

**KERLIN FIRE BURNED-AREA REPORT**  
(Reference FSH 2509.13)

**PART I - TYPE OF REQUEST**



Kerlin Fire in a burned plantation above Hyampom, CA

**A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds
- ☐ 2. Accomplishment Report
- ☐ 3. No Treatment Recommendation

**B. Type of Action**

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- ☐ 2. Interim Report # \_\_\_\_\_
  - ☐ Updating the initial funding request based on more accurate site data or design analysis
  - ☐ Status of accomplishments to date
- ☐ 3. Final Report (Following completion of work)



File Code: 2520

Date: September 28, 2018

Route To:

Subject: Kerlin Fire Burned Area Report

To: Regional Forester

Attached is the initial request for Burned Area Emergency Response (BAER) funding for the Kerlin Fire on the Shasta-Trinity National Forest. The fire burned 1,748 acres total all on National Forest lands. The fire began on September 12<sup>th</sup>, 2018 and was contained on September 20<sup>th</sup>, 2018.

I agree with the BAER Assessment findings that an emergency exists regarding threats to FS roads, soil productivity and hydrologic function, domestic water, potential for the spread of invasive weeds, and public safety along roads. The attached Initial 2500-8 BAER Report requests authorization to spend \$37,800 in emergency BAER funds for hazard warnings and closures to protect public safety, road work to control water on Forest System Roads, and to detect and respond to noxious weeds.

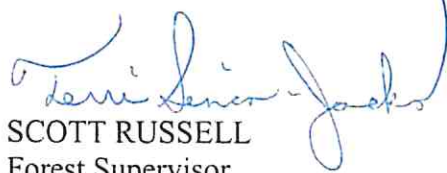
Approval is requested for treatments as follows:

Treatment	Request
Land Treatments	
Noxious Weed Detection Survey	\$ 6,600
Channel Treatments	\$ .....
Road and Trail Treatments	
Road Treatments	\$ 29,150
Trail Treatments	\$ .....
Protection and Safety	
Safety and Hazard Signing	\$ 1,050
Monitoring	
Road Treatment Monitoring	\$ 1,000
<b>Total</b>	<b>\$ 37,800</b>

\* This request does not include costs of the BAER Assessment team.

This request is made with the understanding that BAER funds are emergency funds which may be spent only in accordance with the treatments proposed and approved in the 2500-8, that BAER projects are emergency work, and implementation should be completed as soon as possible and before damaging storms. In all cases initial implementation must be completed before the earlier of one year after fire containment or funding authorization.

Please contact Brad Rust, Forest BAER Coordinator, at (530) 226-2427 if you have any questions.



SCOTT RUSSELL  
Forest Supervisor

cc: Regional BAER Coordinator



## **PART II - BURNED-AREA DESCRIPTION**

A. Fire Name: Kerlin Fire B. Fire Number: CA-SHF-001438  
C. State: CA D. County: Trinity  
E. Region: 5 F. Forest: Shasta-Trinity  
G. District: SFMU H. Fire Incident Job Code: P5L4KN18  
I. Date Fire Started: 9/12/2017 J. Date Fire Contained: 9/20/2018  
K. Suppression Cost: \$7.6 million

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 20
2. Fireline seeded (miles): 0
3. Other (identify): 0

M. Watershed Number (HUC 6): Hyampom (180102120502)

N. Acres Burned:

1,748 acres on FS lands.

O. Vegetation Types:

Mixed conifer on east side of South Fork Mountain above the South Fork of the Trinity River.

