Date of Report: 9-17-21

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 #___
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Tumbledown Fire

B. Fire Number: ID-IPF-000415

C. State: Idaho

D. County: Shoshone

E. Region: Northern

F. Forest: Idaho Panhandle

G. District: St. Joe Ranger District

H. Fire Incident Job Code: P1N5MN (0104)

I. Date Fire Started: July 7, 2021

J. Date Fire Contained: 10-31-21

K. Suppression Cost: $3,206,898 for Tumbledown

L. Fire Suppression Damages Repaired with Suppression Funds (estimates): Click here to enter text.

1. **Fireline repaired (miles):** 10
2. **Other (identify):** Click here to enter text.

Fire suppression and fire suppression repair activities are ongoing. Fireline repaired includes completed and inspected fireline (dozer, hand, mixed construction), for the Stateline complex as of September 4, 2021.

M. Watershed Numbers:

Table 1: Acres Burned by Watershed (HUC12)

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170103040302	Bluff Creek	22,046	409	2%
170103040304	Bruin Creek- St. Joe	27,521	8,190	30%
170103040305	Eagle Creek- St. Joe	37,087	2,036	5%
170103040303	Quartz Creek	14,658	307	2%

N. Total Acres Burned:

The BAER assessment began on September 7th, 2021, with using a fire perimeter and BARC product from August 29th, 2021. Since then, the fire has grown and into private timber ground owned by Hancock. Information reported in this document and in the specialists', reports will reflect the fire perimeter at the time the BARC was acquired. An interim assessment will be completed if necessary.

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	10,942
OTHER FEDERAL (BLM)	0
STATE	0
PRIVATE	0
TOTAL	10,942

O. Vegetation Types: Dominant overstory vegetation throughout the burn consisted of western redcedar and western hemlock, with stands of grand fir in the drier, upland sites. Moist habitat types have understories comprised of twinflower, western oak fern, and wild ginger. Drier vegetation types include understories of beargrass and huckleberry.

P. **Dominant Soils:** . Soil families include the Bouldercreek-Humic Udivitrands families (19%), the Bouldercreek-Ahrs families (17%), the Typic Vitrixerands-Honeyjones Families (14%) and 11 other map units (50%). Surface soil texture is a mix of gravelly silt loam (76%) and silt loam (24%). Dominant slopes derived from the IPNF Land Systems Inventory range from 35-60% and cover approximately 51% of the burn area, slopes ranging from 60-80%+ cover roughly 48%.

Q. **Geologic Types:** Geology within the burn area is comprised of one primary and two minor lithologic components. Carbonate-bearing metasedimentary lithology comprises 85% of the burn area, while mafic intrusive and siltite-argillite components comprise 11% and 3% respectively. Within the burn area, about 2,545 acres or 22.5% will be at elevated susceptibility to rotational landslides due to a reduced slope stability associated with the decreased evapotranspiration and loss of root stability due to tree mortality. There is increased potential for post-fire debris flows, which are considered a type of landslide. Debris flows are typically initiated by high-intensity summer thunderstorms. In this region rain-on-snow events that cause rapid snow melt contribute to higher likelihood for debris flows.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	26
INTERMITTENT	20
EPHEMERAL	--
OTHER	--

