

Date of Report: 10/23/2020

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

A. Type of Report

- 1. Funding request for estimated emergency stabilization funds
- 2. No Treatment Recommendation

B. Type of Action

- 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- 2. Interim Request # 1 in blue arial font
 - Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION*

*Statistics such as burn severity (acres), miles of stream, etc. were determined by watershed boundaries, regardless of Forest/Region. This 2500-8 covers the following major watersheds: Middle Fork Smith River (Slater – Six Rivers NF) and Indian Creek (Slater – Klamath NF) and a small portion of Rogue River-Siskiyou NF), and several other minor watersheds. Statistics associated with NFS infrastructure, natural and cultural resources not associated with watersheds were determined by forest boundaries. This 2500-8 covers the R5, Klamath and Six Rivers NFs portion of the Slater Fire.

A. Fire Name: Slater Fire

B. Fire Number: CA-KNF-007035

C. State: OR; CA

D. County: OR – Josephine; CA – Del Norte, Siskiyou

E. Region: R6; R5

F. Forest: Rogue River-Siskiyou (RRS); Klamath (KNF); and Six Rivers (SRF)

G. Districts: KNF - Happy Camp Ranger District; SRF - Gasquet Ranger District

H. Fire Incident Job Code: P5NKM3

I. Date Fire Started: 09/08/2020

J. Date Fire Contained: Est. 11/01/2020

K. Suppression Cost: \$44M as of 10/19/2020

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):

- 1. Fireline repaired (miles): KNF – 0; SRF - 15.5 miles
- 2. Other (identify): KNF - 2 point locations

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180102090102	Upper Indian Creek	26,723	24,273	91%

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180102090103	East Fork Indian Creek	11,786	11,779	100%
180102090101	South Fork Indian Creek	31,805	6,596	21%
180102090201	Thompson Creek	23,230	7,821	34%
180102090203	China Creek-Klamath River	25,368	5,588	22%
180102090601	Oak Flat-Klamath River	20,928	7,578	36%
180102090403	Lower Clear Creek	21,831	244	1%
1801010102	Middle Fork Smith River	83,733	4,324	5%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS - KNF	76,185
NFS - SRF	4,570
NFS – RRS*	2,193
OTHER FEDERAL (BIA)	80
OTHER NONFEDERAL	3,222
TOTAL	86,250

O. Vegetation Types: On Klamath National Forest lands (KNF) burned by the Slater fire vegetative communities are generally characterized as mixed conifer forests dominated by Douglas-fir (*Pseudotsuga menziesii*), sugar pine (*Pinus lambertiana*), ponderosa pine (*Pinus ponderosa*), Brewer’s spruce (*Picea breweriana*), Port Orford Cedar (*Chamaecyparis lawsoniana*) and incense cedar (*Calocedrus decurrens*), depending on slope and elevation. Common understory species include tan oak (*Notholithocarpus densiflorus*), Pacific madrone (*Arbutus menziesii*), California black oak (*Quercus kelloggii*), canyon live oak (*Quercus chrysolepis*), and manzanita (*Arctostaphylos spp.*).

On Six Rivers National Forest lands (SRF), overstory communities are comprised of tan oak (*Lithocarpus densiflorus*), canyon live oak (*Quercus chrysolepis*), chinquapin (*Chrysolepis chrysophylla*) and Douglas-fir (*Pseudotsuga menziesii*), with understories of big leaf maple (*Acer macrophyllum*), Pacific madrone (*Arbutus menziesii*), evergreen huckleberry (*Vaccinium ovatum*), and salal (*Gaultheria shallon*).

P. Dominant Soils: Soil families include the Clallam families (48%) and Deadwood-Clallam associations (17%), and 35 other map units (35%). Soil surface texture is very gravelly loam (71%). Roughly one-half of the burned area consists of slopes ranging from 30-90%; slopes ranging from 15-70% cover approximately 40% of the burned area. The very gravelly loam soils have low to moderate inherent erosion surface erosion properties with runoff potential defined by hydrologic groups C and D.

Q. Geologic Types: The Slater Fire lies within the Coast Range Physiographic Province and is underlain predominantly by the Rattlesnake Creek Terrane of the Paleozoic and Mesozoic Franciscan Assemblage. Rock types are composed of metasedimentary and metavolcanic rocks, ultramafic rock, granitic intrusive rock from Jurassic volcanism, and Quaternary sediments in the valleys. Steep dissected slopes composed of dormant landslides and with smaller active landslides within their toe zones are the dominant geomorphic features. Most active landslides are on steep channel banks and can occur upslope within larger dormant landslides or in other upland areas. Several large earthflows are in the fire area, most notably the Grayback Road Slide near Des Moines Creek which moves a few inches most years. Resource aerial photography show that steeper drainages have evidence of past debris flows due to extreme weather events such as the 1964/65 floods. Small debris slides occurred post-Natchez Fire in response to 2019 spring convective storms, but they dissipated quickly and only resulted in no impacts to roads and resources

Table 3: Geologic Types

Terrane/Formation	Age	Rock Type
Serpentinite Mélange	Mid- to Late Jurassic	Metavolcanics plus peridotite, and serpentinite

