Soil Input for 2500-8
Erskine Fire

SOIL RESOURCE EXECUTIVE SUMMARY

The Erskine Fire burned 48,019.9 acres in the Piute Mountains south of Lake Isabella, CA near Kernville between 2,500 and 5,900 foot elevations. The average slope of the burned area is 39%. The vegetation included a mix of oak woodland, sagebrush, chaparral, and mixed forest at the highest elevations. Much of the forested area was a re-burn of the 2008 Piute fire, which had a notable component of dead & down woody debris that was consumed. The soils are mostly moderately deep, with some deep soils in the forested terrain, and 9% rock outcrop. Total surface water holding capacity of the Mod-deep soils is ~1.5 inches, while deeper soils hold ~3 inches of water. Total annual precipitation for the burned area varies drastically with elevation & from West to East because of a prominent rain shadow. Rainfall ranges from ~8 - 25 inches; and 17.1 inches was the average annual precipitation used from Rock:Clime for ERMiT modeling. The two year six hour storm is 1.1 inches.

The soil burn severity is overwhelmingly moderate (43%) and low (44.9%). In most of the moderate burn severity, and some of the low severity (particularly on south-facing slopes), there is very little vegetation or ground cover remaining except surface rock. There is only 1% high soil burn severity because of the low pre-fire ground cover, and partly because the fire was heavily wind-driven and had short residence times. Very low soil burn severity was 11% of the fire area.

Due to low soil cover, the initial erosion hazard is high or very high on 57% of the fire area. Erosion in the aftermath of the fire could threaten soil productivity and water quality in localized areas, but overall the erosion response is expected to be relatively moderate. Most pourpoint watersheds have erosion rates less than 3 tons/acre. Of the ground that is treatable, erosion rates are not elevated high enough to constitute an emergency situation to soil productivity. Thus, no treatments are proposed to protect soil productivity.

PART II - BURNED-AREA DESCRIPTION

P. Dominant Soils:

The following soil map units comprise approximately 70% of the burned area in the Erskine Fire.

Rock Outcrop

Stineway

Livermore

Xyno

Kernville

Siskiyou

Cineba

Tollhouse

Southlake

Tips

PART III - WATERSHED CONDITION

B. Water-Repellent Soils:

16,451 acres (34% of fire area)

Hydrophobic soil conditions were common within moderate and high burn severity (50-60% area) and rare in low burn severity (20% area). Hydrophobic strength was often moderate in the top 3 cm, and occasionally strong in the upper end (worst) of moderate burn severity. Hydrophobic conditions are expected to exist in approximately 34% of the fire area.

C. Soil Erosion Hazard Rating:

Erosion Hazard Rating	Acres	% of Fire
Low	5,830	12%
Moderate	8,462	18%
High	17,593	37%
Very High	9,474	20%
Unrated Rock Units	6,660	14%

D. Erosion Potential:

Erosion and Sediment Potential is assumed to be similar in burned landscapes dominated by steep slopes and is discussed in Section E.

E. Sediment Potential:

The Erosion Risk Management Tool (ERMiT), was used to model both pre and post fire sedimentation. In areas with moderate and high burn severity, erosion potential was generally increased above natural conditions. Sedimentation was modeled for the first year post-fire with 2, 5, and 10 year runoff events.

The following 2 tables are the same, just one is editable & one is copied as a picture.

