BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[**X**] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[**X**] 1. Initial Request (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)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Sunrise

B. Fire Number: MT-LNF-001336

C. State: Montana

D. County: Mineral

E. Region: 01 - Northern

F. Forest: 16 - Lolo

G. Districts: Superior, Ninemile

H. Fire Incident Job Code: P1K51R (0116)

I. Date Fire Started: July 16, 2017

J. Date Fire Contained: Est. 10/31/2017

K. Suppression Cost: $31M (as of 09/13/2017)

L. Fire Suppression Damages Repaired with Suppression Funds:

Reference the Sunrise Fire suppression rehabilitation plan for more information.

1. Fireline water barred (miles): Approximately 34 miles of dozer line, 1 miles of masticator/plow line, and 6 miles of hand line. An estimated 90 miles of existing roads were used as fireline. Equipment lines were repaired using excavators and handcrews. Water bars will be constructed and slash applied, where appropriate on any firelines.
2. Fireline seeded (miles): Approximately 34 miles of dozer line, 1 miles of masticator line, and 6 miles of hand line. Seeding is planned prior to snowfall.
3. Other (identify): Incident base camps, spike camps, staging areas, drop points, and helispots (roughly 53 locations) are identified for suppression repair activities, including seeding, planting, ripping or scarification, and blocking motorized vehicle access where needed.

M. Watershed Number:

HUC12 Name	HUC12 Number
Lower Trout Creek	170102040608
Meadow Creek-Clark Fork	170102040606
Quartz Creek	170102040604
Second Creek-Clark Fork	170102040609
Upper Trout Creek	170102040607

N. Total Acres Burned: 26,517 acres (analysis boundary as of 09/07/2017)

NFS (24,103) Other Federal (0) State (2) Private (1138)

These acres are based on the BAER analysis area and will differ from the fire perimeter acreage provided on Inciweb.

O. Vegetation Types: Ridges primarily consist of mixed conifer including lodgepole, subalpine fir, and spruce, with occasional whitebark pine and are dominated by subalpine fir/beargrass (ABLA/XETE) and Douglas-fir/huckleberry-beargrass (PSME/VAGL-XETE) habitat types. North and east aspect hillslopes support primarily Douglas-fir, larch, lodgepole, and grand fir (ABGR/CLUN), and ponderosa pine/Douglas fir with larch inclusions (PSME/PHMA). South facing slopes consist of open grown ponderosa pine and Douglas-fir with a primary habitat type of Douglas-fir/rough fescue (PSME/FESC). Valley bottoms support grand fir and western red cedar with a habitat type of western red cedar/queencup beadlily (THPL/CLUN).

P. Dominant Soils: Soils within the Sunrise Fire are generally derived from metasedimentary deposits that have been influenced by the flooding and rapid draining of historic Glacial Lake Missoula. Soil texture is a silt loam with a 45% rock content. The development of organic soil horizons is limited in these areas, generally no more than 1 to 2 inches depending on elevation and aspect. At high elevations (above 4200 feet), wind-blown ash from Mount Mazama has deposited, resulting in a thin (<1 inch) ash cap.

Q. Geologic Types: The Sunrise Fire area has underlying geology comprised of weakly-weathered meta-sedimentary rocks that are part of the Belt Rock Supergroup. This geologic type is highly stable. Geomorphic features within this fire area were influenced by Glacial Lake Missoula, which caused flooding and rapid draining throughout the Sunrise Fire perimeter, leaving behind swales and draws that may carry perennial or intermittent streams. Glacial Lake Missoula features are more prone to soil and rock movement, especially on steep slopes >45%.

R. Miles of Stream Channels by Class:
Perennial: 13 miles Intermittent: 42 miles

S. Transportation System (miles)
NFS Roads: 97 miles NFS Trails: 0 miles

PART III - WATERSHED CONDITION

A. Burn Severity:

Sunrise Fire	Acres	Percent	NFS	State	Private
High	1984	7	1957	0	28
Moderate	6891	26	6439	0	452
Low	10326	39	9118	0	1208
Unburned/Very Low	7315	28	6590	2	722
Total	**26517**		**24103**	**2**	**1138**

B. Water-Repellent Soil (acres): 225 acres showed moderate to strong hydrophobic character. This is representative of 11% of the high burn severity area, which is < 1% of the total burned area.

C. Soil Erosion Hazard Rating (acres):
940 (low) 11,539 (moderate) 14,037 (high)

D. Erosion Potential: 1.75 tons/acre

ERMiT predictions indicate post-fire soil loss ranges between 1.1 to 2.4 tons/acre for a 10-year storm event, depending on slope length, shape, soil depth, and steepness. This is greater than a ten-fold increase above background pre-fire erosion rates. Given the100 years of climate records from the Orofino (ID) weather station, the greatest propensity for a precipitation event of that magnitude to occur would be as a spring rain-on-snow event or high-intensity summer thunderstorm.