(Franciscan Assemblage) Rattlesnake Terranes (Franciscan Assemblage)	Jurassic to Middle Cretaceous	Metavolcanics, metasediments, micaceous and graphitic schists, metagraywacke, phyllite, peridotite, serpentinite
Intrusive Volcanics		Granitic intrusions; gabbro, Diabase, diorite, and tonalite
Basinal Sediments and Landslide Deposits	Neogene, Quaternary	Sedimentary, fluvial, lacustrine, alluvium/colluvium

R. Miles of Stream Channels by Order or Class:

Table 4: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	156.5
INTERMITTENT	259.9
EPHEMERAL	60.6

S. Transportation System:

Trails: National Forest (miles): KNF – 3.0; SRF – 0
Roads: National Forest (miles): see table below

Other (miles):
Other: Non USFS Roads (miles): 22.3

Table 5: Roads: National Forest (miles)

	KNF	SRF
Unauthorized Routes	0.0	0
Level 1 - Administrative Use	0.0	0
Level 2 - High Clearance Vehicle	204.3	17.06
Level 3-5 - Passenger Vehicles	75.7	3.11
TOTAL	280.1	20.17

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 6: Burn Severity Acres by Ownership

Soil Burn Severity	NFS – KNF	NFS - SRF	NFS - RRS*	Other Federal (BIA)	Other Nonfederal	Total	% within the Fire Perimeter
Unburned	2,111	299	1	-	50	2,461	3%
Low	23,606	4,070	494	60	1,990	30,220	35%
Moderate	45,844	200	1,356	20	1,158	48,578	56%
High	4,624	1	342	-	24	4,991	6%
Total	76,185	4,570	2,193	80	3,222	86,250	100%

B. Water-Repellent Soil (acres): 18,922 (22%)

Estimated as a function of inherent repellency that varies by soil texture as influenced by SBS.

C. Soil Erosion Hazard Rating:

Table 7: Miles of Stream Channels by Order or Class

EROSION HAZARD	ACRES	(%)
High	7,793	10%
Moderate	10,765	12%
Low	67,692	78%
Total	86,250	100%

D. Erosion Potential: 48 tons/acre over 2 years (2-year averages range from 33 to 62 tons/acre).

Year 1 average is 54 tons/acre with range from 36 to 69 tons/acre; year 2 average is 42 tons/acre with range from 33 to 62 tons/year. Total potential erosion across the fire areas estimated using ERMiT. Estimated value is based on the next 24-month time period without treatment.

E. Sediment Potential: 14,716 yd³/mi²/yr (postfire year 1); 11,442 yd³/mi²/yr (postfire year 2)

Estimated value derived from ERMiT eroded volumes as a function of sediment delivery ratio (SDR) that accounts for hillslope sediment travel distances and hillslope storage.

F. Estimated Vegetative Recovery Period (years):

Estimated shrub recovery is 3-5 years with natural conifer recovery estimated at 100 years.

G. Estimated Hydrologic Response (brief description):

The following information pertains to all watersheds located within the Slater Fire perimeter that drain to the Klamath and Smith Rivers. The watershed response to the Slater Fires will be variable and largely driven by the amount of moderate and low severity burn acres.

The post-fire hydrologic response for the assessment area was modelled by selecting a subset of watersheds and determining pre and post-burn peak flows using the Wildcat5 rainfall-runoff hydrograph model and USGS regional regression equations that were adjusted for bulking factors to account for increased flows and sediment. Watersheds chosen for analysis were delineated by selecting a pour point (an outlet of a catchment that all runoff passes through) that was often associated with a value at risk in watersheds where burn severity was predominantly moderate and/or high.

The largest changes in hydrologic response are predicted for the Indian Creek watershed which experienced disproportionately higher acres of moderate burn severity when compared to the rest of the assessment area. The increased hydrologic response will be characterized by increases in runoff, woody debris and sediment, the latter which should mostly originate from adjacent channel slopes due to sloughing and bank failures.

The hydrologic response is predicted to be much lower in the Thompson Creek watershed (east of Indian Creek) and the watersheds located in the western portions of the Slater Fire on the Six Rivers National Forest due to a greater amount of low burn severity acres.

Modelled post-fire runoff responses are variable throughout the fire area but can be characterized by increased peak flows in throughout the burn area with substantial increases in the Indian Creek watershed. Runoff in the Indian Creek watershed is predicted to be almost 2 times higher than pre-fire conditions. Runoff in Little Grider Creek is expected to be about 2/3 greater than pre-fire conditions. Predicated runoff amounts trend lower in watersheds located to the west of Indian Creek and on the Six Rivers National Forest.

An important consideration for evaluating the hydrologic response in the Indian Creek watershed is that it is being driven more by loss of vegetative cover than soil burn severity. While the soil burn severity is mostly moderate, nearly all vegetation in the East Fork and Lower South Fork of Indian Creek was burned. The hydrologic response from these watershed areas will be driven by the loss of the forest canopy and decreases in evapotranspiration. The same can also be said for the Little Grider Creek watershed. Peak flows are expected to be considerably higher than pre-fire conditions due to the loss of forest and ground cover in both areas.

It is also worth noting that the entire East Fork Indian Creek watershed burned in the Slater Fire. Only 21%

of the South Fork Indian Creek watershed burned, however much of the remainder was burned in 2018 in the Natchez Fire. The past fire activity will also influence the hydrologic response of the South Fork Indian Creek watershed.

