

EarthCache Site

The Mogul Landslide

GPS Coordinates: N39°30.814', W119°55.588' (WGS 84 datum)

Short Description

Landslide – for some the word has connotations of the song by the Dixie Chicks or Fleetwood Mac, but at this Earthcache site just west of Reno you can see a real-life example of the geologic formation for which the song was titled.

Long Description

To get to an easily accessible viewing point for the landslide, take the Mogul exit #7 off Interstate 80 eastbound, a few miles west of Reno, and turn west on the frontage road at the foot of the off-ramp. Pull off the road in a large gravel turn-out (location of coordinates). From this spot, look due south across the river. If you scan the area just below the crest of the hill, you will see an arcuate cut of layered gravel deposits overlying soft, unstable sediments of what is called the Sandstone of Hunter Creek. This scar is the headwall of a historic landslide that occurred sometime between 1880 and 1906. The crumpled looking lobe of ground below the scar is the material that moved down slope in the landslide, extending into the river. (The feature can also be seen less distinctly from the Scenic View overlook area of eastbound Interstate 80 between exits #6 and #7 west of Reno.)

Now look east and west along the face of the hillsides adjacent to this most obvious recent landslide. The hummocky ground extending from the steeper slopes down to the Truckee River is all material that has broken away and moved downhill as landslides in the past 100,000 years or so. The toe of each of these landslides has forced the river to make a wider curve to the north and some may actually have blocked the river flow for a while. The deposits are now being eroded away by the river.

A landslide is a geological phenomenon of ground movement down a slope. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors affecting slope stability that may trigger a landslide:

- erosion by rivers, glaciers, or ocean waves create over-steepened slopes;
- rock and soil slopes are weakened by water saturation (from snowmelt, heavy rains, or man-caused events);
- earthquakes create stresses that weaken slopes and volcanic eruptions produce loose ash deposits and sediments on steep slopes;
- vibrations from machinery, traffic, blasting and even thunder may trigger failure of weak slope;
- excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may cause weak slopes to fail;
- groundwater pressure may destabilize a slope;
- in shallow soils, the removal of deep-rooted vegetation that binds the colluvium to bed rock may cause a slope to fail.

On the slopes south of the Truckee River at Mogul, several of these factors combined have contributed to multiple landslides over the past 100,000 years, resulting in the hummocky topography characteristic of landslide deposits. Erosional cutting away the toe of the slopes by the Truckee River, steepening of slopes by uplift of the Sierra Nevada along faults, saturation by rainfall of a past wetter climate, and earthquakes have all played a part in the past landslide history of the area.

The most recent landslide that left the most obvious and prominent scar on the slope to the south, was perpetrated by the inhabitants of the Truckee Meadows. This slide was the direct result of water leakage from the Steamboat Ditch saturating the soil on an already steep slope. The ditch at that time passed around this point of land in a combination of short tunnels and a flume. Following the landslide, the ditch was re-routed through a longer more leak-proof tunnel, behind the hill, avoiding conflict with the less stable ground on the face of the slope. The line of green trees and bushes that crosses the slopes above the small, perched meadow to the right of the slide is the present trace of the Steamboat Ditch. The Mogul landslide is still considered to be an active landslide.

Question to be answered to log this site: What general direction (north, south, east, or west) did the landslide block move in the most recent landslide at this site? E-mail your answer to this question to the site developer, along with a photograph of your group and the number of people in your group.

References:

U.S. Geological Survey Fact Sheet 0071-00, Landslide Hazards.

Gates, William Chester Bruce, 1994, Regional slope stability of the Truckee River Canyon (drainage basin) from Tahoe City, California to Reno, Nevada; Ph. D. dissertation, University of Nevada Reno.

Tingley, J.V., Pizarro, K.A., Ross, C., Purkey, B.W., and Garside, L.J., 2005, Geologic and Natural History Tours in the Reno Area, Special Publication 19, expanded edition. For more details about this book, please visit the following webpage: <http://www.nbmq.unr.edu/sales/pbsdtls.php?sku=sp19>