E. Sediment Potential: 681 yd^3mi^2 (cumulative sediment delivery for first 2 years post-fire).

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1-3 grass (achieve % effective ground cover), 5-10 shrubs, 20-50 conifers

B. Design Chance of Success, (percent): 50-90%, depending on site and treatment

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 24 hour

E. Design Storm Magnitude, (inches): 3.6

F. Design Flow, (cubic feet/second/square mile): 24-30, varies by drainage

G. Estimated Reduction in Infiltration, (percent): 11% of high burn severity soils are at risk for reduce soil water infiltration. This represents < 1% of the entire burned area.

H. Adjusted Design Flow, (cfs per square mile): 34-318, varies by drainage, see table

PART V - SUMMARY OF ANALYSIS

Background: The Sunrise Fire started on July 16, 2017 and grew to 24,784 acres on August 19th. The BAER assessment team initiated field reconnaissance of the burned area on September 6th, using a BAER assessment perimeter of 26,517 acres. At that time the fire was 90% contained so there were minimal access restrictions to the burned area for the BAER assessment team. The Sunrise fire burned in the Trout Creek, Verde Creek, Sunrise Creek, Meadow Creek, and Quartz Creek drainages on the Superior and Ninemile Ranger Districts, Lolo National Forest. These drainages are tributary to the Clark Fork River.

The primary values at risk from post-fire effects due to the Sunrise Fire are: human life and safety, transportation infrastructure (roads and culverts), soil productivity, water quality, and native vegetation communities. The primary threats caused by the fire include increased runoff, which is expected to intensify the first 2-3 years following the fire until the burned watersheds recover and accelerated hillslope erosion as a result of amplified runoff and decreased infiltration rates. High intensity, short duration rainfall may result in valley bottom flooding and localized debris flows, primarily in the Meadow, Sunrise, and Verde drainages. Additional threats originating from the destabilized hillslopes throughout the burned area include falling trees and rolling rocks.

A. Describe Critical Values/Resources and Threats (narrative):
(formatted to incorporate “Critical Values and Risk Assessment” from WO ID 2520-2015-1)

1. Human Life and Safety:

Potential threats to visitors/recreating public, residents of private lands, & Forest Service employees include flooding with a minor potential for localized debris flows, hazard trees and rock fall, and loss of ingress and egress. These threats exist along roads, at recreation areas, and to permitted uses downstream or downslope of burned slopes, particularly in areas with a high or moderate soil burn severity. Risk is increased with higher probability in places having greater access and more frequent concentrations of people. Locations with increased risk include: road systems within the Meadow, Sunrise, Verde, and Trout Creek drainages. Trout Creek Campground is also at a low risk for impacts due to upstream burned areas.

Very high risk (likely, major) to **forest visitors and Forest Service employees** within and adjacent to the burned area travelling NFS roads within the Quartz, Meadow, Sunrise, Verde, and Trout Creek drainages, and at developed recreation sites due to the increased threat **of falling trees, rolling rocks, flash floods, and debris flows** within the burned area. *(Treatments PS-01 Warning Signs, RT-05 Access Barriers)*

Intermediate risk (possible, moderate) to recreating **forest visitors and Forest Service employees** working in the Trout Creek campground and picnic area due to the increased threat of **flash floods, debris flows, falling rocks, and trees**. *(Treatment PS-01 Warning Signs)*

There may be increased risk to private residents within and adjacent to the fire perimeter including residents in Quartz, Meadow, and Sunrise Creeks. The potential for flash flooding, debris flows, falling rocks, and trees poses a threat 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 and emergency services is recommended.

2. Property:

There are 97 miles of National Forest System Roads (NFSR) within the fire area and 196 miles of undetermined roads within the fire area. Post-burn conditions and the predicted watershed response indicate the potential for an increase in runoff, with movement of sediment and debris downslope into roadway drainage features, such as roadside ditches, culvert inlets, roadway dips and run outs. Once these drainage features become impacted and overwhelmed by the increased runoff, their function fails allowing uncontrolled water to divert, resulting in major damage to the invested road improvements, loss of road function, and loss of access along some road segments.