Lastly it is important to note that this analysis is intended to address the first damaging storm in the rainy season. The modelling does not consider the effects of subsequent storms which may be larger and exhibit greater hydrologic responses.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Slater Fire incident began near Slater Butte on the Happy Camp Ranger District of the Klamath National Forest on September 8, 2020 during a period of very strong winds. The fire grew very quickly and rapidly ran down Indian Valley through the community of Happy Camp due to an unstable air mass, strong winds/northeast winds, very hot temperatures and low humidity. This resulted in extreme fire behavior with the fire burning over 100,000 acres in the first 48 hours. The Slater Fire quickly spread onto the Rogue River-Siskiyou National Forest in Oregon (R6) and the Six Rivers National Forest in California (R5). Previous fire occurrences over the past 10 years greatly impacted fire spread in several areas of the Slater Fire.

A. Describe Critical Values/Resources and Threats (narrative):

A comprehensive list of potential values at risk within or directly downstream of the Slater burned area was compiled through consultation with local management and resource specialists and through BAER Team on the ground assessment. (It can be requested from the Project Record). Following guidance in Interim Directive 2520-2013-1, the BAER assessment team evaluated this list of values through field assessment and subsequent analysis to identify the critical values (FSM 2523.1 – Exhibit 01) that may be treated under the BAER program (Appendix A) The critical values were then assigned a level of risk defined by the probability of damage or loss coupled with the magnitude of consequences using the risk assessment matrix (FSM 2523.1 – Exhibit 02). The critical values with unacceptable risks signify a burned-area emergency exists. The characterization of the probability of damage or loss is based on the watershed response analysis completed by the BAER Assessment. Critical values having a “Very High” or “High” risk rating include recommended emergency stabilization actions known to mitigate potential threats or minimize expected damage, which are described below. No treatments were identified for values when the analysis resulted in an “Intermediate” or lower risk rating for all categories except for human life/safety. These intermediate risk areas were identified and discussed with the recommended treatment consisting of coordination with local, state, and other federal cooperators. Additionally, critical warning signs are recommended in some areas with an intermediate risk.

Table 8: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

1. Human Life and Safety (HLS):

- a. **Very High to High** risk to human life/safety on NFS land from threats associated with hazard trees, rock fall, increased flooding and debris flows, and loss of egress/access throughout the burned area, but particularly on roads and trails **in the burn and downstream of the burn**. Treatment recommendations are temporary closures, install warning signage for both roads and trails, and storm patrol inspections and response to ensure treatments are functioning as intended. (KNF and SRF)
- b. **Very High** risk to the public exists due to hazardous materials introduced to water sources in and downstream of the burn area due to chemicals leaching from up to **five** NFS burnt

- bridges. Recommended treatment is the removal of the remnants of the burnt bridges. (KNF)
- c. **Very High to High** to human life/safety from driving off five bridges or due to bridges collapsing (Mill Creek, Upper East Indian Fork Bridge, West Branch bridge, Doolittle bridge, and Upper West Branch Bridge (FS48-Grayback Rd). Treatment recommendations include installing signs and construct berms to physically close some of the bridges until an inspection can be completed, temporary closures and install warning signs. (KNF)
 - d. **Very High to High** risk to human life/safety on NFS land from threats associated with hazard trees, rock fall, increased flooding and debris flows throughout the burned area, but particularly travelling cross country on foot or by horseback. Treatment recommendations include temporary closures and install warning signage at major access points before entering the burn and along roads and trails. (KNF and SRF).
 - e. **Very High** risk to human life/safety on NFS land from threats associated with hazard trees and rock fall at the East Fork Indian Creek Trailhead. Treatment recommendations include temporary closures and install warning signage. This trailhead will need to be assessed for hazard trees prior to reopening. (KNF)
 - f. **Very High** risk to human life/safety on NFS land from threats associated with hazard trees, falling into stump holes, interacting with debris from burnt infrastructure, and sewage contamination at West Branch Campground. Treatment recommendations include temporary closures and install warning signage, removal of smaller unsalvageable burnt debris, and pumping the CXT. This site will need to be assessed for hazard trees prior to reopening. (KNF)
 - g. **High** risk to human life and safety of Forest visitors and employees accessing operational maintenance level (OPML) 1 and decommissioned roads; now devoid of vegetation. Forest visitors and employees may be at risk due to inadvertently travelling on unmonitored templates. Treatment recommendations include installing temporary closures and warning signage. (KNF)
 - h. **Intermediate** risk to human life/safety from driving off seven bridges or due to bridges collapsing (Indian Mill Bridge, Indian Mill 2 Bridge, Tom Grey Bridge, Perkins Bridge, Green Mill Bridge, South Fork Indian Bridge, and East Indian Bridge). Treatment recommendations include temporary closures and install warning signs. (KNF)
 - i. **Intermediate** risks to human life/safety on NFS lands from threats associated with increased flooding, hazard trees, interacting with debris from burnt infrastructure, and sewage contamination at Curly Jack Campground, the Scenic Overlook on Greyback Road, and at the Indian Creek River Access. Treatment recommendations include temporary closures and install warning signage, removal of smaller unsalvageable burnt debris, and pumping the CXT. These sites will need to be assessed for hazard trees prior to reopening. (KNF)
 - j. **Low** risk to human life/safety along the River Trail. No treatment recommended. (KNF)