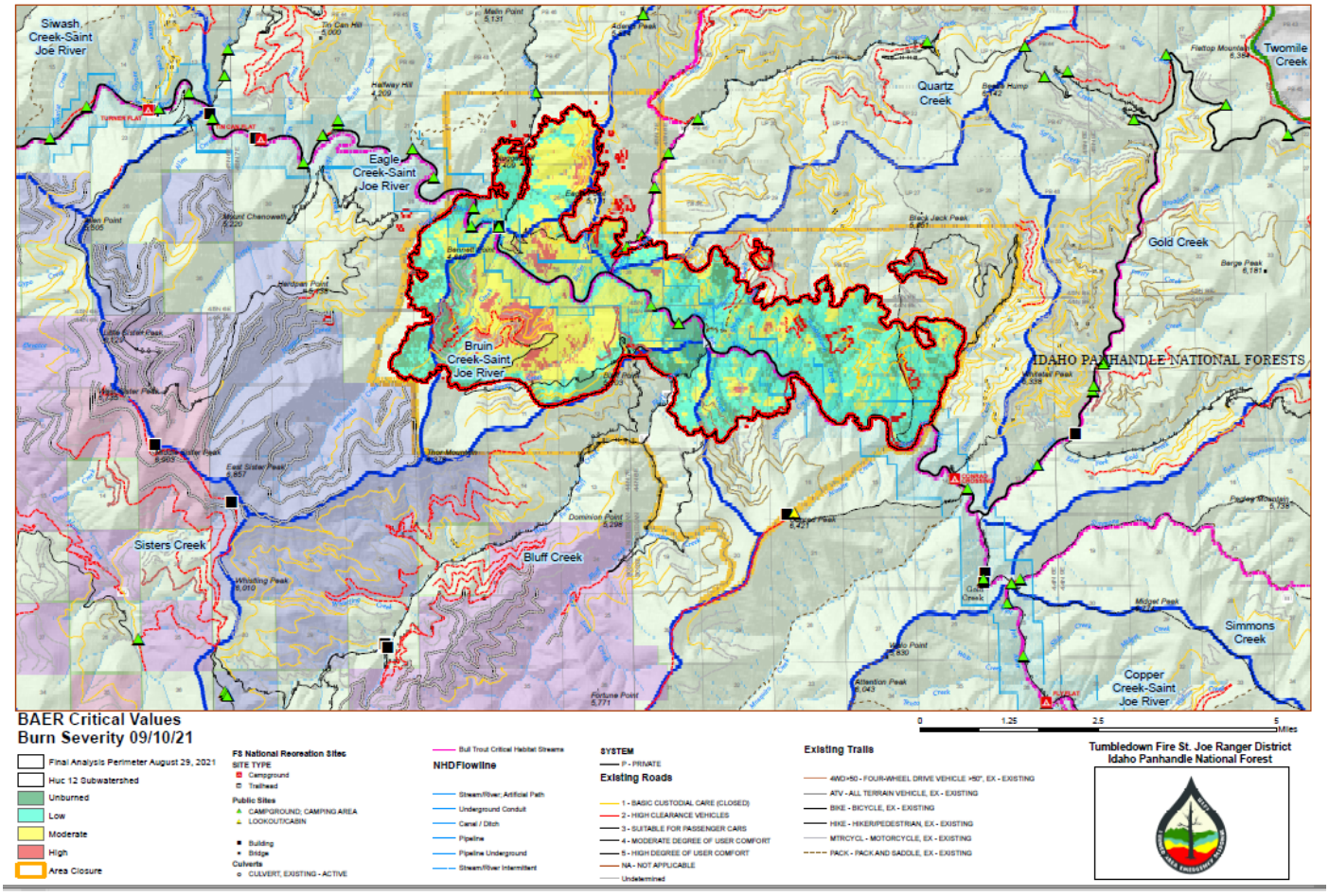
S. **Transportation System:**
Trails: *National Forest (miles): 14* *Other (miles):* 0
Roads: *National Forest (miles): 57* *Other (miles):* 9 miles of County owned Highway 50

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership. Values have been added to the nearest whole number. Perimeter as of August, 29, 2021.

Soil Burn Severity	NFS	Other Federal (BLM)	State	Private	Total	% within the Fire Perimeter
Unburned	2,034	-	-	-	2,034	19
Low	4,682	-	-	-	4,682	43
Moderate	3,690	-	-	-	3,690	34
High	536	-	-	-	536	5
Total	10,942	-	-	-	10,942	100



C. **Water-Repellent Soil (acres):** All soil burn severity classes experienced varying levels of water repellency. Moderate to strong repellency was mainly associated with moderate and strong SBS. Low and moderate repellency was mainly associated with low and moderate SBS.

Hydrophobicity	Acres	Percent of Fire
None	3,595	33%
Weak	2,298	21%
Moderate	2,667	24%
Strong	2,381	22%
Total ac	10,942	100%

D. **Soil Erosion Hazard Rating:** Potential soil erosion rates for individual soil types are dependent on characteristics such as slope, depth to bedrock and soil texture, which contribute to runoff potential. This is characterized as the soil erosion hazard rating.

Erosion Hazard	Acres	Percent of Fire
Low	2,616	24%
Moderate	4,661	43%
High	3,665	34%
Total ac	10,942	100%

E. **Erosion Potential:** Total potential erosion across the fire areas estimated using ERMiT. Estimated value is based on the next 24-month time period without treatment.

	tons/acre	yd^3/mi^2
Soil Erosion Potential - Yr1	43.9	33,995
Soil Erosion Potential - Yr2	33.3	25,808

E. Sediment Potential: 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.

Sediment Delivery Ratio	yd3/mi2/yr
Year 1	11,898
Year 2	9,033

F. Estimated Vegetative Recovery Period (years): High soil burn severity comprised 5% of the burn and is where one might expect post-fire soil conditions to heavily impact soil productivity, and subsequently vegetative recovery. Moderate soil burn severity results in a widespread loss of forest floor cover, which alters hydrologic function, but typically the soil heating and the consumption of organic matter is not sufficient to damage roots, soil structure, or the native seed bank. Substantial soil loss in the over steepened drainages with elevated debris flow susceptibility may take longer for vegetative recovery. Areas with low and moderate burn severity that do not experience debris flows are expected to revegetate over a period of 1 to 3 years.