There is a **very high risk** (likely, major) where **NFS roads** cross perennial and intermittent drainages from **increased runoff and debris flows**. Undersized culverts and inadequate drainage structures are not expected to convey the expected increase in post-fire runoff which can severely damage NFS road infrastructure. NFS roads within high and moderate burn severity areas are concerns for these risks. *(Treatments: RT-01 Road Drainage Maintenance, RT-02 Culvert Removal, RT-03 Culvert Modification, RT-04 Culvert Upsizing, RT-05 Access Barriers, and RT-06 Storm Patrols)*

There is a **high risk** (possible, major) to **NFS road prisms** from **increased overland flow and accelerated hillslope erosion** concentrating on road segments downslope from areas burned at moderate and high severity. Damage to or failure of road segments constitute a loss of Forest Service infrastructure, with accelerated sediment delivered to downslope streams resulting in **threats to water quality**. *(Treatments: RT-01 Road Drainage Maintenance, RT-05 Access Barriers, and RT-06 Storm Patrols)*

Several private residences exist within and downstream from the fire area. There may be increased risk to non-NFS properties within and adjacent to the fire perimeter including residences within the Quartz, Meadow, and Sunrise Creek drainages. The potential for flash flooding, debris flows, falling rocks and hazard trees pose threats to privately-owned dwellings. Coordination and information sharing with landowners and emergency services is recommended.

3. Natural Resources

Bull Trout

There is a **low risk** (unlikely, moderate) to ESA-listed species **bull trout (***Salvelinus confluentus***) designated critical habitat** in the **Trout Creek** drainage. This risk assessment is based on the low percentage of total acreage burned within the Trout Creek watershed (with only 4% burned at high severity). Core spawning and rearing habitat is threatened by potential for increased sediment delivery from burned slopes, though in this case, risk is low, associated with intact vegetation between the burned area and stream channel which acts as a buffer for sediment delivery. The probability for damage to this watershed is “unlikely” and magnitude of consequences “minor” for risk to bull trout. No BAER treatments are recommended.

Native Plant Communities

The West Zone of the Lolo National Forest has unique terrestrial habitats with strong native plant communities. The risk to native plant communities was analyzed in the context of threats associated with noxious weed spread into the burned area. The level of risk is associated with

habitat type and potential for noxious weed spread to those plant communities. Overall, the presence of known weed infestations adjacent to currently uninfested areas or by infested corridors such as roads bisecting these areas within the fire perimeter are a considerable threat to **native plant communities**. Roughly 11,671 acres within the Sunrise fire are at **high risk** (likely, moderate) from **weed infestation** based on the Lolo NF Plan Amendment No. 11 (Noxious Weed Management). Typically less vulnerable habitat groups such as group 3 (4,465 acres within this group) are at an intermediate risk of weed spread and infestation due to mineral soil exposure from fire.

BAER treatments are recommended for early detection and rapid response (EDRR) on 6,343 acres of the 11,671 acres of habitat groups assessed at **high risk** (likely, moderate) for threats from **noxious weed spread and infestation**. These treatments will focus on vectors with high potential for weed spread including road right-of-ways, known noxious weed populations, and sites disturbed during fire suppression activities, in particular dozer lines, drop points, and staging areas. *(Treatments: L-01 EDRR)*

The following summarizes the risks to habitat groups from noxious weeds:

Risk Assessment for Potential Weed Spread and Establishment within the Sunrise Fire Perimeter

Lolo NF Habitat Groups at Ecological Risk	Estimate of Habitat Group Acres	Weed Species Threat
High Risk		
0,1, 2	11,671	Spotted knapweed, St. Johnswort, meadow hawkweed, oxeye daisy
Intermediate Risk		
3	4,465	Spotted knapweed, St. Johnswort, meadow hawkweed, oxeye daisy
Low Risk		
4A, 4B, 4C, 4D, 5, 6	8,112	Spotted knapweed, St. Johnswort, meadow hawkweed, oxeye daisy

Soil Productivity and Hydrologic Function

There is a **high risk** (likely, moderate) to **soil productivity and hydrologic function** associated with known post-fire watershed threats including accelerated hillslope and sheet erosion, rilling, gullying, and increased overland flows in moderate and high burn severity areas. It is acknowledged that post-burn environments result in a deterioration of soil productivity, with impacts to organic matter, soil development, and biogeochemical processes. Analysis of existing soil conditions and land-types within the burned area suggests that while these areas have an elevated erosion hazard, the potential for erosion events will be localized and will not result in a long-term degradation of soils. While these impacts are significant in the short term, natural soil recovery is considered the best treatment, and the risk the soil productivity as a BAER critical value is low. It is anticipated that soil productivity will be influenced by burned acres in the short term (< 10 years) and as forest floor recovery occurs, the risks to soil productivity and hydrologic function will diminish. There are no treatments recommended to protect the BAER critical values of soil productivity and hydrologic function, however other land and road treatments will benefit these values.

4. Cultural and Heritage Resources:

A very low risk (likely, moderate) to **critical Cultural and Heritage Resources** within the burn perimeter. The Sunrise fire area includes the Historic Cedar Quartz Mining District, and these sites have not been evaluated for the National Register of Historic Places. Based on assessment of BAER critical values no risks were determined and no treatments are recommended.

5. Other non-BAER Values:

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. Treatments for these other values have not been identified. Activities to address the non-BAER Critical Values on NFS lands can be considered for 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.