There may be an increased threat to private residences within and adjacent to the fire perimeter, to Highway 96 and 199, and to authorized permitted water systems (~15). The potential for flash flooding, debris flows, falling rocks and trees poses a threat to human life/safety as well as loss of ingress and egress to landowners if road systems are impacted. Water quality for domestic water sources may be at an increased risk from burnt hazardous material becoming mobilized and entering the streams and or leaching into the ground water. Several private residences exist within and downstream from the fire area. Coordination and information sharing with landowners, Karuk Tribe, NRCS, CalTrans, and emergency services is recommended. (KNF and SRF)

2. **Property (P):Very High to High** risk to 169 miles of NFS roads (OPML 2-5) and associated NFS road infrastructure (12 bridges) in moderate to high soil burn severity with substantial damage expected because flooding, debris flows, and erosion is imminent. Post fire conditions and predicted watershed response indicate increased runoff, excessive sedimentation, debris flows, and rockfall will occur into roadway drainage features, such as such as roadside ditches, culvert inlets, over side drains, roadway dips and run outs. Once these drainage features become impacted and overwhelmed, their function fails, allowing uncontrolled water to divert, resulting in major damage to

the road and invested road improvements, loss of road function, and the denial of access along some road segments. Treatment recommendations are improving road drainage features, temporary closures, install warning signage, and storm patrol inspections and response to ensure treatments are functioning as intended. (KNF)

- b. **Very High to High** risk to less than 1 mile of NFS roads (OPML 2-3) with substantial damage expected because flooding, debris flows, and erosion is imminent. Post fire conditions and predicted watershed response indicate increased runoff, excessive sedimentation, debris flows, and rockfall will occur into roadway drainage features, such as such as roadside ditches, culvert inlets, over side drains, roadway dips and run outs. Once these drainage features become impacted and overwhelmed, their function fails, allowing uncontrolled water to divert, resulting in major damage to the road and invested road improvements, loss of road function, and the denial of access along some road segments. Treatment recommendations are temporary closures, install warning signage, and storm patrol inspections and response to ensure treatments are functioning as intended. (SRF)
- c. **High** risk to FS property along the East Fork Indian Trail within and downslope from hillslopes burned at a moderate to high severity due to an increased threat erosion of trail tread, impacts to trail at crossings, trail blockage by eroded soil, dry ravel and or falling burned trees. Areas of concern short segments and are not contiguous. Major stream crossings are well armored. No treatment recommended. (KNF)
- d. **High** risk exists to the USFS property at West Branch Campground found in the burn area due to increased flooding and hazardous trees impacting the features at these locations. Treatments recommended include the removal of imminent hazard trees (~40), temporary closures and install warning signage.(KNF)
- e. **Intermediate** risk to 116 miles of NFS roads (OPML 2-5) and associated NFS road infrastructure in low soil burn severity “stacked” above or in between roads in moderate to high soil burn severity expected because flooding, debris flows, and erosion is possible. Post fire conditions and predicted watershed response indicate increased runoff, debris flows, and rockfall will occur into roadway drainage features, such as such as roadside ditches, culvert inlets, over side drains, roadway dips and run outs. Once these drainage features become impacted and overwhelmed, their function fails, allowing uncontrolled water to divert, resulting in major damage to the road and invested road improvements, loss of road function, and the denial of access along some road segments. No treatments are recommended at this time. (KNF)
- f. **Immediate** risk exists to the property at Curly Jack Campground and Indian Creek River Access site found in or just downstream of the burn area due to increased flooding. Treatment recommended at Curly Jack Campground includes install warning signage. Treatment recommended at Indian Creek River Access includes install warning signage and pumping the CXT. Water quality concerns will be mitigated with the pumping of the CXT. (KNF)
- g. **Immediate** risk exists to the USFS barracks at the Happy Camp Work Center and the Happy Camp District Office just downstream of the burn area due to increased flooding. Treatment recommendations will be coordinated with National Weather Service to establish trigger points regarding watches and warnings. Develop an evacuation plan for these two facilities to initiate when triggers are met. (KNF)
- h. **Low** risk to FS property along the River Trail. No treatment recommended. (KNF)

There may be an increased threat to private property within and adjacent to the fire perimeter, to Highway 96 and 199, and to authorized permitted water systems (~15). The potential for flash flooding, debris flows, falling rocks and trees poses a threat to this property as well as loss of ingress and egress to landowners if road systems are impacted. Several private residences exist within and downstream from the fire area. Coordination and information sharing with landowners, Karuk Tribe, NRCS, CalTrans, and emergency services is recommended. (KNF and SRF)

3. **Natural Resources (NR):Very High, High, and Intermediate** risk to hydrologic function from loss of ground cover and coarse woody debris, mass erosion, flooding and debris flows that scour channels

below the root structure of the surviving plant communities. Approximately 62% of the fire burned at moderate to high severity, the threat to hydrologic function exists to varying degrees in all subwatersheds with significant moderate to high severity. The highest threat is within the Indian Creek drainage. Treatment recommended is natural recovery. Impacts to hydrologic functions will benefit from the proposed roads, trails and land treatments. (KNF and SRF)

