard assessments to aid in recovery planning.
- Efforts will include providing risk communication products in English and Spanish to support recovery and rebuilding in areas with exposure to landslide, coastal erosion, and flooding hazards.

Resource Mapping in Florida and Puerto Rico

- Hurricanes Ian and Fiona caused extensive damage across Florida and Puerto Rico, requiring reconstruction to restore lifelines and establish resilient infrastructure. Reconstruction not only requires a reliable, affordable, and therefore proximal supply of industrial minerals (for example, gravel) but also an understanding of geologic factors that may amplify future hazards impacts.
- Funding in Florida will be used to produce modern airborne geophysical surveys, detailed geologic maps, chemical and physical sampling and analysis of priority industrial mineral extraction sites, and industrial minerals resource assessments and phosphogypsum storage hazards assessments.
- Although Puerto Rico's mineral industry consists entirely of industrial mineral commodities, the rate of production has been declining, and the capacity of this industry to meet the demands of reconstruction and hardening after the 2022 hurricane impacts is uncertain and requires assessment. Funding in Puerto Rico will be used to produce modern, integrated geologic and geophysical maps, and industrial minerals resource assessments.



Alaska Typhoon Response (\$20.1M)

Typhoon Merbok Volcano Hardening

- Typhoon Merbok caused the loss of power and communications at regional hubs and remote stations throughout the regional volcano monitoring network, which hampered the USGS's ability to continually monitor about 30 active remote volcanoes.
- Funding will be used to increase the overall level of operational resiliency during the winter storm cycle by hardening installations to better withstand and mitigate impacts from future storms.
- The USGS will repair damage to stations and regional receive facilities; harden communication infrastructure at receive facilities and major repeater sites; enhance and augment power systems at individual stations and provide backup power systems at regional receive facilities; develop and use backup or failover internet connections (satellite or terrestrial) at regional receive facilities; and improve existing information technology networking and data acquisition systems.