B. Emergency Treatment Objectives:

Mitigate and protect, to the extent possible, threats to personal injury or human life of forest visitors and Forest Service employees by raising awareness through posting hazard warning signs on roads, improving stream crossings, and communicate hazard of flooding, debris flows, and rock fall. Provide safe access to the burned area for personnel implementing authorized BAER response actions and communicate threats to cooperating agencies and community groups. Consider temporary closures to protect public users of NFS lands and recreation facilities.

Protect or minimize damage to NFS investments in roads infrastructure by installing drainage features capable of withstanding potential increased stream flows and/or debris flows. Minimize damage to key NFS travel routes.

Protect or mitigate potential post-fire impacts to critical natural resources within the burned area. Implement treatments that minimize threats to naturalized ecosystems by minimizing the potential for expansion of non-native invasive species (NNIS) into the burned area; minimize expected invasion of NNIS within and adjacent to the area where soils and vegetation was disturbed as a result of fire suppression activities.

Mitigate potential post-fire impacts to cultural resources and assess cultural sites that were inaccessible prior to fire containment to prevent irretrievable loss of archaeological assets.

Evaluate authorized BAER treatments and existing infrastructure to determine effectiveness in post-fire flow conditions. Monitor weeds for effectiveness of BAER treatments and to identify need for future treatments.

Assist cooperators, other local, State, and Federal agencies with the interpretation of the assessment findings to identify and address potential post-fire impacts to communities and residences, domestic water supplies, public utilities (including power lines, roads, and other infrastructure).

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

Land - 80% Channel - NA Roads/Trails - 70% Protection/Safety - 90%

D. Probability of Treatment Success

Treatment	Years after Treatment		
	1	3	5
Land	80	80	90
Channel	NA	NA	NA
Roads/Trails	80	90	90
Protection/Safety	90	80	70
Initially, visitors will heed the warning signs. Complacency is expected after the initial year unless there is a damaging event.			

E. Cost of No-Action (Including Loss): $2,800,000 (based on replacement cost of road infrastructure.)

The majority of the roads within the burned area are built on steep ground with large cut and fill slopes and a considerable number drainage features. For the 60 miles of high priority roads being recommended for treatment, the no-action is estimated from roughly 20 miles of arterial collector roads @ $60,000 replacement cost/mile and 40 miles of local/spur roads @ $40,000 replacement cost/mile.

Mitigation of potential loss of life or injury, soil productivity, and ecological integrity were accumulated values considered when developing road treatment recommendations. While it is acknowledged the road treatments will reduce hazards to human life and impacts to natural resource, it is impossible to factor a monetary loss for these values into the cost of no-action.

F. Cost of Selected Alternative (Including Loss): $226,330 (based on replacement cost of road infrastructure.)

There is a 30% chance the proposed road treatments may not be effective or possibly not implemented prior to the first damaging event. The cost of the selected alternative is estimated using the funding requested for the road treatment plus this 30% chance of failure (($174,100 + (0.3 * 174,100)).

G. Skills Represented on Burned-Area Survey Team:

[**X**] Hydrology	[**X**] Soils	[ ] Geology	[ ] Range	[ ] Recreation
[ ] Forestry	[ ] Wildlife	[ ] Fire Mgmt.	[**X**] Engineering	[ ] Minerals/HazMat
[ ] Contracting	[ ] Ecology	[**X**] Botany	[**X**] Archaeology	[**X**] Vegetation
[ ] Fisheries	[ ] Research	[**X**] GIS	[ ] Landscape Arch	

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H. Treatment Narrative:

Land Treatments:

L-01 EDRR (Early Detection and Rapid Response): EDRR is necessary to prevent the establishment and spread of noxious weeds into the unique native plant communities burned in the Sunrise Fire. EDRR will be used to minimize the potential for new noxious weed infestations and ensure the natural recovery of native perennial grasses and forbs. This treatment will also ensure the ecological indicators (soil stability, hydrologic function, and biotic integrity) are functioning properly during the natural recovery period on lands administered by the FS. Chemical treatment of new and existing noxious weed infestations will reduce the likelihood of spread to disturbed areas and help re-establish high quality wildlife habitat within the burn.

Fire is a disturbance that provides a receptive avenue for the spread of noxious weeds and/or invasive species. Noxious weeds and non-native invasive species are a concern for biodiversity. Weed invasion is a potentially threatening process leading to competition and habitat modification. Plant communities and native species likely to be at greatest risk from weed invasion are those which occupy weed-prone habitats, such as riparian zones, forestlands with naturally low understory vegetation cover, and disturbed areas adjacent to and near existing weed infestations. On the Sunrise Fire disturbances caused by suppression forces (dozer lines, drop points, etc.) and transportation routes (roads and trails) are the main vectors for noxious weed invasion. This treatment mitigates this risk by allowing for an early means of detecting new noxious weed occurrences in highly susceptible areas and a quick response for control.

