Soil Report

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Chalk-Goose Fires Road & Hillside Monitoring Report 2009

Executive Summary - Soil Quality Standards and Soil Productivity

This report documents road and hillside monitoring part for the Shasta-Trinity Burned Area Emergency Response (BAER) implementation effort for the fires of 2009. Road treatments were very effective in handling increased flows even when culverts plugged from excessive sediments. Natural recovery was selected for hillslope recovery in areas that suffered moderate to high soil burn severity. Overall effectiveness after 1 year was adequate recovery in moderate burned severity timbered sites and fair to poor for high burned severity sites. Hillside Creek suffered extensive rilling and gully erosion due to steep slopes, lack of cover, and concentrated thunder-cell activity in this area (see pics below).

Figure 1: Chalk Mt. Hillside Ck. Burned Watershed and Erosion after One Winter Season

Forest Plan Standards: Implement forest soil quality standards as they relate to and soil erosion. (Ref: Forest Plan 4-25e, Forest Soil Quality Standards).

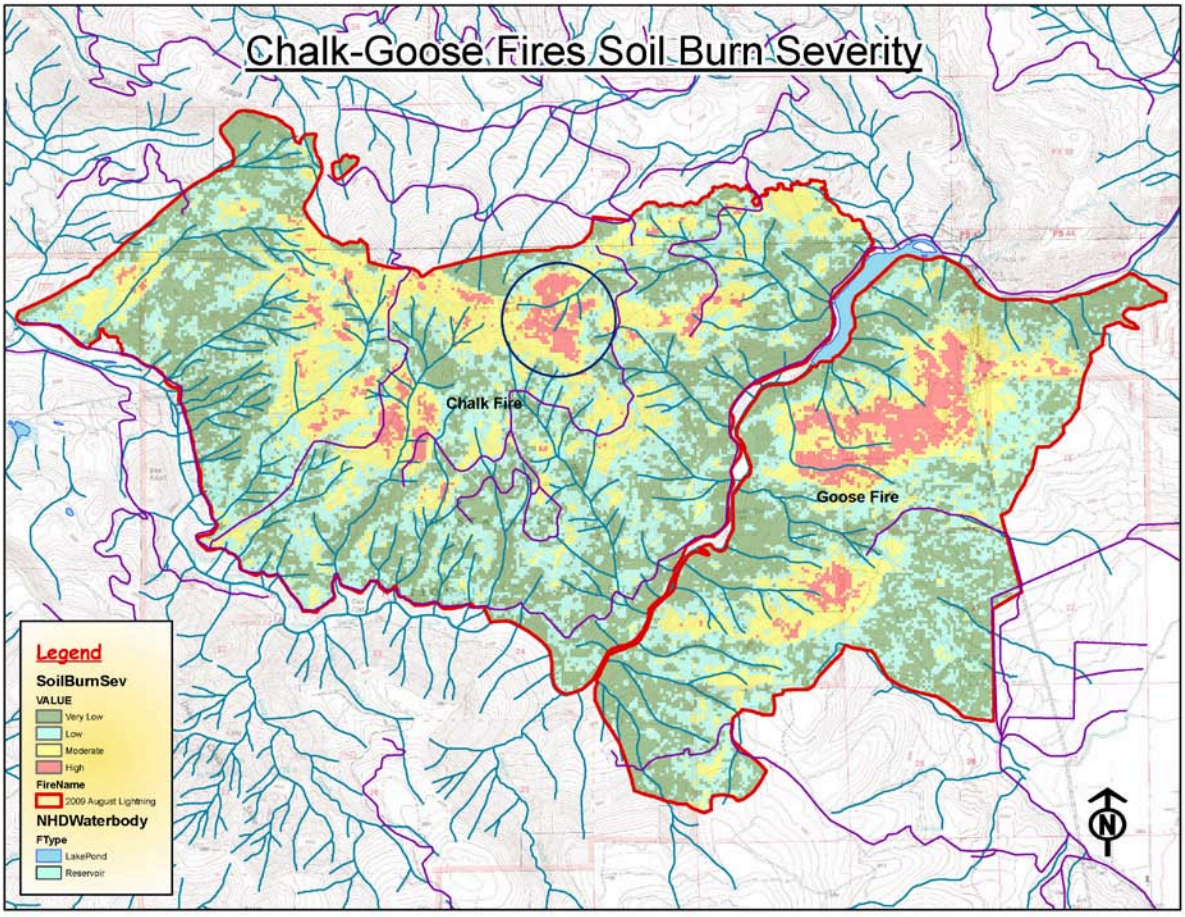
Objectives: The Chalk-Goose Fires were caused by lighting on Saturday, August 1, 2009 six miles east of Big Bend, California in Shasta County within the Chalk Mountain LSR. The Chalk-Goose Fires burned a total of 10,737 acres (8,777 acres Shasta-Trinity & 1,669 acres private & 344 acres Lassen NF) on steep rocky mountainsides to flat plateaus with mixed burn intensities. Approximately 37% burned at high and moderate soil burn severity (see soil burn severity map below). The rest of the fires were either low or very low soil burn severity.