P. Dominant soils:

Holland, Marpa, and Neuns soil families

Q. Geologic Types:

Belt/Assemblage	Age	Terrane/Formation	Rock type
Western Paleozoic and Triassic	Paleozoic, Mesozoic	Rattlesnake Creek	Metavolcanics plus Metasediments, Diamictite, Hornblende Schist, Peridotite, Serpentine
Western Paleozoic and Triassic	Jurassic to Late Cretaceous	Western Klamath Pickett Peak	Metavolcanics, Metasediments, Micaceous Schist, Metagraywacke, Chert, Peridotite, Serpentine

R. Miles of Stream Channels by Order or Class: 36 miles perennial , 14 miles intermittent; 34 miles ephemeral

S. Transportation System:

Trails: 0 miles Roads: 32 miles

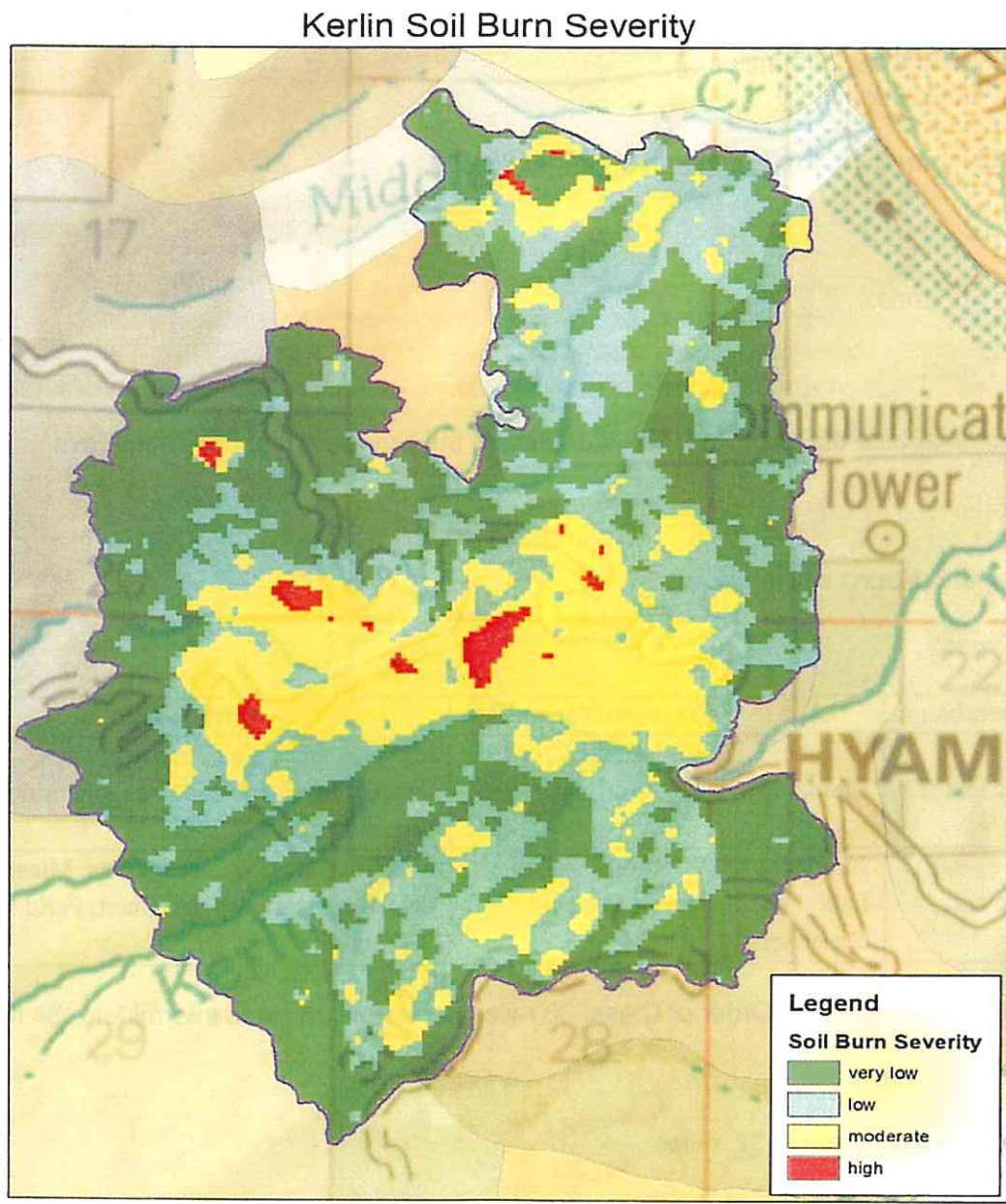


### PART III - WATERSHED CONDITION

#### A. Burn Severity:

Kerlin Fire Soil Burn Severity - Land Status Acres						
Land Status	Soil Burn Severity					
	unburned	very low	low	moderate	high	Grand Total
NON-FS	10.5	299.5	161.5	41.5	1.6	514.5
USDA FOREST SERVICE		550.6	358.9	307.4	19.9	1236.8
Grand Total	10.5	850.1	520.4	348.8	21.4	1751.2

#### Kerlin Fire Final Soil Burn Severity Map:



### **B. Water Repellent Soils:**

Water repellency is present in the moderate and high soil burn severity classes, approx. 