Critical areas to consider for treatment include riparian habitat, roads, dozer lines, ephemeral drainages, and burned areas where suppression vehicles and equipment traveled through known noxious weed populations. Moderate and severely burned areas generally have altered soil structure and reduced organic matter content creating more favorable germination substrate for weed seeds. Undisturbed areas in the drier habitat type groups in the fire area are also at risk. Of 293 total road miles in the fire area, 174 were identified for EDRR, 4.5 acres per mile was used to account for roadside and areas of undetermined roads which included the running road surface.

- Treatments adjacent to roads used to access the fire perimeter or used as fireline are the highest priority. These locations contain the seed source for weed spread into the burned area. The immediate need is to treat roads adjacent to approximately 1,162 acres. The soil organic cover and the tree and shrub canopy layer of the adjacent area was removed by mixed severity fire. This condition increases the potential of rapid establishment and spread of weeds. The primary weed threats are spotted knapweed, St. Johnswort, meadow hawkweed, and oxeye daisy. The recommended treatment is spray application of 7 oz. Aminopyralid (trade name – Milestone) per acre near any water and 32 oz. of Picloram per acre in the dryer areas along with a surfactant to control spotted knapweed, St Johnswort, oxeye daisy, and meadow hawkweed.

- The treatment of disturbed sites used for fire suppression (drop points, helispots) are the next highest priority. The immediate need is to treat 12 sites located on NFS lands, totaling approximately 3 acres. These areas were cleared of native vegetation, leaving an exposed mineral seedbed conducive to the establishment of noxious weeds. The recommended treatment is spray application of 7 oz. Aminopyralid (trade name – Milestone) per acre near any water and 32 oz. of Picloram per acre in the dryer areas

along with a surfactant to control spotted knapweed, St Johnswort, oxeye daisy and meadow hawkweed.

– Disturbed areas within and along the fire perimeter, such as dozer lines, hand lines, staging areas and safety zones will be prioritized for EDRR. Additional EDRR will take place on 4,013 acres of highly susceptible habitat groups that experienced high severity fire. In these locations, the organic layer and the tree and shrub canopy layer was removed by the fire. This condition allows for the potential of rapid establishment and spread of these weeds. EDRR is necessary to prevent the establishment and spread of noxious weeds and non-native invasive species into these burned area and the loss of elk winter range values.

EDRR Cost Estimate

Description	Target Weed Species	Prescription	Estimated Acres	Cost per Acre	Cost	Timing
EDRR Fire Line and Roads	Spotted Knapweed, St. Johnswort, Meadow Hawkweed Complex, Oxeye Daisy	7 oz. Aminopyralid per acre or 32 oz. of picloram per acre with a surfactant	783	$70.00/acre (implemented by district personnel and IDIQ contract)	$54,810	Spring 2018
EDRR Fire Suppression Site Impacts	Spotted Knapweed, St. Johnswort, Meadow Hawkweed Complex, Oxeye Daisy	7 oz. Aminopyralid per acre or 32 oz. of picloram per acre with a surfactant	3	$160.00/acre (implemented by district personnel and IDIQ contract)	$480	Spring 2018

Channel Treatments: none proposed

Road and Trail Treatments:

R-01 Road Drainage Maintenance (storm proofing): In areas with high and moderate burn severity there is an elevated threat to National Forest system roads, associated with increased runoff on burned slopes and stream channels. As runoff increases, there is a likely risk to road prism surfaces, drainage structures, and Human Life and Safety unless drainage maintenance treatments are used to minimize the effects of post-fire flows. Based on the high probability of drainage issues and major magnitude of consequences with respect to replacement costs, and risk to Human Life and Safety, this treatment is seen as a preventative method to significantly mitigate associated risks of road failures.

This treatment is designed to mitigate threats to Human Life and Safety, National Forest system property, and other additional values, including emergency access, access for forest visitors and local residents, and potential risks to watershed values including water quality, aquatic habitat, and soil productivity. Approximately 97 miles of National Forest system road are located within the fire perimeter. Treatments are proposed on the open (use levels C and F) National Forest roads within these moderate and high severity areas, in total, 60 miles of road.

Treatment prescriptions for road drainage maintenance include:

- Cleaning and shaping all road drainage features such as drain dips, culvert inlets and outlets, and ditch cleaning.
- Cross drainage or additional ditch relief may be necessary to handle the additional movement of water.
- Culvert removal, water bars, stream rehabilitation, seeding, and weed treatment as appropriate.