G. Estimated Hydrologic Response (brief description): Hydrologic response following wildfire in the Tumbledown burned area will include reduced interception and infiltration of precipitation, increased runoff and erosion, higher stream flow volumes in tributaries for a given precipitation input, and a more rapid rise of stream compared with those of unburned conditions. Due to the small size of the catchments burned adjacent to the St Joe River and the amount of low severity/unburned areas, the increase in flow to the St Joe river will be unnoticeable relative to the flows of the river overall (e.g., ~200cfs being added to 5,000-10,000 cfs). Additionally, the probability of severe erosion, debris torrents, and hillslope failures is higher, and will remain so for at least the next several years. Road-stream crossings and other road drainage systems are particularly vulnerable to damage in portions of or downstream of the wildfire; however, there are relatively few culverts and bridges located in the moderate to high severity burn areas or downstream of them.

There were three other watersheds that intersected the fire perimeter: Eagle Creek-Saint Joe River, Quartz Creek, Bluff Creek. These 12th HUC watersheds had relatively (~1%) small fire impact; however, they do have very similar topography to the Bruin Creek-Saint Joe River watershed and can be expected to act similar in hydrologic processes.

Post-fire 5-year-return-interval flows at selected points were estimated to increase between 1 and 1264 percent. The smaller headwater channels with extensive area burned with moderate to high severity were predicted to have a greater increase than the larger drainage areas. When comparing to the main Saint Joe River, these increases will have little effect on the overall flow (~1% increase at 5-year recurrence interval). It is also important to note that this really doesn't increase the main Saint Joe River until a 25-100 year event (~2-3 to 83%) which is outside the scope of this assessment (i.e., unlikely); however, these estimates predict the increase in water runoff, but do not account directly for sediment bulking.

Flow Estimates for 5-Year Return Interval

Modeled Drainage	Pre-Fire discharge (ft^3/s)	Post-Fire discharge (ft^3/s)	Percent Increase
Saint Joe blw Fire	7510	7581.44	1%
Saint Joe @ Prospector Bridge	7740	7811.44	1%
Fuzzy Creek	8.48	24.56	190%
Face Trib STJOE S1	1	13.64	1264%
Face Trib STJOE N1	1	5.52	452%

Face Trib STJOE N2	1	3.63	263%
Face Trib EAGLE E1	1.12	8.74	680%
Bennett Creek	4	13	274%
Bullet Creek	1	2	96%

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Tumbledown fire started on July 7, 2021 from a thunderstorm system that moved through the Idaho Panhandle. Due to record drought conditions and unseasonably high temperatures, the storm system resulted in a high number of lightning-caused wildfires. The Idaho Panhandle National Forest began initial attack and identified opportunities to group and manage multiple fires within several complex incidents. On July 19, the St. Joe July Lightning incident was renamed to Stateline Complex and includes 12 fires identified in the initial assessment, with the Dolly Creek Fire and Tumbledown Fire standing as the largest fires burning within the complex. The remote location, steep terrain, limited access, distance between fires, and lack of suppression resources is challenging firefighting efforts and logistical support. As of Sept. 12, the fire was 50% contained, with full containment estimate to be by October 31, 2021.

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

Table 5: 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):

Value	Probability	Consequence	Rating	Threat
Trails and Roads	Possible	Major	High	Some open roads and trails in high and moderate burn severities will have increased risks during summer thunderstorms and wind events. Debris flows could dam the creek and impact the Eagle Creek road.
Turner Flat and Tin Can Flat Campgrounds	Unlikely	Moderate	Low	Campgrounds are downstream of fire, but next to St. Joe River. Fallen trees maybe transported and deposit in channel directing flow into streambanks by campground.
Floating and fishing in St. Joe River	Possible	Major	High	Potential for debris flows and fallen/transported trees is most pronounced below Bluff Creek increasing the risk of injury or death to water recreationist.