4,053 acres, but patchy in occurrence. Where it occurs, the repellent layer is from 2 to 6 inches thick, moderate to severe, and 50-70% continuity. Generalizations for occurrence were coarse textured soils with hydrophobic producing vegetation that were completely consumed.

### **C. Soil Erosion Hazard Rating:**

Low = 860 acres, Moderate = 520 acres, High = 370 acres

### **D. Erosion Potential: (based on a 2-year 6hr storm)**

Kerlin Soil Erosion Potential ERMIT (major soils)		
Soil	Soil Burn Severity	Erosion for 2yr/6hr(t/ac)
Holland	Low	9.0
	Moderate	11.3
	High	22.0
Neuns	Low	8.3
	Moderate	10.5
	High	16.6
Marpa	Low	10.3
	Moderate	15.4
	High	18.6

### **E. Sediment Potential:**

Average sediment delivery potential is 40 to 50% due to flatten stream gradients before the South Fork of the Trinity, roughness of surface topography with rock fragments, and large downed wood for entrapment.

## **PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period, (years):	3-5
B. Design Chance of Success, (percent):	75
C. Equivalent Design Recurrence Interval, (years):	2
D. Design Storm Duration, (hours):	6
E. Design Storm Magnitude, (inches):	1.83
F. Design Flow, (cubic feet / second/ square mile):	90
G. Estimated Reduction in Infiltration, (percent):	40
H. Adjusted Design Flow, (cfs per square mile):	130