Road Drainage Maintenance Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Road Drainage Maintenance	mile	$1,000	60	$60,000

RT-02 Culvert Removal & Fill Stabilization: Culverts will be removed and replaced with armored crossings to eliminate the substantial risk of culvert plugging, overtopping, breaching, and channel scour. The work will consist of fill removal, removing existing culverts, and re-creating the natural contour of the drainage. Excavated fill material will be placed in compacted lifts against existing road cut faces and existing roadside ditches rerouted around the base of compacted spoil slopes. A maximum 1.5:1 (horizontal:vertical) slope will be stabilized with large wood debris scattered horizontally in continuous about 10' space rows. The slopes will then be seeded. The channel bottom will be stabilized by arranging bed material to create a step pool type channel. Weed-free straw bales will be countersunk and staked to provide sediment filtration between the channel and overlying earthen slopes. The resulting BAER treatments will leave the drainage channel unencumbered to handle increased flows and more easily pass debris from post-fire runoff events. This treatment is less expensive with considerably higher probability of success than culvert replacement.

The following locations are where the culverts will be removed and replaced with fords:

- NFSR 5461 accessed from NFSR 7783 in Meadow Creek drainage.
- NFSR 17424 at junction with 34059-A (unauthorized route) in Meadow Creek drainage.
- NFSR 7796 at junction with NFSR 7792 in Sunrise drainage (lower crossing)
- NFSR 7796 in Sunrise drainage (upper crossing)

Culvert Removal Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Culvert Removals	each	$1,000	4	$4,000

RT-03 Drainage Modification to Culverts: Roads within the Sunrise Fire area contain drainage structures that cross streams in watersheds that have a moderate to high burn severity. These streams now have the potential for increased runoff and debris flows. The increases in flows pose a threat to the existing crossings which may result in plugging culverts or exceeding their maximum flow capacity. If increased flows deliver debris and plug drainage structures the result could be additional erosion and debris further down the drainage due to the failures of the road fill slopes, thereby impacting water quality and riparian areas.

Culverts will be modified to lower the risk for loss of road surface and culvert plugging, overtopping, and breaching. Removing the fill from over existing culverts will provide a flow path to accommodate expected increase in flow and debris should the culvert inlet become blocked. Culvert inlet and outlet armoring will be placed to protect road fill slopes.

The following locations have been identified for drainage modifications to culverts:

- NFSR 7783 at junction with NFSR 7789 in Meadow Creek drainage
- NFSR 7792 in Sunrise Creek drainage (lower)
- NFSR 7792 in Sunrise Creek drainage (middle)
- NFSR 7792 in Sunrise Creek drainage (upper)

Culvert Drainage Modification Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Culvert Drainage Modifications	each	$2,000	4	$8,000

RT-04 Culvert Upsizing: Culvert pipe failures and road infrastructure loss and associated sediment delivery to downstream resources are risks that can be mitigated through the BAER treatment of culvert upsizing. Eight culvert locations were selected for culvert upsizing based on watersheds that contain elevated risk for high run-off and drainage from moderate and high severity burned areas. An increase in runoff or flow within these pipes poses a threat to existing crossings where the current culvert width does not support expected increases in runoff, which may result in culvert plugging or exceeding the culvert flow capacity. With a very likely probability for culvert failure within these four locations, there are associated threats with major consequences to the road prism and downstream water quality.

None of the proposed culvert replacements are associated with bull trout critical habitat or are necessary for aquatic passage.

The following locations have been identified for culvert upsizing:

- NFSR 7783 at junction with NFSR 5461 in Meadow Creek drainage
- NFSR 7789 at junctions with NFSR 17419 in Meadow Creek drainage (Nellie Creek)
- NFSR 7792 Sunrise Creek (lower)
- NFSR 7792 Sunrise Creek (upper)

Culvert Upsizing Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Culvert Upsizing	each	$10,000	4	$40,000

RT-05 Access Barriers: Access barriers provide for public safety, prevent illegal motorized vehicle operation on closed NF system roads, and allow natural vegetative recovery in the burned area. For administratively closed roads the access barriers also restrict travel and provide for protection and sustainability of the road template. Natural barriers (rock) or gates will be placed where intact vegetation was providing a visual screen and serving as a closure device. Ensure consistency with Forest Travel Management.

Access restrictions will be implemented to enforce existing travel restrictions on NF system roads that are either in maintenance level (ML1) storage or ML2 roads where human life and safety and road investment values are at risk.