Typhoon Merbok Coastal Community Impacts

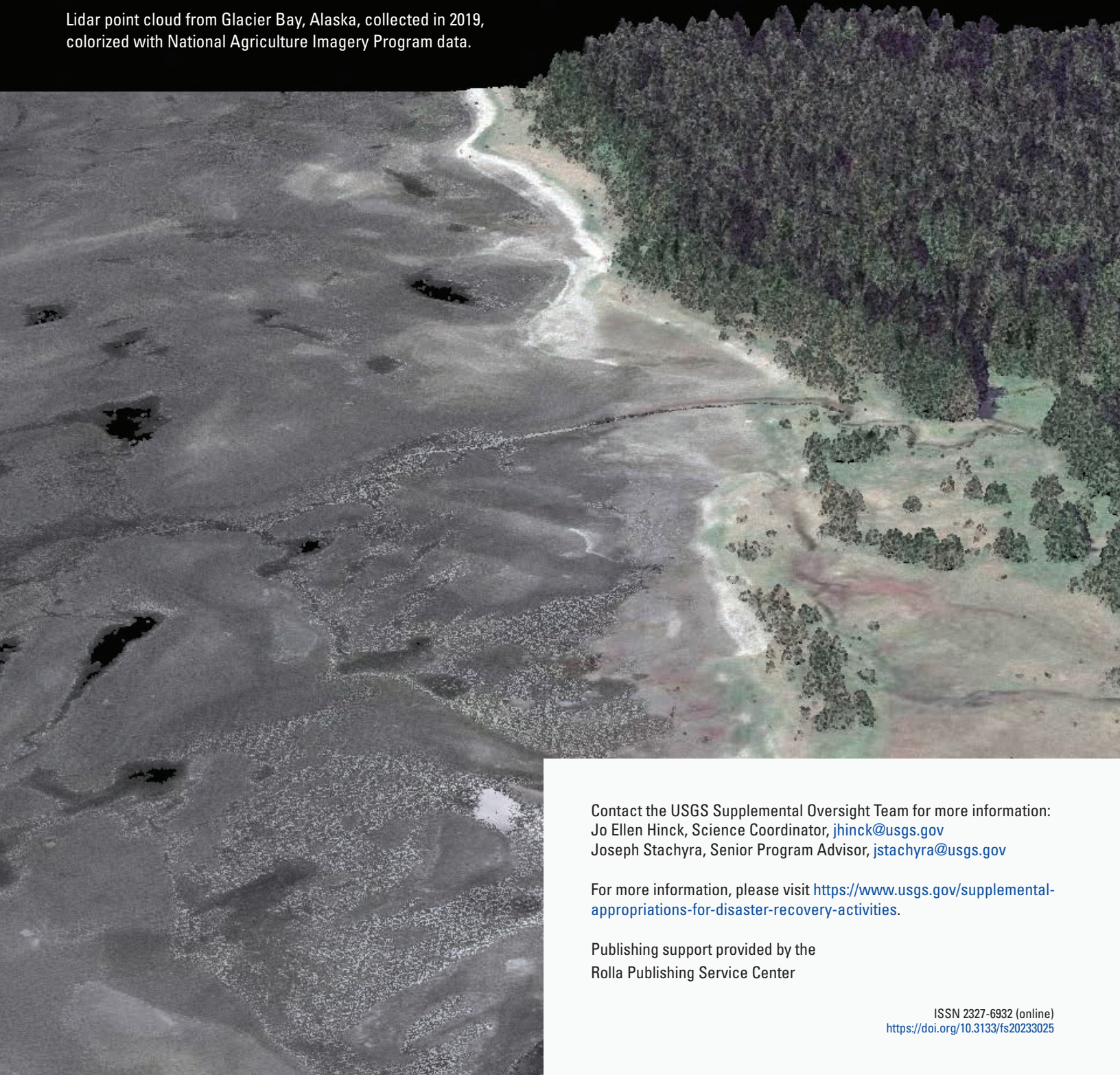
- As Typhoon Merbok barreled across the Bering Sea and western Alaska, hurricane-strength winds, extreme storm surge, and high waves impacted more than 35 Alaska Native communities along a 1,300-mile stretch of coast. Flooding and winds destroyed or damaged homes, infrastructure, property, utilities, and subsistence fish camps, while eroding large sections of coast.
- Funding will be used to provide coastal mapping products and operational and long-term forecasts to aid communities in assessing increased risks to coastal hazards after Typhoon Merbok and to guide rebuilding efforts. Products will include permanent high-water flood markers, stakeholder co-developed interactive mapping tools of shoreline change and modeled flood and erosion risks, and tools for capturing real-time coastal observations and forecasting of flood hazards.
- The USGS will also work with the National Oceanic and Atmospheric Administration to establish 5–6 new real-time water level observing stations to integrate with the National Water Level Observation Network and fill observational data gaps for community risk reduction; the National Oceanic and Atmospheric Administration will assume management and maintenance of the newly completed stations.



Lidar for Typhoon Merbok

- Current, high-resolution elevation data are essential for rural coastal villages in western Alaska impacted by Typhoon Merbok to protect natural resources, infrastructure, and—most importantly—human life.
- Funding will be used by the USGS 3D Elevation Program to obtain about 6,000 square miles of light detection and ranging (lidar) data for 36 rural villages. Several of the affected coastal communities are at sea level and under direct threat of flooding and erosion worsened by climate change. Loss of permafrost, more frequent freeze-thaw cycles, and intense storms are causing land subsidence and bank erosion along rivers and coastlines, further threatening structures and communities.
- Lidar data will be used in assessments of coastal and riverbank erosion, mapping flood risk, predicting sea-level rise impacts, and other recovery efforts. The lidar data will be used by Federal programs to aid in managed retreat, village relocation planning for homes and infrastructure in flood hazard zones that are expanding due to severe erosion and permafrost thaw, or both.

Lidar point cloud from Glacier Bay, Alaska, collected in 2019, colorized with National Agriculture Imagery Program data.



Contact the USGS Supplemental Oversight Team for more information:
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For more information, please visit <https://www.usgs.gov/supplemental-appropriations-for-disaster-recovery-activities>.

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