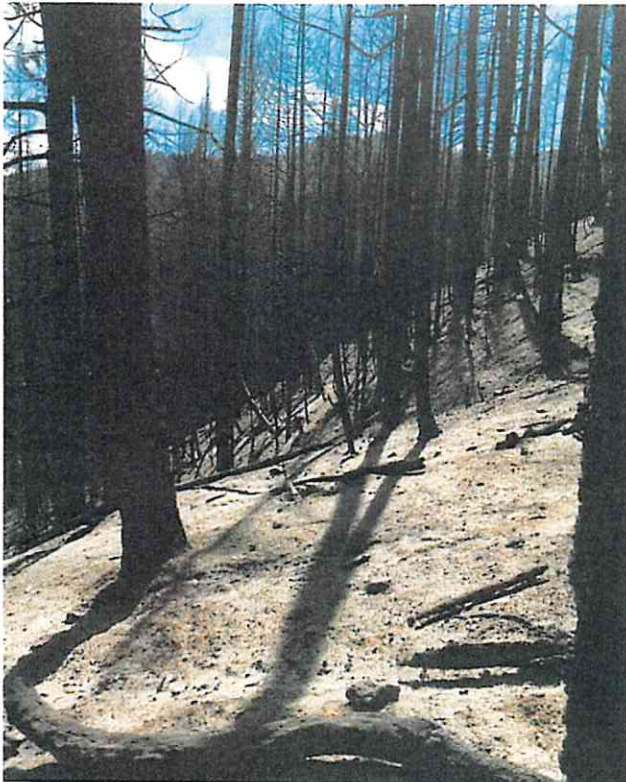


## PART V - SUMMARY OF ANALYSIS

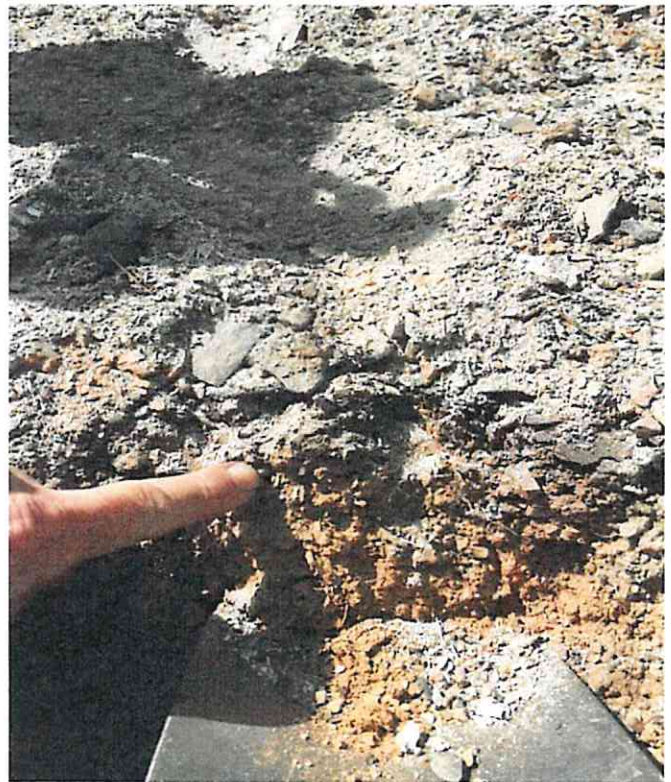
### **A. Describe Critical Values/Resources and Threats:**

**Background:** The Kerlin Fire was human caused and is under investigation is located two miles west of Hyampom, California in Trinity County below South Fork Mountain Range. The Kerlin Fire burned a total of 1,748 acres (1,237 acres Shasta-Trinity & 515 acres private) on steep rocky mountainsides to flat plateaus with mixed burn intensities. Approximately 21% 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.

General trends ridges burned moderate to high severity fed by aligned up-canyon South Fork River winds. Midslope areas burned moderate and lower areas along creeks and the Trinity River had low burn severity. In high soil burn severity areas on mixed brush/Douglas Fir/tanoak in Kerlin Creek had deep water repellency, deep, soil char, and repellency to 2 inches.



Kerlin fire high soil burn severity in gravelly loams



High soil burn severity topsoil destruction

### **Values at Risk:**

1. *Roads:*
  - a. Kerlin Creek road (3N14) and Mill Creek roads could experience excessive erosion and fill failures.
2. *Water supply and quality:*
  - a. Trinity River water quality for beneficial downriver use will be turbid in the burned area.
3. *Fisheries and Aquatic Invertebrates:*
  - a. South Fork of the Trinity River – The South Fork is a 301D listed river due to excessive sediments. Burned hillslopes, eroding sediments, and watershed with higher flows expected in the fire area.

- b. South Fork is an important fishery for the listed T&E Coho salmon and is a sediment impaired river making any excessive sediment will have an impact on Coho salmon.
- c. Foothill yellow-legged frog, erosion and sediments in the Trinity River.

4. *Ecosystem stability and Soil stability/productivity:*

- a. Road 3N14 and 3N50 from excessive erosion and slides.
- b. Concentrated large pocket of high soil burn severity in headwater pockets and reaches of Kerlin Creek and Mill Creek, all immediately above the Trinity River.

5. *Botany (T&E, noxious weeds):*

- a. Noxious weed issue due to multi-dozer lines throughout LSR.
- b. Presence of Knapweed along Trinity River that could have been drafted by helicopters from the river and dropped on firelines.