2. Property (P):

Value	Probability	Consequence	Rating	Threat
Trail #51 Craddock Ridge	Likely	Moderate	High	Majority of Craddock trail goes through high intensity burn on steep slopes. High and moderate intensity burn area also has many hazard trees.
Remaining roads within fire perimeter	Possible	Minor	Low	Majority of each trail goes through low intensity burn areas. There are small pockets of high intensity burns on mid-slope. Could see localized erosion and loss of short sections of trail tread.

Eagle Creek Boat Launch	Possible	Moderate	Intermediate	Next to St. Joe River, Wood debris could shift flows into site
Turner Flat Campground	Possible	Moderate	Intermediate	Campground is downstream of fire, but next to St. Joe River. Fallen trees maybe transported and deposit in channel directing flow into streambanks by campground.
Tin Can Flat Campground	Unlikely	Minor	Very Low	Campground is downstream of fire, but next to St. Joe River. Campground is well above floodplain.
Remaining roads within fire perimeter	Likely	Minor	Low	Remaining roads go through mainly unburned to small pockets of moderate intensity burn areas. Maybe localized erosion in moderate burns. Roads more at risk from occasional hazard trees
Roads in Bennett, Eagle, and Fuzzy Creek drainages	Likely	Moderate	High	Roads go through or are below high and moderate intensity burns. Hazard trees could damage surface. Roads are outsloped and self-maintaining. Very few steep grades on road. Lower risk of water running down roads.
Prospector Bridge	Very Likely	Major	Very High	Potential for wood get caught on instream bridge pier, initiating scour around the footing, and collapsing the bridge.

3. Natural Resources (NR):

Value	Probability	Consequence	Rating	Threat
Native and Natural Plant Communities	Very Likely	Moderate	Very High	Localized noxious and invasive weed populations exist immediately adjacent to the burned area and area disturbed by suppression. Plants will compete aggressively with native species for space and nutrients.
Wild and Scenic River – St. Joe Outstandingly remarkable values for fish for westslope cutthroat; water quality, visuals, and recreation (e.g., swimming, boating, camping, etc.).	Very Likely	Moderate	Very High	Changes to water quality from erosion and debris flows. Change in river conditions from debris flows and fallen/transported trees impact rafting and other water recreation.
Bull Trout	Very Likely	Minor	Low	Risk to species and designated critical habitat due to the threat of post-fire runoff, ash, erosion, and sediment delivery. Impacts will occur in a migratory corridor

4. Cultural and Heritage Resources:

Value	Probability	Consequence	Rating	Threat
Two unevaluated sites - precontact site (rock shelter). Historic mining site	Unlikely	Minor	Very Low	Both sites are in low burn severity and have low risk of erosion, vandalism and still retain good ground cover.

B. Emergency Treatment Objectives - Reduce threats to:

- Human life and safety on roads in high and moderate severity burn areas by installing warning signs and gates.
- Road damage from increased runoff and sediment through storm patrols, cleaning drainage ditches and culverts, and install additional culverts at select locations in high and moderate burn severity areas.
- Trails from increased runoff and sediment through cleaning drainage and install waterbars in high and moderate burn severity areas.
- Human life and safety from hazard trees at select locations where treatment implementation would put workers at risk (I.e. storm patrol and trail drainage installation).
- Native plant communities by reducing the spread invasive plants within the area, especially along and adjacent to Forest roads and dozer lines used by fire equipment and in areas with localized invasive

plant species within and adjacent moderate and high intensity burns the first year following containment of the fire.

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

Land 90% **Channel** 65%
Roads/Trails 85% **Protection/Safety** 90%

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	90	85	85
Channel	100	100	100
Roads/Trails	85	90	90
Protection/Safety	95	100	100

E. Cost of No-Action (Including Loss): Refer to attached Values at Risk (VAR) spreadsheet for specific costs.

The VAR analysis summary identified that the total treatment cost is estimated at $100,575 with an expected benefit of $1,837,056. The summary implied minimum value of protecting non-market resource critical values is justified for the treatments proposed in this BAER assessment. The expected benefit/cost ratio is 6.2.