The following locations have been identified for access barriers are needed for effective implementation of PS-02 administrative closures:

- NFSR 18006 (2 barriers, human life & safety)
- NFSR 5461 (1 barrier, human life & safety)
- NFSR 17424 (1 barrier, human life & safety)
- NFSR 16980 (1 barrier, property – travel management motorized restrictions)

- NFSR 7796 (2 barriers, property – travel management motorized restrictions)
- NFSR 18686 (1 barrier, property – travel management motorized restrictions)
- NFSR 344/NFSR 7793 (3 barriers: @ NFSR 250-NFSR344 junction, @ NFSR 344-NFSR 7993 junction, @ NFSR 7793-NFSR 7797 junction, human life & safety)
- NFSR 18589 (1 barrier, @ junction with NFSR 450, property)

Access Barriers Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Access Restriction Device	each	$1,000	12	$12,000

Contract Administration & Overhead (applies only to RT-01 through RT-05)

Item	UOM	Unit Cost	# of Units	Total Cost
Contract Administration	days	$360	20	$7,200
Contracting Officer	days	$430	5	$2,150
Contract Preparation	days	$360	10	$3,600
			Total Cost	**$12,950**[a]

a – burden is roughly 9%

RT-06 Storm Patrols-Roads: Storm patrols are a treatment used to reduce risks to human life and safety and National Forest property (i.e. roads and drainage structures). These treatments are also beneficial to other BAER critical values, including reducing risks to watershed function and maintaining soil productivity, which can be damaged when road failures occur.

The Sunrise fire perimeter contains many roads that cross intermittent and perennial streams, located in watersheds that have burned at moderate or high severity. In these areas, streams have greater potential for increased runoff and debris flows, which pose a threat to existing road crossings. Threats from increased runoff can include plugged culverts and overtopping, which can cause moderate to major damage to road prisms.

In addition to hydrologic risks, road prisms are also impacted by loss of vegetative cover on adjacent hills. Bare soils are more prone to erosion events and in some cases burned soil can lose structure and create hazards associated with a deterioration in soil stability. Rill, sheet, and gully erosion are possible in this post-fire environment under storm events, and these events may initiate runoff events that may hinder access to roads and potential cause damage to forest road prisms.

Due to the likelihood of a runoff event and destabilized slopes based on normal storm frequency, there is a threat to forest visitors and employees traveling in the burned area due to increased potential of facing hazards within open forest roads. These hazards can include rolling rocks, falling trees, flash floods, road slumps, and mud flows. Post-fire flooding can interrupt visitor access and compromise access to forest work areas and private residences. Storm patrol treatments are designed to allow for evaluating forest road conditions following storm events and to identify and implement additional work as needed to maintain and/or repair damage to road surfaces and drainage features in order to provide safe access to National Forest Service lands. Forest engineers and contracted operators will survey the 97 miles of system roads within the fire perimeter during or after high-intensity summer thunderstorms and spring snow-melt. Patrols are designed to inspect road surface condition, ditch erosion, and culverts; as required, these patrols will also take necessary action with heavy equipment to minimize damage to the transportation infrastructure.

Road Storm Patrols Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Storm Patrols - Contract	days	$360	20	$7,200
Equipment Time	days	$1,500	20	$30,000
			Total Cost	**$37,200**

Protection/Safety Treatments:

PS-01 Hazard Warning Signs: Working, travelling, and recreating in burned areas poses an elevated risk to Human Life and Safety. The purpose of this treatment is to acknowledge and alert forest employees and visitors to the existing threats associated with traveling routes within and downstream of burned areas.

"Entering Burned Area" signs are needed to alert the public to possible threats to life and safety. These signs should contain language addressing risks that warrant heightened awareness such as falling trees, rolling rocks, and flash floods.

These warning signs should be posted in site-specific locations to alert travelers to upcoming dangers such as shape curves, falling rocks, and "Flood Risk – No Parking or Standing", etc. These signs will be located in strategic intersections to inform the traveler of their current location on the Forest Visitor Map and Motor Use Vehicle Map (MVUM). In most cases, these areas are located adjacent to the fire perimeter.

Locations for Warning Signs:

- NFSR 344 at junction with NFSR 10102 (Whiskey Gulch)
- NFSR 7789 (Meadow Creek Road – at fire perimeter)
- NFSR 7792 (Sunrise Creek Road – at fire perimeter)
- NFSR 450 (Verde Creek Road – at fire perimeter)
- NFSR 250 (Trout Creek Road at Trout Creek Campground)
- NFSR 450 (Windfall Creek – at fire perimeter west side)
- NFSR 344 at junction with NFSR 250 (Trout Creek Road)
- NRSR 344 at junction with NFSR 7793

Hazard Warning Signs Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
BAER Hazard Warning Signs	each	$300	8	$2,400

PS-02 Administrative Closures: Closing roads is the safest and most effective treatment when a threat to human life is identified. Roads are closed where an alternative access point(s) exists. Closures are implemented with a signed forest order and must be enforced. This treatment includes initiating the administration actions needed to prepare and implement the closure orders to increase the effectiveness of temporary access restrictions on NF system roads recommended in treatment RT-05. The barriers described in RT-05 are used to enforce these closures.

Temporary closure of NF system roads affected by the Sunrise fire is needed to protect public safety from post-fire hazards along travel routes. There is an extensive network of roads within the fire area. Closure orders would be in place until hazards/threats within the burn area and along specific routes have been evaluated by the local unit and a determination that the risk has been mitigated or reduced to an acceptable level. If there is a need for individuals to access private inholdings, permitting or exemptions may be considered through implementation.