**B. Emergency Treatment Objectives:** To allow safe passage of water to protect Forest Service and PG&E infrastructures and watersheds from accelerated sheet and rill erosion. To protect water quality and fish and aquatic habitat from degeneration. To protect watersheds from the spread of noxious weeds and cultural site vandalism.

Risk determination is dependent on the design storm selected and downstream values at risk. By using an average storm (2-year event) emergency planning measures can be designed to mitigate and minimize anticipated risks. Emergency determination matrix displayed below shows if an emergency exists, probability of failure if untreated or treated, and treatment proposed to mitigate the emergency.

**Kerlin Fire Values @ Risk Emergency Determination Matrix**

<u>Value at Risk</u>	<u>Emergency</u> <u>U%(yes/no)T%</u>			<u>Reason</u>	<u>Treatment</u>
3N14 & 3N50	95	Y	25	Erosion	rolling-dips, culvert cleaning
Kerlin and Mill Creeks erosion and debris flows	95	Y	55	Burned hillslopes	Natural recovery & roadside chipping
Aquatics habitat – Trinity River	60	M	45	Eroded fine sediments	Natural recovery, increase flow
Water quality – Trinity River	70	M	55	Eroded fine sediments	Natural recovery, increase flow
Noxious weeds and T&E	80	Y	10	Firelines and powerlines	Detection survey and mulch
U = untreated; T = treated; Where Y = yes, M = maybe, and N = no					

**C. Probability of Completing Treatment Prior to Damaging Storm or Event:**

Land 95 % Channel - % Roads 90 Trails - % Protection/Safety 95 %

**D. Probability of Treatment Success**

	<u>Years after Treatment</u>		
	<u>1</u>	<u>3</u>	<u>5</u>
Land	-	-	-
Channel	-	-	-
Roads	90%	85%	80%



Trails	-	-	-
Protection/Safety	90%	95%	95%

**E. Cost of No-Action (Including Loss): \$750,000**

**F. Cost of Selected Alternative (Including Loss): \$37,800**

**G. Skills Represented on Burned-Area Survey Team:**

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input type="checkbox"/> Range	<input type="checkbox"/>
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	<input type="checkbox"/>
<input checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

Team Leader: Brad Rust

Email: brust@fs.fed.us

Phone: 530-226-2427

FAX: 530-226-2485

**H. Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities.)

**Land Treatments:**

**Treatment Type**

Early Detection Rapid Response (EDRR) surveys and treatments will be conducted in 2019 for Shasta-Trinity National Forest west side target noxious and invasive plant species. EDRR is a strategy developed to increase efficiency of weed work by combining surveying and immediate treatment of new weed populations as they are discovered. Areas disturbed during fire suppression (dozer lines and drop points) will be surveyed and treated to prevent new infestations. Surveys and treatments will be for one year only per BAER regulations.

**Treatment Objective**

Protect native plant communities and rare plant habitats from impacts of invasive plants. Prevent establishment of new infestations where propagules were introduced or spread by fire suppression efforts.

**Treatment Description**

Dozer lines and drop points will be surveyed and treated in spring/summer of 2019 at the appropriate time for each species; when plants are detectable but before they have gone to seed. There are about sixteen miles of dozer line and eight drop point locations that will be surveyed. Infestations will be inventoried using the Shasta-Trinity National Forest Invasive Plants Data Form, mapped with GPS locations, and flagged with noxious weed tape. Where feasible, new or isolated infestations will be treated by hand during the same visit as the surveys. Sites should be visited multiple times in the same year to ensure complete eradication of plants, to prevent seeds from being produced and spread.

**Treatment Cost**

Treatment costs are based on survey and treatment work being completed by two-person crews of Forest Service seasonal biological technicians, with direction from the west side Botanist (Table 3).