F. Cost of Selected Alternative (Including Loss): Refer to attached Values at Risk (VAR) spreadsheet for specific costs.

G. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☒ Fisheries ☐ Wildlife
☐ Other:

Team Leader: John Chatel
Email: john.chatel@usda.gov **Phone(s) 971-801-5379**

Forest BAER Coordinator: Jori Johnson
Email: jori.a.johnson@usda.gov **Phone(s) 559-760-3941**

Team Members: *Table 7: BAER Team Members by Skill*

Skill	**Team Member Name**
Team Lead(s)	John Chatel, Jori Johnson
Soils	Phil Schwartz, Terry Hardy
Hydrology	Josh Erickson, Rob Lawler
Engineering	Kevin Duchow
GIS	Amy Thompson, Kim Vieira
Archaeology	Tom Milter
Weeds	Josh Heise
Recreation	Christine Plourde
Other	Ariel Cummings (Fish)

H. Treatment Narrative:

Land Treatments:

Noxious Weeds EDRR

Purpose of Treatment: To respond to the potential for rapid invasion of invasive plants into native plant communities on the Idaho Panhandle National Forest. EDRR is prescribed in order to mitigate long term impacts to native plant communities within and in the vicinity of the fire's boundaries. The purpose of treatments is to promote native plant resources by removing invasive plant populations.

General Description:

- Invasive plant detection surveys – Known infestations of high priority invasive plants within high and moderate burn severity in the Tumbledown Fire area will be assessed for potential spread or expansion. When assessment actions are initiated, personnel will be equipped to immediately treat infestations when suppression repair is completed, and safe access is possible. This will allow for the best chance of managing known infestations to prevent an expansion from pre-fire levels. Additionally, detection surveys will be focused in areas of increased probability of infestation (e.g. Roads, trails, select streams, fire lines, drop points, helispots, staging areas, areas of high and moderate burn severity within a ¼ mile of known invasive plant infestations, and BAER implementation impacts). BAER funding authorization will be used to meet the above objectives for up to 1 year after fire containment (projected for October 2021). Existing or future partnerships may be used to monitor and/or treat invasive plants on National Forest System Lands.
- Treatment of known invasive plant sites and new sites detected through surveys – Objective is to strategically treat known infestations (currently estimated to be roughly 307 acres). Strategic treatments include sites adjacent to moderate and high severity burned areas, fire lines.

Location (Suitable) Sites: Known and expected invasive plant sites within and directly adjacent to the Tumbledown Fire area on National Forest System Lands. Proposed locations for surveys are along vector corridors and within high and moderate severity burned areas within the Tumbledown Fire. Existing known invasive plant locations are included in the accompanying map and will be treated in a strategic manner. New sites found during EDRR surveys will be treated to the extent possible with priority given to sites within or near to fire lines and near riparian habitat.

Design/Construction Specifications: Detection surveys entail hiking or driving vector corridors and hiking areas of high and moderate burn severity. Survey protocols include GPS mapping, flagging, and documenting occurrences. Treatments include manual removal, chemical application and possible bio-control releases depending on the plant species.

Channel Treatments:

Prospector Bridge: Storm patrol and evaluation of stabilization

Purpose of Treatment: The Prospector Bridge crosses the St. Joe River and has two concrete piers that sit at the edge of the river at bank full flows. The piers are on spread footings, large concrete block at the bottom of the pier, and are held in place by gravity. Scour is a large concern with this type of footing as if the material below the footing is removed, the footing just falls down. With the expected increase in trees floating down the river, potentially getting caught on the piers and increasing the scour potential around those footings, a more detailed plan for mitigating the scour potential needs to be developed. It the footings get scoured and fall, it could collapse the bridge.

General Description: The Tumbledown Fire burned in steep terrain, killing trees adjacent to the St. Joe River canyon. In addition, debris flows may bring in wood with intense thunderstorms and rain on snow events. Once in the river, the trees will float downstream unless they are stored on in-channel gravel bars. However, these are infrequent in this confined, transport channel. The Prospector bridge is the first bridge on the mainstem St. Joe below the fire and has a high potential of collecting trees along it left bank (looking downstream) pier that sits at the bankfull edge.

Location (Suitable) Sites: The Prospector Bridge is the crossing of the St. Joe River at NFSR 752 Milepost 0.00.

Design/Construction Specifications: While the BAER team discussed several concepts on what could be done as a mitigation, a more detailed design including a hydraulic analysis of how the river flow would be affected needs to be done. BAER is a rapid assessment and doesn't provide the time necessary for such an analysis and design. The recommendation would be to take a closer look at this bridge to evaluate the appropriate treatment response, and submit for funding associated with that treatment in an interim request.

