Central Coast Watershed Studies

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Imminent Geologic & Hydrologic Hazards on Fort Ord BLM Lands, CA

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Publication No. WI-2008-02

3 March 2008

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Executive Summary

The Bureau of Land Management acquired 7,500 acres of land as part of the re-use of the decommissioned Fort Ord Army base. A variety of geologic hazards exist on the landscape including gully erosion, mass wasting, and decaying earthen dams. This short report highlights a few critical areas that deserve closer evaluation and remediation. Of particular concern are decaying earthen dams and mass wasting of tall stream banks that may impact BLM infrastructure or adjacent urban development.

This report was prepared for Eric Morgan, Fort Ord BLM. It should be cited as,

Smith, D., 2008, Imminent Geologic and Hydrologic Hazards on Fort ORd BLM Land, CA:. Prepared for Fort Ord BLM. The Watershed Institute, California State University Monterey Bay, Publication No. WI-2008-2, 13pp.

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1 Introduction

1.1 Overview

In 1996, The Bureau of Land Management acquired 7,200 acres of open land as part of the re-use of the decommissioned Fort Ord Army facility. BLM is charged with managing the land as a natural resource management area, supporting and improving ecosystem function as much as possible. Smith et al. (2002) drew attention to over 100 incidents of erosion, mass wasting, and other geologic hazards on the property that were prioritized for restoration activities, in keeping with the BLM directive to repair resource impacts extant at the time of base closure. The BLM has performed geomorphic and ecological restoration on a great number of those sites of concern. This report is presented to highlight some additional sites of potentially urgent concern. These sites require immediate attention on the basis of public safety.

1.2 Physical Setting

The landscape is moderately dissected rolling hills underlain by young terrestrial deposits. The stratigraphy includes Upper Tertiary Santa Margarita Sandstone, Plio-Pleistocene Paso Robles Formation, and Quaternary Aromas Sandstone. Draping those units is well-drained, poorly consolidated older sand dune deposits with preserved relict dune topography. Interdune areas have internal drainage, whereas the dissected areas drain to the Salinas Valley either directly, or by way of Toro Creek along Highway 68 (Smith et al., 2002).

Although there are locally resistant beds, the overall geologic substrate has a high erosion and mass-wasting potential, as evinced by the great number of gullies, and the local presence of badlands topography and shallow landslides (Smith et al., 2002; 2004).

2 Methods

We have identified several sites where geologic hazards may present a threat to infrastructure and human safety. This assessment is the result of a range of methods including cursory site inspection, local surveys, and longer-term monitoring. Such methods are detailed in the following sections.

3 Geologic and Hydrologic Hazards

The hazards described below include two sites with landslides and three sites with old dams.

3.1 Landslide hazards

Although several Quaternary landslides have been mapped (Rosenberg, 2001), few are active today. We describe two in this report because of their potential impact on neighboring properties human safety. The "Owl" landslide poses a risk of debris flow run-out into residential areas. The "Creekside" landslide is a localized area of mass wasting that could occlude Toro Creek, sending flood waters over to the Creekside Condominiums.

3.1.1 Owl Landslide

Debris flows form when water-saturated soil and moves down slope, commonly during intense rainfall events. The flows can move slowly or quickly, but typically have high strength. They are able to buoy large rock and wood pieces as they move along. Debris flows cause millions of dollars of damage to California properties each year. The Owl landslide is a large region with soil slip within colluvium of the Paso Robles Fm. It could form a debris flow given the right hydrologic conditions, and it is located up-gradient from residences (Figs. 1 and 2). Aerial photographic analysis indicates that the slope first failed during the 1998-1999 El Nino event (Smith et al., 2004). Monitoring of the landslide shows that it has not had significant movement since that time (Smith et al., 2004).

Figure 1: The Owl landslide and down-slope urban development

Figure 2: Close-up of Owl landslide. Photo montage of kite-born aerial photos (Smith, et al., 2004)

3.1.2 Creekside Landslide

The Creekside Condominiums are located along the banks of Toro Creek (Fig. 3). The properties were flooded during the high water events of the 1998-1999 El Nino rains. Any aggradation or occlusion in the Toro Creek channel will add risk to flooding hazard in the condominiums.

Figure 2: Creekside landslide. Arrow shows headwall scarp.

The condominiums are on a low terrace on the right side of Toro Creek. The left bank, adjacent to the condominiums is a tall eroding slope with the potential for sudden failure leading to channel blockage. The bank is locally undercut and shows evidence of both historic and recent sliding. Although the volume of potential slide material is not large, it is certainly large enough volume to locally block the creek channel. High flow events could lead to catastrophic slope failure and instantaneous flooding of the adjacent condominiums. Recent site inspection verified that the toe of slide is being steepened by erosion during recent flow events.

3.2 Dam and reservoir hazards

Abandoned, earthen dams pose a significant hazard across the U.S. Poor construction, the influence of weather and time, and the lack of periodic inspection or maintenance make old dams a flooding and debris-flow risk for downstream residents. Three historic dams and reservoirs located on BLM property pose a risk to downstream property (Fig. dams). Oilwell dam would impact the same residents as a debris flow from the Owl landslide. A Guidotti dam break would impact flood hazard in Toro Creek, and Pilaricitos dam failure would impact agricultural lands in the Salinas Valley. Compounding the problem of dam safety is the understanding that the reservoir areas are important wildlife watering areas, and locally may harbor threatened amphibians.

3.2.1 Oilwell Reservoir

Oilwell dam is located downstream from a deeply dissected landscape with active gullies. The high sediment yield from the small watershed has nearly filled the reservoir with sediment and a willow forest. The face of the dam has a concrete spillway, but there is a deep gully located adjacent to the spillway in unreinforced fill. The gully head may eventually breech the dam.

3.2.2 Guidotti Reservoir

Guidotti reservoir is located along the western margin of BLM property, on a small tributary to Toro Creek. It has a low earthen dam with a sediment-filled reservoir. A gully has formed along the left margin of the dam face.

3.2.3 Pilacitos Reservoir

Pilarcitos dam is located in Pilarcitos canyon, upstream from agricultural fields of the Salinas Valley. The reservoir is nearly full of sediment, with a shallow pond still present at times. A reconnaissance site visit did not indicate any obvious external flaws in the dam face. The spillway culvert has contributed to erosion downstream of the reservoir. It is also possibly responsible for an enormous gully system immediately upstream from the reservoir.

4 References

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