- b. **Very High to High** risk to water quality from hazardous materials mobilizing and or leaching into the domestic water supply. Areas of concern include NFS lands at West Branch Campground area where infrastructure burned, from up to five burnt bridge now located in the channel in the burn area, and potential unidentified marijuana grow sites. Sewage contamination could impact domestic water supply within the burn area from the flooding and overwhelming of a CXT at West Branch Campground and Indian Creek River Access. Treatments recommended include removal of burnt bridge material out of the channel and pump two CXTs. (KNF)
- c. **Very High to High** risk to water quality 303d listed streams from the increase in sediment delivery to the channels and loss of canopy cover which could impact water temperature. Treatment recommended is natural recovery. However; other proposed treatments will result in benefits to this value. (KNF and SRF)
- d. **Very High, High to Intermediate** risk for water quality concerns and loss of designated critical habitat for Coho salmon and native fisheries, in particular fall chinook (culturally significant) due to the probability of increase flows resulting in flooding, excess sedimentation input, spillage of raw sewage, and the mobilization of hazardous materials into the waterways. For aquatic species, post-fire impacts will include compromised water quality and changes in water chemistry due to ash delivery and hazardous materials, changes in water temperature from loss of canopy shading and increased sedimentation, scouring of riparian/aquatic vegetation, and changes in streambed/pool habitat due to geomorphic movement (debris flows), and flushing of individual fish downstream during flood events. These combined impacts may lead to a long-term loss or reduction of suitable stream habitat for Coho salmon and other native fish. For all fish species, there is a concern that until enough vegetative recovery has occurred habitat degradation will continue. Treatment recommended is directionally felling of trees at critical points on a tributary below culverts. Additionally, specific fisheries treatments to reduce potential impacts to habitat will rely on the road stabilization treatment. (KNF and SRF)
- e. **Very High, High, and Intermediate** risk for loss of suitable designated critical habitat for the Northern Spotted Owl due to the loss of suitable foraging habitat and loss of crown vegetation. The loss of crown vegetation will likely lead to Activity Center abandonment due to the lack of suitable habitat and suitable foraging habitat. Treatment recommended is natural recovery and leave large diameter trees whenever practicable. (KNF and SRF)
- f. **High** risk to native plant communities, endemic sensitive plant habitats, and special botanical interest areas due to the risk of invasive species spread and introduction to uninfested areas within and adjacent to the Slater Fire. Loss of duff, competing vegetation, and canopy cover in areas with moderate to high soil burn severity creates a vulnerable habitat susceptible to invasion by adjacent disturbed noxious weed sites. Treatments recommended include early detection rapid response (EDRR) surveys. (KNF and SRF)
- g. **High** risk to native Port Orford Cedar communities uninfected by the non-native pathogen, *Phyophthora lateralis*. This introduction of infected water, soil, or other debris into uninfected Port Orford stands occurs during fire suppression. Winter closures for the protection of Port Orford Cedar communities are already in place for many of the roads within the burn area. Additionally, other proposed treatments such as the administrative closure will result in benefits to this value. (KNF)
- h. **Low** risk to soil productivity. There is potential for accelerated erosion to occur across the burned area primarily due to the loss of overstory and understory canopy, with higher increases likely in isolated locations delineated as high SBS. However, within the Moderate SBS areas (56% of area), gravelly and very gravelly surface soil textures, surface rock and intact woody debris that remains armors the soil surface and these conditions are expected to limit soil detachment from rainfall, keeping accelerated erosion to slightly higher than

- inherent surface erosion rates. The concerns are primarily associated with higher risk to hydrologic function from precipitation and snowmelt runoff. Additional threats to soil quality from accelerated erosion and introduction of non-native and invasive plant species exist from unauthorized OHV intrusions due to the loss of physical and vegetative barriers. Treatment recommended is natural recovery. However; other proposed treatments will result in benefits to this value. (KNF and SRF).
- i. **Low** risk to water quality from localized debris flows and the reactivation of landslides increasing inputs of ash and sediment. Treatment recommended is natural recovery. However; other proposed treatments will result in benefits to this value. (KNF and SRF)
 - j. **Low** risk to water quality ORV impacts to the Klamath River, which is a designated wild and scenic river. Treatment recommended is natural recovery. However; other proposed treatments will result in benefits to this value. (KNF)
4. **Cultural and Heritage Resources:** **High** risk to eligible cultural and historic sites due to an increased threat from increased runoff, erosion, flooding, or debris flow causing irreversible damage. There are 3 cultural sites within moderate and high soil burn severity the burned area. All three of these sites will benefit from erosion control mitigation. Cultural resources will benefit from the proposed road stabilization treatments. (KNF)
- b. **High** risk to sacred/cultural ceremonial sites and traditional hunting and gathering sites due to loss of access to these sites, an increased threat from increased runoff, erosion, flooding, or debris flow causing irreversible damage to native fisheries, and due to the introduction and spread of invasive species into native plant communities and sensitive plant habitats. Treatment recommended is natural recovery. However; other proposed treatments will result in benefits to this value. (KNF and SRF)

There are numerous NFS values that are not BAER Critical Values in addition to non-NFS values potentially at risk from post-fire threats originating primarily on NFS lands. These are summarized in a "Values at Risk" (VAR) table in the assessment project record. Treatments for these other values have not been identified. Activities to address the non-BAER Critical Values on NFS lands can be considered for the "pilot program" and or discretionary program funding. It is recommended the non-NFS values potentially threatened by post-fire conditions be communicated to the appropriate parties through interagency coordination procedures.