Pour Point ID	2 - Year Average Sediment Delivery Rate (Tons/Acre)	2 - Year Total Sediment (Tons)	5 - Year Average Sediment Delivery Rate (Tons/Acre)	5 - Year Total Sediment (Tons)	10 - Year Average Sediment Delivery Rate (Tons/Acre)	10 - Year Total Sediment (Tons)	2 - Year (Pre Fire) Average Sediment Delivery Rate (Tons/Acre)	2 - Year (Pre Fire) Total Sediment (Tons)
Whole Fire Pre Fire	0.1	6,725.3	0.4	30,698.9	1.7	81,538.0	-	-
Whole Fire Post-Fire	1.1	91,058.5	4.5	388,360.9	9.7	772,438.9	-	-
							Pre-Fire Data	
PP 1	1.5	1516.8	6.2	6038.5	15.9	14170.1	0.2	163.3
PP 2	1.0	2000.3	4.4	8136.1	11.2	18423.1	0.1	195.8
PP 3	1.1	1156.6	4.7	4601.4	11.7	10775.5	0.1	128.6
PP 4	1.7	375.3	6.9	1484.9	17.1	3440.8	0.2	42.1
PP 5	1.6	441.0	6.7	1766.7	16.8	4002.1	0.2	45.9
PP 6	1.6	120.9	6.7	499.9	16.8	1125.1	0.2	11.7
PP 7	2.0	1457.5	7.1	5019.6	13.5	9315.0	0.3	230.6
PP 8	6.2	704.7	16.3	1832.6	23.6	2671.2	1.4	145.9
PP 9	4.6	981.9	12.8	2662.8	20.0	4088.6	1.0	257.6
PP 10	1.3	3328.8	5.1	14409.7	11.1	29958.0	0.2	200.1
PP 11	1.3	11472.4	5.5	48185.8	11.5	90861.3	0.2	931.2
PP 12	1.5	2279.2	5.9	9336.1	11.0	17203.6	0.2	150.8
PP 13	1.4	9591.6	5.8	43241.8	12.6	85343.8	0.1	846.5
PP 14	0.9	301.3	4.3	920.8	10.0	1700.4	0.0	12.7
PP 15	0.1	2.0	0.8	14.8	1.8	28.3	0.0	0.3
PP 16	1.1	2213.0	5.5	17803.9	12.2	40632.1	0.0	35.1
PP 17	1.2	1745.6	5.8	8982.1	15.0	19941.4	0.1	104.3
PP 18	1.2	45287.6	4.8	189420.8	9.9	372557.5	0.1	2454.8
PP 19	1.5	201.7	6.6	1336.9	16.5	2996.5	0.1	7.6
PP 20	3.9	830.0	13.9	5846.0	27.4	12224.4	0.7	62.7
PP 21	2.4	146.0	9.4	570.3	24.3	1403.3	0.3	17.4
PP 22	1.6	4763.9	6.6	22856.7	13.7	46763.2	0.2	232.8

	2 - Year		5 - Year		10 - Year		2 - Year (Pre Fire)	
Pour Point ID	Average Sediment Delivery Rate (Tons/Acre)	Total Sediment (Tons)	Average Sediment Delivery Rate (Tons/Acre)	Total Sediment (Tons)	Average Sediment Delivery Rate (Tons/Acre)	Total Sediment (Tons)	Average Sediment Delivery Rate (Tons/Acre)	Total Sediment (Tons)
Whole Fire Pre Fire	0.1	6,725.3	0.4	30,698.9	1.7	81,538.0	-	-
Whole Fire Post-Fire	1.1	91,058.5	4.5	388,360.9	9.7	772,438.9	-	-
							Pre-Fire Data	
PP 1	1.5	1516.8	6.2	6038.5	15.9	14170.1	0.2	163.3
PP 2	1.0	2000.3	4.4	8136.1	11.2	18423.1	0.1	195.8
PP 3	1.1	1156.6	4.7	4601.4	11.7	10775.5	0.1	128.6
PP 4	1.7	375.3	6.9	1484.9	17.1	3440.8	0.2	42.1
PP 5	1.6	441.0	6.7	1766.7	16.8	4002.1	0.2	45.9
PP 6	1.6	120.9	6.7	499.9	16.8	1125.1	0.2	11.7
PP 7	2.0	1457.5	7.1	5019.6	13.5	9315.0	0.3	230.6
PP 8	6.2	704.7	16.3	1832.6	23.6	2671.2	1.4	145.9
PP 9	4.6	981.9	12.8	2662.8	20.0	4088.6	1.0	257.6
PP 10	1.3	3328.8	5.1	14409.7	11.1	29958.0	0.2	200.1
PP 11	1.3	11472.4	5.5	48185.8	11.5	90861.3	0.2	931.2
PP 12	1.5	2279.2	5.9	9336.1	11.0	17203.6	0.2	150.8
PP 13	1.4	9591.6	5.8	43241.8	12.6	85343.8	0.1	846.5
PP 14	0.9	301.3	4.3	920.8	10.0	1700.4	0.0	12.7
PP 15	0.1	2.0	0.8	14.8	1.8	28.3	0.0	0.3
PP 16	1.1	2213.0	5.5	17803.9	12.2	40632.1	0.0	35.1
PP 17	1.2	1745.6	5.8	8982.1	15.0	19941.4	0.1	104.3
PP 18	1.2	45287.6	4.8	189420.8	9.9	372557.5	0.1	2454.8
PP 19	1.5	201.7	6.6	1336.9	16.5	2996.5	0.1	7.6
PP 20	3.9	830.0	13.9	5846.0	27.4	12224.4	0.7	62.7
PP 21	2.4	146.0	9.4	570.3	24.3	1403.3	0.3	17.4
PP 22	1.6	4763.9	6.6	22856.7	13.7	46763.2	0.2	232.8