Roads and Trail Treatments:

Road Drainage Stabilization and Select Hazard Tree Removal

Purpose of Treatment: The watersheds burned in the Tumbledown Fire will show the effects of the fire via increased runoff rates, erosion, sediment, and debris transport creating a future concern for roads and associated drainage structures. The effects could result in filling the ditches, plugging culverts and potentially overtopped or washed away road surfaces and fill slopes. Water bars and rolling dips can become filled with material until they are no longer functioning properly. Removing the material from these structures will allow them to continue to move water across the road instead of allowing it to overtop the structure and potential run down them. Treatments are recommended to minimize the risks to public safety and protect the investment of the transportation system from the expected increased post-fire runoff.

General Description: Several road drainage stabilization treatments have been prescribed for Forest Service Roads within the Tumbledown Fire that will be directly impacted by post fire events. These treatments are necessary to mitigate the predicted effects that will occur to the transportation infrastructure system.

Location (Suitable) Sites:

Road drainage locations:

NFSR #	NAME	MILES	TREATMENT
1956E	St Joe Face East	8.4	Drainage as shown on map
1214	Eagle Creek	1.6	Drainage as shown on map
	Total	**10.00**	

Design/Construction Specifications:

- Ditch Cleaning – Where present, drain ditches along the length of the roads shall have all existing silt and debris removed and either hauled away or side cast such that the material cannot reenter the drainage structure during a runoff event.
- Culvert Cleaning – Remove any blockages from inlet, outlet and inside barrel and straighten bent inlets and outlets when possible. Catchment-basins shall have all existing silt and debris removed from in front of the culvert inlet so that they are functioning at full capacity. Culverts are typically 18 inches to 24-inch ditch relief culverts.
- Water Bar and Rolling Dip Re-establishment and cleaning – remove the material that has accumulated in the water bars and rolling dips. This is most effectively done while grading the road.
- Hazard Tree mitigation – Hazard trees will be felled that are within reach of all sites where drainage work will be needed. The hazard tree work associated with drainage will be paid for under drainage.
    - Place trees on contour (where possible) in locations that do not adversely affect road drainage.
    - Review hazards of felling trees/JHA before implementation.

Road Storm Inspection and Response

Purpose of Treatment: The purpose of the monitoring is to evaluate the condition of roads for motorized access and to identify and implement maintenance of the treatments to road surfaces and flow conveyance structures to provide safe access across FS lands. The patrols are used to identify those problems such as debris caught in culvert inlets, plugged or partially plugged culverts, and washed-out roads and to clear, clean, and/or block those roads that are or have received damage. Forest personnel will survey the roads within the fire perimeter after spring runoff and summer storms. Survey will inspect road surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows. A plan very similar to a FERM (Flood Emergency Road Maintenance) plan should be drafted. The plan identifies the responsibilities of those prior to, during and post large flow events.

General Description: The steep slopes within the Tumbledown Fire combined with the lack of vegetation in the moderate and high burn severity portions of the fire will potentially lead to soil, rock, and small organic material being washed down onto the roads from precipitation events. This material could end up in the roadway drainage features and cause them to fail. Failure of drainage features such as culverts

and rolling dips can lead to loss of access as well has damage to roads. While it is unlikely that a single precipitation events would cause enough material to be deposited into culverts to cause them to be plugged, multiple events without monitoring and cleaning the drainage structures could.

Location (Suitable) Sites: The patrols should first focus on the Forest Service roads that receive the most traffic and are of more value to the transportation system. The Forest and district can identify the most susceptible areas and roads across the district within the fire perimeter. A short list of the roads recommended to look at first are listed below:

NFSR #	NAME	Miles/Sites
527	Prospector Bridge (check for woody debris getting caught on the piers, the road is downstream of the fire)	1 site
1956E	St. Joe Face East (Fuzzy Creek area)	17.0 miles
1214	Eagle Creek (the portion from FH50 to Trail 1280, looking for material coming off the drainages across the channel)	3.0 miles
	TOTAL	**20.00**

Design/Construction Specifications:

- FS personnel will direct the work.
- Immediately upon receiving heavy rain the FS will send out patrols to identify road hazard conditions – obstructions such as rocks, sediment, washouts – and plugged culverts so the problems can be corrected before they worsen or jeopardize motor vehicle users.
- Heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins shall be procured when needed.
- All excess material and debris removed from the drainage system shall be placed outside of bank-full channel where it cannot re-enter stream channels.