### Estimated cost of noxious weed survey and treatment in the Kerlin Fire.

Personnel	Daily Rate	# Days	Cost
GS-11 Botanist	380	3	\$1,140
GS-7 Bio Tech Crew Leader	200	13	\$2,600
GS-6 Bio Tech Crew Member	170	13	\$2,210
<b>Subtotal:</b>			\$5,950
Fleet/Materials	Cost	Miles/Units	Total
Mileage (100 miles/day x 13 days)	0.5	1300	\$650
<b>Subtotal:</b>			\$650
<b>Total:</b>			<b>\$6,600</b>

Natural Recovery: Vegetation in the mixed conifer will recover slowly. Even in areas of moderate soil burn severity, the canopy was mostly killed and the seed source removed. Stands with an element of Ponderosa pine will likely recover more quickly, since at least a few mature trees are likely to have survived to produce seed into newly exposed mineral soil. Meadows dominated by grasses and forbs will recover within a year, because for the most part soil temperatures were not hot enough to kill root systems. The montane chaparral shrubs were mostly killed by the fire, but fire stimulates manzanita seeds stored in the soil to germinate. In riparian areas along Saddle and Noname creeks, sedges and grasses were resprouting within 10 days of the fire, and most riparian shrubs are also likely to resprout.

Hillslope mulching: was not selected as a treatment since slopes were too steep and values at risk were not great enough to justify treatments.

### Heritage

The following cultural resources on FS lands were inspected for post fire concerns: Each site was thoroughly examined and documented. Then the sites were discussed with current Heritage Program Manager Matthew Padilla who concurred with the decision that no critical values were at risk.

### Sites on FS lands-

05-14-52-57 is a prehistoric site that was originally recorded in February third 1977. The original record notes artifacts related to food processing and tool manufacturing. However it is also mentioned that the site area was clear cut and logged in 1972. Then noted "100 % site destruction" according to the monitoring form dated 1983. A road to the landing and the landing itself that encompass the site area heavily damaged and cleared any features present. Since that time it would appear that the roads have been improved and regraded (evident by old berms in a number of locations). Further damaging the sites integrity. During the most recent visit during the Kerlin incident the landing was utilized as a drop point for parking engines and a water tender but did not burn over or get directly impacted by suppression activity. The site area was heavily surveyed but no artifacts where located on the existing road or landing utilized by the incident. A single unmodified chert nodule was located in a degraded timber pile and a single river cobble was found in an old berm covered in vegetation. It is likely that the site is ineligible for the national register but subsurface examination is likely required to confirm. However no direct or indirect effects from the incident caused the current site condition. Therefore with no erosion anticipated, no direct impacts from fire, and low integrity of the site since its initial recording; no treatments BAER treatments are being requested at this time.

05-14-52-145 is a prehistoric site that was originally recorded in February fourth 1980. The original record mentions broken milling stones, a broken point and a light lithic scatter. All artifacts were confined to a flat ridge in a 30m by 30m area. The record mentions that the site was destroyed/rearranged by logging when the area was clear cut, machine piled, burned and replanted with ponderosa pine. During the most recent visit during the Kerlin fire the area burned with a moderate intensity but was unaffected by suppression, mop-up, and repair activity. It was also evident that the vicinity burned earlier (2015) with a prominent burn scar near the site. The site area was heavily surveyed as well as the vicinity down slope but no artifacts where located. At least one stump near the site burned but no artifacts appeared to be effected. The ACT tag was located at the base of a 22" pine tree and rehung as best as possible. It is likely that the site is ineligible for the national

register but subsurface examination is likely required to confirm. However no direct or indirect effects from the incident caused the current site condition. Therefore with no erosion anticipated, no direct impacts from fire, and low integrity of the site since its initial recording; no treatments BAER treatments are being requested at this time.

