

## **BARRY ARM LANDSLIDE INTERAGENCY INFORMATION STATEMENT**

U.S. Geological Survey, Alaska Division of Geological & Geophysical Surveys, National Tsunami Warning Center, Alaska Earthquake Center

Thursday, 10 November 2022, 3 PM AKDT (23:00 UTC)

61°09'10" N 148°09'15" W

### **Executive Summary**

- The landslide began slowing on October 13, 2022, with all widespread motion stopping on November 8, 2022.
- It is unknown if the landslide will reactivate again in the coming weeks or months.
- Despite the halt in movement, the landslide remains a hazard to recreationalists, marine traffic, infrastructure, and important natural and cultural resources in northwestern Prince William Sound.
- Previous analyses revealed widespread movement of the Barry Arm landslide beginning on August 21, 2022, with rates of movement ranging from 50 mm to >100 mm (2 to >4 inches) per day.
- The interagency team will continue to monitor the landslide and the water beneath it with existing instrumentation and satellite data. Tsunami warning capability is being tested, but not yet available.

### **Current observations**

On August 26, 2022, we reported that a ground-based synthetic aperture radar instrument installed on the east side of Barry Arm revealed the movement of a portion of the Barry Arm landslide (known as the Kite) beginning early in the morning on August 21, 2022. The movement spread from the Kite to other parts of the landslide beginning on August 28. The rate and location of motion were confirmed using satellite imagery on September 13.

Radar data show that the landslide began slowing on October 13, with widespread cessation of movement on October 31. Recent analysis has revealed no significant movement of the landslide from November 8, 2022, to the present. In total, portions of the landslide experienced >3 meters (>10 feet) of cumulative displacement since August 21, 2022.

Retrospective analysis of satellite data for the Barry Arm landslide reveals that this pattern of localized acceleration and slowing may be common. Other published studies at Barry Arm have identified ground movement at similar or much greater rates since 2008.

### **Prognosis**

Localized ground movement is not necessarily a precursor to partial or complete failure of the Barry Arm landslide. Conversely, the current lack of observable ground movement is not a clear indication that hazards have significantly decreased. While our level of concern is reduced when the landslide is stable, other external triggers, such as a large nearby earthquake, could cause a rapid decrease in the stability of the landslide and a potential for catastrophic failure and the generation of a large tsunami. As such, the landslide remains a significant natural hazard in northwestern Prince William Sound.

## **Current monitoring**

There is a local monitoring network in Barry Arm that includes two seismometers, an infrasound array, a ground-based radar, several weather stations, and four cameras. Additionally, there is an infrasound array located in the town of Whittier, Alaska, approximately 50 km (31 miles) from the Barry Arm landslide. The National Tsunami Warning Center also operates three water level sensors in Barry Arm.

Systematic monitoring of optical imagery and remote sensing data, including satellite InSAR, is conducted throughout the year. New satellite observations are available bi-monthly with favorable atmospheric conditions; however snowfall will likely limit the use of InSAR analysis during the winter months.

There is currently no operational real-time warning system for the Barry Arm landslide and potential tsunami. Warning capabilities are currently experimental and subject to rigorous testing prior to being assigned an operational status. Updates on the status of the landslide as determined by current monitoring capabilities will be provided through the Alaska Division of Geological & Geophysical Surveys Barry Arm landslide webpage and email list (linked below).

## **Background**

The Barry Arm landslide is a large (~500 M m<sup>3</sup> or 650 M yd<sup>3</sup>) landslide located in the northwestern corner of Prince William Sound, Alaska. Rapid, catastrophic failure of the landslide could generate a tsunami that would be life-threatening for anyone in Barry Arm, Harriman Fiord, and parts of Port Wells. Significant risks also exist in other, more distal locations of western Prince William Sound, including the town of Whittier, Alaska.

The existence of the landslide is evident in photographs dating back to at least 1937, with possible evidence of the landslide in photographs dating to 1913. Slow ground motion of the Barry Arm landslide has been documented going back several decades. Increased movement was documented during a period of rapid recession of the Barry Glacier from 2010 – 2016, with observed rates up to  $26 \pm 3$  m/yr ( $85 \pm 10$  feet/yr) observed from May 2010 to September 2013. Deformation rates returned to a background level of approximately  $1.3 \pm 0.7$  m/yr ( $4.3 \pm 2.3$  feet/yr) in March of 2017 as the retreat of the Barry Glacier slowed. Another period of movement was observed using aerial and satellite data in the fall of 2020 during which parts of the landslide moved over 3 meters (10 feet) between October 2020 and August 2021.

## **Additional Information**

Visit the following agencies for information on the Barry Arm landslide and how you can prepare for a tsunami and other emergencies.

Alaska Division of Geological & Geophysical Surveys: The most up-to-date source of information on the Barry Arm landslide, including links to partner agencies, available at <https://dggs.alaska.gov/hazards/barry-arm-landslide.html>.

National Tsunami Warning Center: Information on tsunami preparedness, available at <https://tsunami.gov/>.

U.S. Geological Survey: Information on the Barry Arm landslide and tsunami monitoring, with links to related science and publications. <https://www.usgs.gov/programs/landslide-hazards/science/barry-arm-alaska-landslide-and-tsunami-monitoring>

Alaska Earthquake Center: Information on earthquake preparedness, available at <https://earthquake.alaska.edu>.

National Weather Service: Current tsunami alerts, available at <https://www.weather.gov/safety/tsunami-alerts>.

SUBSCRIBE TO BARRY ARM UPDATE MESSAGES by email:  
<https://list.state.ak.us/mailman/listinfo/barryarm>

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