

Observation of Activity at the Ferguson Rock Slide

Sierra National Forest
Bass Lake Ranger District

January 20th, 2010.

This memo delineates mass movement events observed by Bryant Platt at the Ferguson Rock Slide on January 20th, 2010 between 2:00 and 4:00 PM. During this period several photographs and several minutes of video were recorded depicting the four regions of the rock slide that appear to have produced most of the slope failures. For descriptive purposes, this report separates these regions into four source areas (see Figure 1). Area 1 failed the most often, Area 2 produced frequent moving rocks, Area 3 produced several large boulders that were deposited in the Merced River, and Area 4 resulted in minimal debris movement. All of the descriptions below are provided from the perspective of the observer, viewing the slide from the opposite side of the river, and not from that of the slide. As such, 'left' represents the upstream side of the rock slide and 'right' the downstream.

Area 1 is located along the shear zone on the extreme right side of the Ferguson Rock Slide, uphill from the high voltage power line tower. This region continuously produced small to medium sized debris throughout much of the field visit with only occasional larger material falling. A general difference in the nature of movement between the smaller and larger clasts was observed: the finer debris would continuously fall from the source area and accumulate in a choke point in a debris shoot before traveling down slope as a large, slow moving, air supported granular 'flow,' while the medium sized material would primarily fall and tumble down slope as individual bodies. Debris produced from both mass movement mechanisms were generally deposited on the underlying talus cone, however occasional large debris would travel farther down slope, through the riparian vegetation, and into the Merced River.

Area 2 is located near the right margin of the rock slide, down slope and upstream of Area 1. This area failed less frequently than Area 1, however rock fall from this area was fairly frequent during the observation period. Failure from this source area, generally was comprised of medium sized clasts ($d < 1 \text{ m}^3$) tumbling down slope, however smaller debris was also generated. Material from Area 2 would either travel directly down slope as a rock fall or would accumulate and fail in dry granular flows similar to those in area one. Rock fall would generally make it less than $\frac{3}{4}$ of the way down the talus slope, while the granular flows would typically dissipate on the higher talus slope.

Area 3 is located along the left side of the Ferguson Rock Slide and appears to extend further up slope than any of the other source areas. The rate of occurrence for rock fall in this region

was less than in Areas 1 and 2, however the average size of debris generated was considerably larger ($d_{\max} > 2\text{-}3\text{ m}$). The large size of the moving debris and the exceptionally steep slope on this side of the Ferguson Rock Slide, resulted exclusively in rock falls that deposited rock either on the lower talus slope on the remnant of CA 140 or in the Merced River. During the field visit three or four rock falls that carried rock into the river were observed, however only one was caught on video. Smaller debris was also produced from this source area, however unlike in Areas 1 and 2, these clasts did not travel far and were subordinate to the larger boulders.

Area 4 is located in the central section of the Ferguson Rock Slide, perched above the largest talus slope deposit. Considering the amount of material accumulated since 2006 beneath this source area and the steepness of the slope, it is somewhat surprising that this area produced the least material of the four areas during the field visit. This area was only observed to have failed once between 14:00 and 16:00, when it produced a small volume of small to medium sized rocks that were promptly deposited on the mid to upper talus slope.

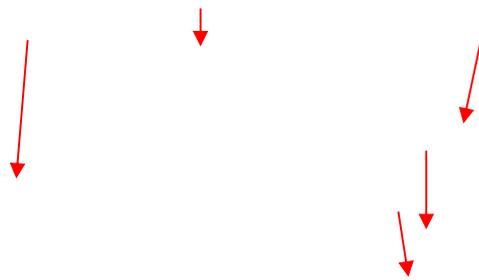


Figure 1: Movement observed during January 20th, 2010 field visit. Black circles approximately represent primary rock fall source areas and red arrows relative direction of movement. Image modified from USGS (2006).