The following roads are proposed for temporary administrative closures:

- NFSR 18006 (2 barriers—closed entire length, human life & safety)
- NFSR 5461 (1 barrier (existing seasonal closure), human life & safety)
- NFSR 17424 (1 barrier (existing seasonal closure), human life & safety)

Temporary Trail Closure Cost Estimate

Item	UOM	Unit Cost	# of Units	Total Cost
Roads - Temporary Closure Order	each	$1,570	3	$4,710

BAER Assessment & Implementation Consultation and Coordination:

Associated activities obligated under ID-FSM2520-2015-1 need to be considered in the BAER funding request when emergency response actions are authorized. These are accumulated tasks above the normal program of work and generally not accounted for in out-year program planning. Because implementation of approved BAER response actions trigger these required tasks and the unit's allocated budget does not account for these obligations, BAER funding is the appropriate authorization to ensure this coordination and consultation is completed.

Interagency Coordination

	Rate	Days	Cost
Forest BAER Coordinator (GS-12)	$450	3	$1,350
BAER Implementation Specialist (GS-11)	$350	6	$2,100
		Total Cost	**$3,450**

Implementation Tracking & Required Reporting of Authorized Emergency Response Actions

	Rate	Days	Cost
Forest BAER Coordinator (GS-12)	$350	5	$1,750
		Total Cost	**$1,750**

Emergency Consultation on Implementation of Authorized Emergency Response Actions

	Rate	Days	Cost
Forest Fish Biologist (GS-12)	$450	1	$450
		Total Cost	**$450**

NHPA Compliance for Implementation of Authorized Emergency Response Actions

	Rate	Days	Cost
Forest Archeologist (GS-12)	$450	2	$900
		Total Cost	**$900**

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.)

LT-01 Treatment sites will be evaluated annually for the next three years to ensure control methods are meeting resource objectives and to inventory for new invaders. Weed specialist/technicians will visit chemically treated sites after treatment; this is especially important for weed populations that are sprayed to ensure efficacy of herbicide application.

Initiate follow-up treatments if additional non-native species or new infestations are discovered. Control will be considered successful upon determination that all noxious weeds have been controlled and non-native invasive plants have not spread beyond their pre-fire locations.

Implemented road drainage improvements (RT-01) will be evaluated to ensure stabilization objectives are being met after storm events (RT-02 Road Storm Patrols).

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim __

			NFS Lands				Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
L-01 EDRR Fire Line and Rc	acres	70	783	$54,810	$0		$0		$0	$54,810
L-01 EDRR Fire Suppressio	acres	160	3	$480	$0		$0		$0	$480
					$0		$0		$0	$0
			Subtotal Land Treatments	$55,290	$0		$0		$0	$55,290
B. Channel Treatments										
None				$0	$0		$0		$0	$0
			Subtotal Channel Treatments	$0	$0		$0		$0	$0
C. Road and Trails										
RT-01 Road Drainage Maint	miles	1,000	60	$60,000	$0		$0		$0	$60,000
RT-02 Culvert Removal & Fe	each	1,000	4	$4,000	$0		$0		$0	$4,000
RT-03 Culvert Modification	each	2,000	4	$8,000	$0		$0		$0	$8,000
RT-04 Culvert Upsizing	each	10,000	4	$40,000	$0		$0		$0	$40,000
RT-05 Access Barriers	each	1,000	12	$12,000	$0		$0		$0	$12,000
Contract Admin/Overhead	lump sum	12,900	1	$12,900			$0			
RT-06 Storm Patrols	days	1,860	20	$37,200	$0		$0		$0	$37,200
			Subtotal Road and Trails	$174,100	$0		$0		$0	$161,200
D. Protection/Safety										
PS-01 Hazard Warning Sign	sign	300	8	$2,400	$0		$0		$0	$2,400
PS-02 Closure Order	each	1,570	3	$4,710	$0		$0		$0	$4,710
				$0	$0		$0		$0	$0
			Subtotal Protection/Safety	$7,110	$0		$0		$0	$7,110
E. BAER Evaluation										
Initial Assessment	Report			$25,000	$0		$0		$0	$25,000
Coordination & Consultation	lump sum	6,550	1	$6,550	$0		$0		$0	$6,550
			Subtotal Evaluation	$31,550	$0		$0		$0	$31,550
F. Monitoring										
Insert new items above this line!				$0	$0		$0		$0	$0
			Subtotal Monitoring	$0	$0		$0		$0	$0
G. Totals										
Total - This Request				$243,050	$0		$0		$0	$243,050
Previously Approved					$0		$0		$0	$0
			Total to Date	**$243,050**						**$243,050**

PART VII - APPROVALS

1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date