05-14-52-146- is a ditch believed to be utilized for water conveyance in 1914. It was originally recorded February sixth 1980. According to the record it had been truncated by logging and associated road construction. The most recent visit during the Kerlin fire confirmed that road 3N14J had truncated the ditch to the NW leading to Mill creek and a skid road to the SE just before reaching private property. The vicinity ranged but burned low to moderate and no suppression or mop up damage occurred. A pine had fallen across the ditch but did not appear recent and was not cut. The area appears to be a plantation and if any other segments existed at that time they were likely destroyed when the plantation was initiated and/or harvested. This linear feature was recorded as a site but with the limited integrity left it is likely ineligible. While erosion is a possibility the majority of run off will likely follow the road that parallels the ditch on top of the ridge line. Since no direct impacts from fire and low integrity; no treatments are being requested at this time.

**Sites on private lands-** Two archaeological sites 05145200013 and 05145200014 located on private lands but were verified as not within the burned area nor where they damaged by contention suppression activities. The two sites are classified as values not at risk and no treatment is being requested by the BAER heritage specialist.

### **Roads Treatments:**

Forest roads within the fire area will be repaired as a result of suppression activity which is critical to protect road-bed and associated infrastructure. But because of the expected increase in watershed response, the assessment team feels that significant damage would occur on some roads in the fire perimeter due to undersized culverts and poor drainage. There is a likelihood that post burn conditions will increase runoff and the movement of sediment into drainage features, such as culvert inlets, overside drains, roadway dips and run outs, this occurrence could cause drainage function to fail and uncontrolled water to divert, resulting in a moderate risk of damage to the invested road improvements, loss of road function, and the denial of access. FS road 3N14 and 3N50 are of concern due to limited culvert sizes, plugged culverts, and potential of flooding.

There are road fill slope failures and compromised road subgrades caused by tree root and log burning in 3N14 and 3N50, and 3N50A.

**FS Roads** goal of restoring overall drainage function along with installing culvert inlet treatments, rolling-dips, and drainage armor will control water from moving off site reducing the risk to adjacent resources along some road.

- A. Treatments Type: will include culvert cleaning, fill slope reconstruction, and rolling dip installation.
- B. Treatment Objective: To repair damage caused by the fire, provide safe travel on the public transportation system and to mitigate future damage to the transportation system caused by post fire watershed conditions.
- C. Treatment Descriptions and Costs:



Road Costs	Rolling Dips (RD) /Armored Dips (AD)			Fill Burn-out Repair			Culvert Cleaning			
Road	Qty (each)	Each (\$)	Total Cost	Qty (each)	Cost Each	Total Cost	Each	cost/each	Total Cost	Overall Total
3N14	2	\$ 2,250	\$ 4,500	2	\$ 1,800	\$ 3,600	5	\$ 750	\$ 3,750	\$ 11,850
3N50	2	\$ 2,250	\$ 4,500	2	\$ 1,800	\$ 3,600	5	\$ 750	\$ 3,750	\$ 11,850
3N50A							3	\$ 750	\$ 2,250	\$ 2,250
Storm-patrol										\$ 2,200
Warning Signs (3ea)										\$ 1,000
			\$ 9,000			\$ 7,200			\$ 9,750	\$ 29,150

The work proposed herein is intended to stabilize the identified roads in preparation for the anticipated increase in stormwater runoff. We only identified treatments on high risk roads downstream of moderate and high severity burned areas. These treatments were identified as the most cost effective solutions with the highest probability of success to mitigate damage from the post fire stormwater events to the transportation system.

#### **Protection/Safety Treatments:**

**Safety:** Posting of areas burned will alert the public to potential dangers of falling trees and rolling rocks. Repair of road and trail signs burned will insure public safety. Posting of areas burned will alert the public to potential dangers of falling trees and rolling rocks (see road treatment costs).

#### **Heritage Resource Prescriptions:**

No direct or indirect effects from the incident caused the current site condition. Therefore with no erosion anticipated, no direct impacts from fire, and low integrity of these sites since its initial recording; no treatments BAER treatments are being requested at this time.

**Trail Treatments:** None selected use natural recovery.

#### **Protection/Safety Treatments:**

Posting of areas burned will alert the public to potential dangers of falling trees and rolling rocks on roads that will not be closed. Road and trail closure signs will protect the public from areas where road ( FS50 and 36N28Y) will be susceptible to dry ravel, downed trees, debris flows, and landslides.

