



Permafrost Vital Sign

Management Summary 2018

Permafrost Thaw Slump Monitoring

Who/What/Where

Ecologist David Swanson of the NPS Arctic Inventory and Monitoring Network (ARCN) summarized results from 10 years of monitoring of permafrost thaw slumps in the Noatak National Preserve. These dramatic erosion features can shed a lot of sediment into nearby water bodies. Most of the large slumps in ARCN are in the upper Noatak valley, and our monitoring efforts are concentrated there. We used aerial photographs and on-the-ground observations to monitor growth of the slumps.

Key findings

Most of the slumps we monitored started around the year 2004, though some have been intermittently active for decades. They grow by thaw of permafrost in a steep bank (the “scarp”) on their uphill side. We observed scarp migrations rates as fast as 38 meters (125 feet) per year. All of the slumps have been growing at a steady or slowing pace since our monitoring began in 2008. As the slumps grow uphill, the zone of sediment deposition moves uphill also, away from the stream or lake that is often present near the foot of the slump. A lot of sediment can be shed into the water body at first, but it declines over time. The largest slumps have exposed 4 to 7 ha (10 to 20 acres) of bare soil. The large slump on the Noatak River near Akikukchiak Creek is the most significant one on the Noatak National Preserve in terms of impacts.

Management implications

At the present time, thaw slumps do not present a major threat to water quality or aquatic resources in the Noatak National Preserve. The area they cover is actually a tiny fraction of the landscape, and as they grow uphill the lower, older parts of the slumps stabilize, vegetation returns, and the amount of sediment shed into nearby water bodies decreases. We expect slump activity to increase as the climate warms, and we will continue to monitor them in case they become more active or more widespread in the future.

For more information

Contact Dave Swanson, 907-455-0665, david_k_swanson@nps.gov, or read our recent report at <http://www.mdpi.com/2072-4292/10/7/983>.

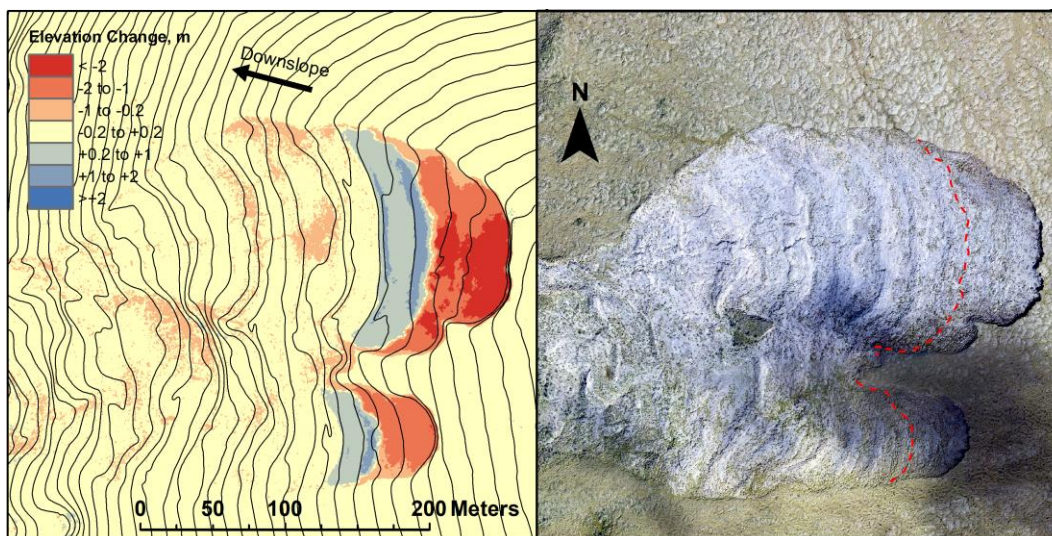


Figure. Growth of a thaw slump in the Noatak National Preserve. The contour map on the left (1 meter contour interval) shows elevations in 2016 and the elevation change from 16 September 2013 to 11 July 2016. The photograph on the right is from 2016, with the 2013 scarp position noted with a dashed red line.