B. Emergency Treatment Objectives:

- a. Reduce the post-fire risks to human life and safety through administrative closures and warning signage. These signs also serve to accelerate natural recovery by preventing travel off roads and trails.
- b. Protect or minimize damage to high-value NFS investments within the burned area. Minimize damage to key NFS travel routes within and downstream the fire boundary.
- c. Protect or mitigate potential post-fire impacts to critical natural resources within the burned area. Implement treatments that minimize threats to water quality for municipal and domestic water supplies from the leaching and mobilization of hazardous material associated with up to four burnt bridges currently located in the channel.
- d. Treat invasive plants that are a threat to naturalized ecosystems by minimizing the expansion of existing populations in the burned area and control of expected invasion of noxious weeds within and adjacent to the area where soils/vegetation was disturbed as a result of fire suppression activities.
- e. Assist cooperators with the interpretation of the assessment findings to identify potential post-fire impacts to communities and residences, domestic water supplies, public utilities (including power transmission facilities, cellular towers, roads, and other infrastructure).
- f. Reduce impacts to water quality and downstream values.
- g. Mitigate effects of changed post-fire watershed response on natural resources such as federally listed species, historic properties and sacred/cultural resources.

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

Land: 75%

Channel: 50%
Roads/Trails: 75%
Protection/Safety: 85%

D. Probability of Treatment Success

Table 9: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	75	85	95
Channel	75	85	95
Roads/Trails	75	85	95
Protection/Safety	80	70*	60*
*Initially, visitors will heed the warning signs. Complacency is expected after the initial year unless there are continued damaging events			

E. Cost of No-Action (Including Loss):

Slater Fire (KNF) - \$8,563,500 is the Market Resource Value with a 0.9 Reduction in Probability of Loss as determined from the VAR Worksheet. The VAR tool uses Risk-based Assessment to evaluate cost-effectiveness for proposed treatments to mitigate potential damage to Values-at-Risk (VAR). Analysis in this tool is based on a combination of applying benefit/cost ratios (B/C ratio) for Market Value resources and the Implied Minimum Value (IMV) method for Non-market Value resources.

F. Cost of Selected Alternative (Including Loss):

Alternative 1: Implementation of recommended response actions listed below is based on market resources only and is economically justified with the following benefit:cost ratio: Slater Fire (KNF) – 16.4

The likely probability of loss if treatments were not applied is based on field observations and estimate of damage or loss with the longer duration precipitation event. For the recommended treatments there is a reduced probability of damage or loss with implementation. The expected loss would not be as costly when implementing the recommended treatments. The VAR analysis focused primarily on market values so potential benefits such as lowering level of risk to human life and safety, natural resources, and cultural resources were recognized in this BAER assessment, but not included in the cost basis for Values at Risk analysis.

Alternative 2: Implementation of recommended response actions listed below and helimulching (~20,000 acres) is not economically justified with the following benefit:cost ratio: Slater Fire (KNF) – 0.3

G. Skills Represented on Burned-Area Survey Team:

- Soils Hydrology Engineering GIS Archaeology
- Weeds/Botany Recreation Fisheries Wildlife
- Other: Geology and Information

Team Leader: Mary Moore
Email: mary.c.moore@usda.gov

Phone(s): 719-486-4872

KNF Forest BAER Coordinator: William (Bill) Wall, Klamath National Forest
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Team Members: *Table 10: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	Mary Moore
<i>Soils</i>	Terry Hardy
<i>Hydrology</i>	Rebecca Lloyd, Steve Bachmann, Kelcy Hutson (t), Anna Chinchilli (t)
<i>Geology</i>	Derek Beal
<i>Engineering</i>	Annora Nelson, Larry Arlington, Samuel Marano (t), Benjamin Molitor, David Wohlers (t), Kevin Retta (t)
<i>GIS</i>	Jim Schmidt, Daniel Reinkensmeyer (t)
<i>Archaeology</i>	Jamison Jordan (t)
<i>Weeds/Botany</i>	Erin Lonergan
<i>Recreation</i>	Sarah Borman (t)
<i>Wildlife</i>	Derrick Olinger (t), Kyle Pritchard (t)
<i>Fish</i>	Kate Olsen
<i>Information</i>	Cathleen Thompson

H. Treatment Narrative:

Land Treatments:

[EDRR \(Early Detection Rapid Response\) Surveys and Treatment \(KNF and SRF\)](#)

Conduct Early Detection Rapid Response (EDRR) surveys and treatments for Klamath and Six Rivers National Forest target invasive plant species. On the KNF approximately 21.7 miles of roads and 233 acres of susceptible area within the fire area will be surveyed and treated. On the SRF approximately 47 miles of improved roads and 3 miles of fire line within the fire area will be surveyed and treated. EDRR is a strategy developed to increase efficiency of weed work by combining surveying, mapping, and immediate treatment of new weed infestations as they are discovered. Areas adjacent to existing infestations and areas disturbed during fire suppression (fire lines, staging areas, spike camps, transport routes, etc.) will be surveyed for new infestations and treated to prevent establishment. Existing infestations which had previously been controlled or near eradication will be treated in order to limit fire-induced expansion.