Trail Drainage Stabilization and Select Hazard Tree Removal

Purpose of Treatment: The purpose of the trail stabilization treatments is to allow water to (1) sheet flow across the trail, and (2) where water does collect, to shed off the trail as soon as possible. Water is a trail's worst enemy, and the trail treatments are intended to minimize the time and distance that water spends on the trails by building features into the trail that shed the water. Where water flow over the trail cannot be avoided, armoring the trail will stabilize it and stop or slow down erosion. By doing these treatments, the trail prism will be protected from the increased hydrological response that is expected for post-fire storm events.

General Description: Trail stabilization work: Install drainage (Rolling Grade Dips/Grade reversals/Nicks) features where needed to stabilize trail. Install Waterbars only where necessary and then only Rock. Clean out existing waterbars. Armor drainage crossings. Re-establish trail bench/prism as needed. Remove hazard trees, where needed, for worker safety.

Location (Suitable) Sites: Craddock Ridge Trail #51

Design/Construction Specifications:

- If contracted out, line out work with agency trail expert. De-berm trail where needed, re-establish 5% outslope, install knicks, and rolling grade dips; minimize waterbar use where grade reversal methods can be used. If waterbars must be used, use only rock. Clean out existing waterbars or replace with grade reversal methods. Armor drainage crossings where needed.
- Remove hazard trees, as needed, for worker safety.

Protection/Safety Treatments:

Hazard Warning and Closure Signs for Roads

Purpose of Treatment: The purpose of "Burned Area Warning Signs" is to reduce the risks to human life and safety by alerting motorists of existing threats while traveling the authorized routes within the areas susceptible to flooding, debris flows, hazards trees, and all other risks attributable to post fire events on the landscape.

General Description: This treatment is for installation of "Entering Burned Area" warning signs.

Location (Suitable) Sites: Locations for "Burned Area" warning signs will be located at all points of entries by use of forest system roads into the burned areas. These locations are as follows:

- On FSR 1214 (Eagle Creek), near the intersection with Forest Highway 50
- On FSR 509 (Bluff Creek), near the intersection with Forest Highway 50
- On FSR 339 (Quartz Creek), near the intersection with Forest Highway 50
- On FSR 1223 (Bruin Creek), near the intersection with Forest Highway 50
- On FSR 339 (Quartz Creek), near the fire perimeter on the north end.
- On FSR 1214 (Eagle Creek), near the intersection with Trail 1280
- On FSR 509, (Bluff Creek), Near intersection with 1956E, facing south

Design/Construction Specifications: "Burned Area" warning signs along the roads shall measure, at a minimum, 30 inches by 36 inch and consist of 0.08" aluminum, sheeted in high intensity yellow with black letters, which is shown in the photo below. The "BURNED AREA" lettering shall be a minimum of 5 inches in height and all remaining lettering shall not be less than 3.5 inches in height. Road Closure and Barricade Markers Signs shall conform to the M.U.T.C.D. standards and shall be installed per Federal Highway Safety Standards.

Road Barriers

Purpose of Treatment: The primary reason of installing the barriers is for public safety when conditions exist that warrant no travel on the roads, especially during periods of expected moderate to high rainfall events. In the event that severe stormy weather is predicted over the Tumbledown Fire area, a line officer may decide they need to close roads that would be affected by the expected run off. A barrier would be necessary in warning the public from accessing the area of the forest by vehicle during these severe weather events. The closure orders will be necessary when it is determined there is a danger to the public caused by potential debris flows and flooding from the hill slopes above the roads.

General Description: This treatment is for the placement of barriers, such as jersey barriers or ecoblocks, to close roads when necessary for public safety and to develop and implement associated closure orders.

Location (Suitable) Sites: Locations for the barriers are indicated in the table which follows:

Road	Location
NFSR 1956E (St Joe Face West)	Near the intersection with NFSR 3683. Somewhere with a good turnaround.
NFSR 1214	Near the intersection with Forest Highway 50
NFSR 1214	Just below the intersection with Trail 1280, trying to prevent access down NFSR 1214, while allowing Trail 1280 to be used.

Design/Construction Specifications: Temporary barriers, such as jersey barriers or eco blocks, shall be used to block access to visitors at the listed road locations.

St. Joe River Access Barriers

Purpose of Treatment:

General Description: The boating/ fishing public health and safety will be protected by installation of access barriers to the river while high levels of wood enter the river system after the Tumbledown Fire. The level of hazard can be monitored and would block access for larger boats to the specific section of river which has been affected. The Conrad Crossing location has been identified specifically to inform recreators travelling from Montana of the hazards downriver of this site. Conrad crossing is the last take out spot upstream of the fire scar, and is of particular importance in warning publics who may not be aware of the burned area condition downriver.