#### **I. Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

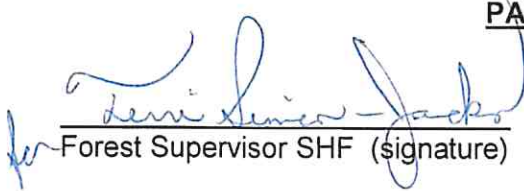
See Appendix A below for road monitoring.



**Part VI – Emergency Stabilization Treatments and Source of Funds**
**Initial # 1**

Kerlin BAER Costs			NFS Lands				Other Lands				Money Left
Line Items	Units	Unit Cost	# of Units	BAER \$	Spent \$	Units	Fed \$	Units	Non Fed \$	Total \$	
A. Land Treatments (L)											
NX Weed Det. Survey	project	\$6,600	1	\$6,600	\$0		\$0		\$0	\$0	
Subtotal Land Treatments				\$6,600	\$0		\$0		\$0	\$0	
B. Channel Treatments (L)											
Subtotal Channel Treatments				\$0	\$0		\$0		\$0	\$0	
C. Road and Trails (R&T)											
Roads - Stormproofing	project	\$29,150	1	\$29,150	\$0		\$0		\$0	\$0	
Subtotal Road & Trails				\$29,150	\$0		\$0		\$0	\$0	
D. Protection/Safety (P&S)											
Safety (hazard and warning signs)	each	\$350	3	\$1,050	\$0		\$0		\$0	\$0	
Subtotal Protection				\$1,050	\$0		\$0		\$0	\$0	
E. BAER Evaluation											
Assessment Team	0520	H5BAER	--	--	\$2,000	--	\$0	--	\$0	\$0	
Subtotal Evaluation				--	\$2,000	--	\$0	--	\$0	\$0	
F. Monitoring (M)											
Road Treatment Monitoring	ea	\$1,000	1	\$1,000	\$0		\$0		\$0	\$0	
Subtotal Monitoring				\$1,000	\$0		\$0		\$0	\$0	
G. Totals				\$37,800	\$0		\$0		\$0	\$0	
Previously approved					Comments:						
Total for this request				\$37,800							

**PART VII - APPROVALS**

1.  Forest Supervisor SHF (signature)

09/28/2018  
Date

2.  Regional Forester (signature)

10/17/2018  
Date

## **APPENDICES: Supporting Information:**

### **Appendix A: Storm-Patrol for Road Crossing Damage**

#### **Kerlin Fire 2018**

#### **Road Storm-Patrol**

The 2500-8 report requests funds to monitor the effectiveness of road crossing on Kerlin fire roads.

##### **1. Monitoring Questions**

- Is the road crossing stable?
- Is the road leading to concentrating runoff leading to unacceptable off-site consequences?

##### **2. Measurable Indicators**

- Rills and/or gullies forming of the road
- Loss of road bed.

##### **3. Data Collection Techniques**

- Photo documentation of site
- Inspection Checklist (attached)

##### **4. Analysis, evaluation, and reporting techniques**

- Monitoring will be conducted after storm events. If the monitoring shows the treatment to be ineffective at stabilizing road and there is extensive loss of road bed or infrastructure an interim report will be submitted. A several page report would be completed after the site visit. The report would include photographs and a recommendation on whether additional treatments are necessary.

#### **Road Inspection Checklist**

Date: \_\_\_\_\_

Inspector \_\_\_\_\_

Time: \_\_\_\_\_

Forest Road \_\_\_\_\_

Describe locations reviewed during inspection: \_\_\_\_\_

\_\_\_\_\_

Was there road damage? \_\_\_\_\_

Was Culvert plugged? \_\_\_\_\_

GPS) \_\_\_\_\_

Describe damage and cost to repair? (GPS) \_\_\_\_\_

Photo taken of road damage \_\_\_\_\_

Recommended actions to repair: \_\_\_\_\_