Survey priority areas in spring or early summer of 2021 when plants are detectable but early enough to treat effectively (prior to maturation and dispersal of seed). Where feasible, new or isolated infestations will be treated by hand or mechanically (e.g. string-trimmer) during the same visit as the surveys. If the infestation is too large to treat during the survey, then plan and implement a follow-up treatment visit. Select manual, mechanical, or chemical treatment dependent upon weed species and location

This treatment is to protect native plant communities, endemic sensitive plant habitats, and special botanical interest areas from impacts of invasive plant species. Prevent fire-induced expansion of known infestations within the fire area. Prevent establishment of new infestations in locations where propagules were introduced or spread by fire suppression efforts.

[Cultural Stabilization Treatment \(KNF\)](#)

There is a high risk to three cultural resource sites within the burn perimeter. Impacts include loss of sites and/or site integrity as a result of erosion, runoff, and flash flooding from post wildfire storm events and an increased potential for looting resulting from increased public access to sites and exposure of previously concealed artifacts and features. The objective for the treatment of the sites is to stabilize the soils to preserve the existing stratigraphy, integrity of the artifacts and features, context of artifacts

and features, and the prevention of looting and disturbance of the site. Mulching combined with annual monitoring of the treated sites can be applied to reduce the possibility of the loss of the resource.

Channel Treatments:

T&E Aquatic Treatment (KNF)

Often limbless burned trees will fall across narrow V-shaped valleys, spanning the channel and will not contact flows, even during flood events. Although there is ample large woody material in the burned area, directional felling aims to get trees into the channel of intermediate and perennial tributaries to Aquatic T&E habitat. Directionally felling trees into channels, rather than across, gives these tributaries a chance to capture sediment before it enters spawning reaches. Targeting sites downstream of roads increases the likelihood of success related to site access and allows us to target areas of highest concern for issues with roads. By targeting concentrations of High soil burn severity, we aim to capture sediment from areas with highest potential to erode. The near-term objectives of this work are to keep high rates of sediment from moving through the system rapidly during the first damaging event, while the mid-term objectives will be to capture debris and sediment during higher flows later in the year.

A few sources were used to determine the treatment specifications, including literature, regional references and conversations with local biologists. Treatments are planned to occur within 11 reaches, with each reach expecting a different number of treatments, totaling 19 treatments. Ideally, we are targeting trees greater than 24" diameter at breast height (DBH), at a rate of 15 trees felled per quarter mile. The implementation team will have to discuss tree size and determine the site-specific locations. If we are limited by availability of trees of size or by wildlife BMPs, smaller trees should be considered, keeping in mind that treatments are to prevent impacts from first damaging events, and not annual flood flows, so trees <24" DBH may still be beneficial. Due to the nature of this landscape, the implementation team will have to take a hard look at the feasibility of this work keeping safety at the forefront of planning. The efficacy of this treatment lies on the anticipation that we can treat many of the tributaries between high severity burn areas and spawning habitat, but if greater than 50% of reaches can't be treated, treatment efficacy should be reconsidered.

Roads and Trail Treatments:

Road Stabilization (KNF):

For the purpose of BAER, road infrastructure (OP ML 2-5) within areas of High/Moderate SBS areas was prioritized for both inspection and treatment. Road mileage data from these roads are 169 miles for the Klamath NF and 0.44 miles for the Six Rivers NF. Because of time constraints, road conditions, and hazards present during the inspection phase, visual inspection of roads was limited to an estimated 114.4 miles. Initial Request includes the minimal treatments required to remedy increased runoff and erosion resulting from the burn area which are directly adjacent to roads in high to moderate soil burn severity. Initial treatments include installation of drain dips (with or without armor); culvert cleaning; ditch cleaning; and template reshaping to provide positive drainage to ditches and culverts. Imminent hazard trees shall be removed as directed by the Engineer, to create a safe work environment at each work site. Complete BAER Assessment is pending.

Brief objectives and description of the road stabilization treatments are as follows:

1. Drop Inlet Lid
 - i. Objective: Replace Burned Drop Inlet Lid to protect drop inlet and associated culvert from debris.
 - ii. Description: Lid to completely cover top of drop inlet.
2. Burned Hole Repair in Road
 - i. Objective: Repair fire damage in traveled way of the road to provide for safe travel.
 - ii. Description: Excavate all woody debris, fill and compact with appropriate material.
3. Install Warning Signs
 - i. Objective: Notify public of potential road hazards and unsafe conditions.