Three roads were at risk due to increased likelihood of debris flows and dry ravel from high soil burn severity areas. Roads 36N28Y, 37N69, and FS50 were at risk from anticipated increased debris flows

and rock fall from severely burned hillslopes. Natural recovery was selected for hillslope treatment for the first winter. Monitoring was conducted over a period of one year to evaluate the effectiveness of natural recovery and future road maintenance needs.

Methods: Road were driven and pictures were taken of before and after one year along with walking hillslopes to collect terrain data (hillslope cover, aspect, slope, soil type, soil map unit, and dominate overstory vegetation) to evaluate hillslope recovery along with road treatment effectiveness (see circled area in Figure 2 below).

Figure 2: Calk-Goose Fire of 2009 Location and Burn Severity with Circled Watershed



Results: On the average for areas that were timbered with moderate soil burn severity hillslopes were intact and cover was adequate (see needle cover pic below). In areas that burned hot, hillslopes were compromised due to steep gravelly sandy loam volcanic soils that received intensive thunder-cell rainfall (see Figure 4 below). Analysis of severe hillslope erosion showed slopes over 50% with severe burning and cover less than 30% developed deep riling that led to debris flows in shallow very gravelly sandy loam soils (low clay and soil strength, see pics below). On slopes from 35 to 50% slopes rills were 4 to 6 inches deep every 20 feet and slopes over 50% rills were every 10 feet. Calculated WEPP erosion rates were 44 t/a for the first year and 31 t/a for the second year. With observed erosion these rates seemed reasonable. Recovery in these areas expected to recovery in the next 5 years.

For roads it was determined no treatment was necessary due to rolling dips functioning well and flood water passing critical-dips with no significant road damage (see Figure 3 below).

Table 1: Chalk-Goose Road Repair Effectiveness per Burn Severity and Terrain.

Chalk-Goose Road Repair Effectiveness							
Resource	Terrain	Burn Severity	Soil Cover %	Cover Type	Recovery	Effectiveness	Remarks
Road 36N28Y	steep volcanics	mod-high	30-50	mixed conifer	good	good	some crossing damage
37N69, FS50	steep volcanics	mod-low	50-70	mixed conifer	very good	excellent	no damage

Recommendations: For areas that were very steep (greater than 60% slopes) and on exposed burned slopes, concentrate treatments on stream crossings to stop road tread flow capture.

Figure 3: Road Repairs on Chalk-Goose Fire Area after One Winter Season

Road 36N28Y rolling-dip

Road FS50 Blackberry critical-dip

Road 37N69 Hillslope critical-dip

Figure 4: Chalk Hillside Creek Watershed Erosion and Cover after One Winter Season

Hillslope Ck. down-cutting erosion

Burned hillslope above Hillslope Ck.

Needle-cover mitigating rilling

Public Involvement: occurs during the NEPA process for identified projects.

Where is data located: Physical Science Dept., Shasta-Trinity National Forest Headquarters, Redding, CA.