Location (Suitable) Sites:

- Conrad Crossing Boat Launch is located within the fire area and within a developed campground.
- Mile Marker 67.8 Boat Launch is a dispersed camp site with a driveway.

Eagle Creek Boat Launch is a dispersed camp site with a pull out.

Design/Construction Specifications: Place temporary access barriers, such as jersey barriers or eco blocks, at the entrances to the above recreation sites.

Warning Signs for St. Joe River Access Sites and Trailheads

Purpose of Treatment: The public needs to be made aware of the hazards associated with post-fire events, such as large woody debris/ logs in the river channel, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events). These hazard warning signs will inform the public, increase safety, and transfer responsibility of post-fire effects safety to the public.

General Description: Install hazard warning sign at boat launches, take outs, river access points and at trailheads to inform the public of the hazards associated with post-fire events, such as large woody debris in the river, hazard trees (especially during wind events), mud slides and rolling rocks (especially during heavy rain events).

Location (Suitable) Sites:

- Bluff Creek River Access is within the burned area.
- Conrad Crossing Boat Launch is located within the fire area and within a developed campground.
- Mile Marker 67.8 Boat Launch is a dispersed camp site with a driveway.
- Eagle Creek Boat Launch is a dispersed camp site with a pull out.
- Nugget Creek River Access is immediately downstream of the burned area.
- Nugget Hill River Access is immediately downstream of the burned area.
- “Money Hole” River Access is downstream of the burned area and will have warning signs for downstream hazards.
- Halfway Hill River Access is downstream of the burned area and will have warning signs for downstream hazards.
- Prospector Bridge River Access is downstream of the burned area and will have warning signs for downstream hazards.
- Gold Flat Dispersed Camp is the last take out upstream of the fire area. Exit river now signage would be installed here.
- Spruce Tree Campground is located upstream of the burned area and will have warning signs for downstream hazards.

Design/Construction Specifications:

- Install hazard warning sign at each of the above listed recreation sites.
- Sink a treated 4x4 post or at the entrances to the listed sites. Place in conspicuous locations for people entering the burned area.
- Mount approximately 36” X 24” Aluminum signs (with pre-drilled holes) to posts. Use fender washers if necessary, to prevent bolt head from pulling through sign during high wind events.
- Periodically check signs and maintain or replace as needed.

I. Monitoring Narrative: No monitoring is proposed

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

			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											
Noxious Weeds Treatment	Acre	123	70.57	$8,680	$0			$0		$0	$8,680
Noxious Weeds Treatment	Acre	51	138.89	$7,145	$0			$0		$0	$7,145
				$0	$0			$0		$0	$0
Subtotal Land Treatments				$15,825	$0			$0		$0	$15,825
B. Channel Treatments											
Prospector Bridge					$0			$0		$0	$0
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Subtotal Channel Treatments				$0	$0			$0		$0	$0
C. Road and Trails											
Trail Drainage Stabilization	Miles	2	10,000	$19,000	$0			$0		$0	$19,000
Strom Inspection and Resp	Miles	20	1,262	$25,240	$0			$0		$0	$25,240
Storm Proofing	Miles	10	2,617	$26,170	$0			$0		$0	$26,170
				$0	$0			$0		$0	$0
Subtotal Road and Trails				$70,410	$0			$0		$0	$70,410
D. Protection/Safety											
River Access Barrier	Each	3	900	$2,700	$0			$0		$0	$2,700
Road Barriers	Each	3	900	$2,700	$0			$0		$0	$2,700
Road Signs	Each	9	250	$2,220	$0			$0		$0	$2,220
Trailhead and River Access Signs	Each	16	420	$6,720	$0			$0		$0	$6,720
				$0	$0			$0		$0	$0
Subtotal Protection/Safety				$14,340	$0			$0		$0	$14,340
E. BAER Evaluation											
Initial Assessment	Report	1	82651	---	$82,651			$0		$0	$82,651
				$0	$0			$0		$0	$0
				---	$0			$0		$0	$0
Subtotal Evaluation				$0	$82,651			$0		$0	$82,651
F. Monitoring											
				$0	$0			$0		$0	$0
Subtotal Monitoring				$0	$0			$0		$0	$0
G. Totals				$100,575	$82,651			**$0**		**$0**	**$183,226**
Previously approved											
Total for this request				**$100,575**							

PART VII - APPROVALS

1. KIMBERLY PIERSON Digitally signed by KIMBERLY PIERSON Date: 2021.09.17 12:31:53 -07'00'

Forest Supervisor Date