- ii. Description: Install signs at Forest entry points and replace fire damaged warning signs.
- 4. Construct Dip
 - i. Objective: Provide relief flow path for flooded roadway or overwhelmed culvert crossings to minimize diversion potential, associated erosion and subsequent damage of road prism.
 - ii. Description: Excavate a drivable dip in road surface that will safely pass flow from overwhelmed drainage.
- 5. Construct Lead Off Ditch
 - i. Objective: Provide drainage away from the road prism.
 - ii. Description: Excavate ditch away from drainage points in road prism.
- 6. Armor Fill Slope
 - i. Objective: Protect fill slopes with riprap bases and outlets where drainage may concentrate and erode.
 - ii. Description: Haul and Place riprap on exposed fill slopes.
- 7. Armor Inlet
 - i. Objective: Protect Inlets with riprap where increased flows may exceed open channel flow capacity, allowing for full pipe flow.
 - ii. Description: Haul and Place riprap in catch basins and around pipe inlet.
- 8. Install Drop Inlet
 - i. Objective: Protect pipe drainage from debris and deposition.
 - ii. Description: Install vertical CMP riser at the inlet end of pipe.
- 9. Install Check Dam
 - i. Objective: Capture debris and sediment prior to pipe inlet.
 - ii. Description: Install straw bales anchored with T-posts upstream from culverts in low gradient drainages.
- 10. Remove Culvert
 - i. Objective: Remove drainage structures that are expected to fail to reduce sedimentation.
 - ii. Description: Excavate and remove culvert, pull back and shape slope to original channel dimensions.
- 11. Install Culvert
 - i. Objective: Allow flows to pass through road to avoid damage to road prism.
 - ii. Description: Install or replace culvert at designated location.

No funds are being requested at this time for Road Stabilization on the 0.44 miles on the SRF.

Protection/Safety Treatments:

Administrative Closure (KNF):

Initial Request includes administrative closure and public warning signs for the fire area; an estimated 15 road and 15 trail signs and developed recreation sites are identified. Complete BAER Assessment is pending. No additional funds are being requested at this time.

Administrative Closure (SRF):

Initial Request includes administrative closure and public warning signs for the fire area; an estimated 5 road and 10 trail signs are identified. Complete BAER Assessment is pending. No additional funds are being requested at this time.

Storm Inspection Roads (KNF):

For the purpose of BAER, road infrastructure (OP ML 2-5) within areas of High/Moderate SBS areas was prioritized for both inspection and treatment. Road mileage data from these roads are 169 miles for the Klamath NF and 0.44 miles for the Six Rivers NF. Initial Request includes post-storm inspection for roads. Immediately upon receiving heavy rain and spring snowmelt the FS will send out patrols to identify road hazardous conditions. Observations and corrective actions are identified before they worsen, jeopardize motor vehicle users and/or road tread. Complete BAER Assessment is pending.

Storm Inspection Roads (SRF):

For the purpose of BAER, road infrastructure (OP ML 2-5) within areas of High/Moderate SBS areas was prioritized for both inspection and treatment. Road mileage data from these roads are 169 miles for the Klamath NF and 0.44 miles for the Six Rivers NF. Initial Request includes post-storm inspection for roads. Immediately upon receiving heavy rain and spring snowmelt the FS will send out patrols to identify road hazardous conditions. Observations and corrective actions are identified before they worsen, jeopardize motor vehicle users and/or road tread. Complete BAER Assessment is pending. No additional funds are being requested at this time.

Storm Response Roads (KNF):

For the purpose of BAER, road infrastructure (OP ML 2-5) within areas of High/Moderate SBS areas was prioritized for both inspection and treatment. Road mileage data from these roads are 169 miles for the Klamath NF and 0.44 miles for the Six Rivers NF. Initial Request includes post-storm response for roads. Observations and corrective actions are identified in post-storm inspections. Emergency action may be required before they worsen, jeopardize motor vehicle users and/or road tread. Complete BAER Assessment is pending.

Storm Response Roads (SRF):

For the purpose of BAER, road infrastructure (OP ML 2-5) within areas of High/Moderate SBS areas was prioritized for both inspection and treatment. Road mileage data from these roads are 169 miles for the Klamath NF and 0.44 miles for the Six Rivers NF. Initial Request includes post-storm response for roads. Observations and corrective actions are identified in post-storm inspections. Emergency action may be required before they worsen, jeopardize motor vehicle users and/or road tread. Complete BAER Assessment is pending. No additional funds are being requested at this time.

Hazardous Material Removal (KNF):

Initial Request includes hazardous material removal of four burnt bridges within the fire area. Complete BAER Assessment is pending. Field verification of these four bridges identified this treatment is a little larger in scale than initially anticipated.

Recreation Site Protection (KNF):

The fire burned around several campgrounds, recreation facilities and trailheads. The treatment is to fall imminent hazard trees at the West Branch campground. Removal of nonsalvageable burnt infrastructure would occur at West Branch Campground and the Scenic Overlook on Greyback Road. CXTs would be pumped at West Branch Campground and Indian Creek River Access. The purpose of the treatment is to prevent damage to recreation infrastructure from fire damaged trees and reduce human contact to hazardous materials and or raw sewage. The fire burned in the surrounding areas of the campgrounds, cabin and trailheads resulting in the mortality to pockets of trees in and around the developed sites. A dead tree is considered a hazard tree in a developed area setting. Falling of these trees will prevent further damage to campground structures (undamaged by the fire) and prevent unnecessary injury to the public or their property.

I. Monitoring Narrative:

Forest personnel will conduct implementation monitoring of the BAER treatments to check that treatments are present and functioning properly.

This report is an interim #1 funding request based on a rapid assessment. If additional treatment needs are identified through more site specific on the ground investigation in cooperation with interested agencies, or through further field analysis location or noxious weed detection surveys, interim requests for additional funding will be filed. These funding requests will identify the purpose for each treatment, and specific treatment specifications, locations, and number of each treatment. A detailed implementation and treatment effectiveness monitoring plan will be submitted as a separate document to the Regional BAER coordinator.