PART V - SUMMARY OF ANALYSIS

Summary of Watershed Response

Erosion Response: In some, but not all pourpoint watersheds, significant erosion and sedimentation is expected. Most of the moderate burn severity, and even some of the low burn severity areas contain extremely low ground cover levels, which could contribute to high erosion levels. 57% of the fire area has either a high or very high erosion hazard rating. In pourpoint watersheds, sedimentation rate increases range from 2.8 X to 62 X above background in a 2-year runoff event, and range from 14.9 X to over 200 X increase in a 10-year runoff event. Sediment increases are the most pronounced on the steep slopes to the west of Cook peak (Pourpoints 1-6), and in the upper portions of Goat Ranch Canyon (Pourpoint 16) and Lynch Canyon (Pourpoint 11). However, fire-wide the erosion rates are much lower, averaging only 1.1 tons/acre in a 2-year runoff event, and 4.5 tons/acre in a 5 year runoff event.

Values at Risk

Threats to Soil Productivity**:**

Probability of Damage or Loss: **Likely**

Magnitude of Consequences: **Minor**

Risk Level: **Low**

An elevated level of erosion can be expected in the aftermath of the fire based on modeling of erosion and sedimentation and erosion risk analysis. However, this is a fire-adapted ecosystem that has evolved in the presence of fire, and many of the slopes with the highest predicted erosion are too steep to effectively treat with mulch. Of the ground that is treatable, erosion rates are not elevated high enough to constitute an emergency situation to soil productivity. Most pourpoint watersheds have erosion rates less than 3 tons/acre. Thus, no treatments are proposed to protect soil productivity.

ERMiT MODELING OF HILLSLOPE EROSION

Relative estimate of pre-fire erosion (5 year post-fire used as proxy for pre-fire erosion)

"Pre-Fire"
2-year runoff event

Probability %	50
Year after fire (1-5)	5

Summary For All Hillslopes		
	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	0.08	6725.3
Seeding	0.06	6229.7
Mulch: 0.5 tons/acre	0.06	6229.7
Mulch: 1 tons/acre	0.06	6229.7
Mulch: 1.5 tons/acre	0.06	6229.7
Mulch: 2 tons/acre	0.06	6229.7

"Pre-Fire"
5-year runoff event

Probability %	20
Year after fire (1-5)	5

Summary For All Hillslopes		
	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	0.36	30698.9
Seeding	0.31	29667.8
Mulch: 0.5 tons/acre	0.31	29667.8
Mulch: 1 tons/acre	0.31	29667.8
Mulch: 1.5 tons/acre	0.31	29667.8
Mulch: 2 tons/acre	0.31	29667.8

"Pre-Fire"
10 year runoff event

Probability %	10
Year after fire (1-5)	5

Summary For All Hillslopes	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	1.69	81538.0
Seeding	0.60	57258.0
Mulch: 0.5 tons/acre	0.60	57258.0
Mulch: 1 tons/acre	0.60	57258.0
Mulch: 1.5 tons/acre	0.60	57258.0
Mulch: 2 tons/acre	0.60	57258.0

Post-Fire
2 year runoff event

Probability %	50
Year after fire (1-5)	1

Summary For All Hillslopes	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	1.08	91058.5
Seeding	1.06	90562.9
Mulch: 0.5 tons/acre	0.12	11010.7
Mulch: 1 tons/acre	0.09	8075.8
Mulch: 1.5 tons/acre	0.08	7875.3
Mulch: 2 tons/acre	0.08	7632.9

Post-Fire
5-year runoff event

Probability %	20
Year after fire (1-5)	1

Summary For All Hillslopes		
	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	4.54	388360.9
Seeding	4.49	387329.7
Mulch: 0.5 tons/acre	0.63	51820.0
Mulch: 1 tons/acre	0.46	37778.1
Mulch: 1.5 tons/acre	0.45	37050.0
Mulch: 2 tons/acre	0.44	36308.4

Post-Fire
10-year runoff event

Probability %	10
Year after fire (1-5)	1

Summary For All Hillslopes		
	Average Sediment Delivery tons/acre	Total Sediment tons
Untreated	9.68	772438.9
Seeding	8.59	748159.0
Mulch: 0.5 tons/acre	1.23	100908.3
Mulch: 1 tons/acre	0.84	64622.4
Mulch: 1.5 tons/acre	0.81	61985.0
Mulch: 2 tons/acre	0.78	58649.7