

Date of Report: 9-26-21**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: Dixie Fire****B. Fire Number: ID-NCF-000448****C. State: Idaho****D. County: Idaho****E. Region: Northern****F. Forest: Nez Perce-Clearwater****G. District: Red River Ranger District****H. Fire Incident Job Code: P1N40221 (0117)****I. Date Fire Started: July 5, 2021****J. Date Fire Contained: 10-30-21****K. Suppression Cost: \$36,000,000 for Dixie
(Projected Final Cost)****L. Fire Suppression Damages Repaired with Suppression Funds (estimates):** Click here to enter text.

- 1. Fireline repaired:** A majority of firelines (handline and dozerline) has been repaired as of 9/23/21.
- 2. Other (identify):** Incident command, base camps, staging areas and drop points are identified for suppression repair activities, including removal of flagging and trash, scattering of slash, and rehabbing any user-created trails. Reference the Dixie Fire suppression rehabilitation plan for more information.

M. Watershed Numbers:*Table 1: Acres Burned by Watershed (HUC12)*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170602070702	Big Mallard Creek	36,518	9,703	27%
170602070707	Jersey Creek-Salmon River	34,341	5,517	16%
170602070704	Lehmi Creek	18,468	3,872	21%
170602070705	Rhett Creek	12,351	9,434	76%
170602070703	Trout Creek-Salmon River	26,214	14,063	54%
170602070901	Upper Crooked River	17,433	1,375	8%
170603050101	South Fork Red River	24,142	393	2%

N. Total Acres Burned:

The BAER assessment began on September 18th, 2021, with using a fire perimeter and BARC product from August 24th, 2021. Since then, the fire has had limited growth. 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	44,246
UNPARTITIONED RIPARIAN INTEREST	17
STATE	0
NON-FS	93
TOTAL	44,356

- O. Vegetation Types:** Dominant overstory vegetation throughout the burn consisted mixed conifer and lodgepole pine, with understories of huckleberry and beargrass, with cool moist types (Subalpine fir and Grand fir) on shady aspects and in riparian areas. Spruce and Grand fir are common in wetter areas, and Douglas-fir is common through much of the fire area. Many stands are decadent lodgepole with substantial mortality and advanced regeneration or subalpine fir establishment. Some Western Red Cedar is present but is only common with the lower elevation riparian areas.
- P. Dominant Soils:** The Dixie fire area is dominated by sandy loams and silt loams with minimal coarse fragments in the surface layer. An estimated 50% of the burn area consists of low relief (10-50%) ridges and hillslopes. 30% of the burn occurs on 30-50% slopes and 20% on steep slopes (>50%). Parent material is derived from hard crystalline rocks with some volcanic influence. 90% of the soils have a low to moderate pre-fire erosion risk.
- Q. Geologic Types:** The Dixie Fire lies within the Northern Rocky Mountains Physiographic Province, in the Elk City Basin and Uplands subsection of the Salmon Uplands Section. The geology of the Dixie Fire area is dominantly Idaho Batholith, a geologic intrusion of granitic and granodioritic rocks, metamorphic schist, gneiss, and quartzite bedrock. Minor areas of Mount Mazama volcanic ash loess mantle occur primarily on mid to high elevation, low-relief lands.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	120
INTERMITTENT	21
EPHEMERAL	--
OTHER	--

S. Transportation System:

Trails: National Forest (miles): 52

Other (miles): 0

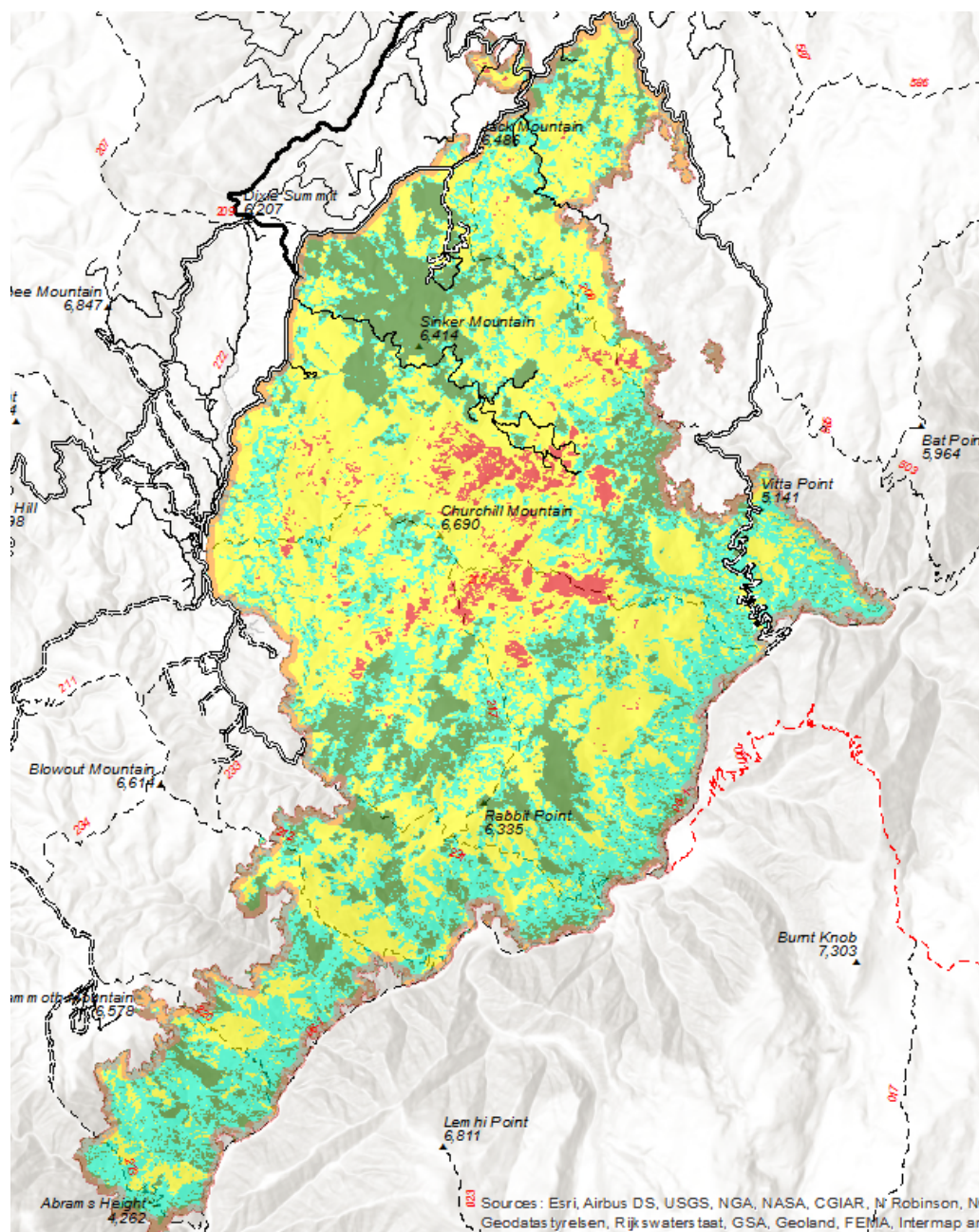
Roads: National Forest (miles): 39 (18 OML 1, 9 OML 2, 13 OML 3)

Other (miles): 6

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, 24, 2021.*

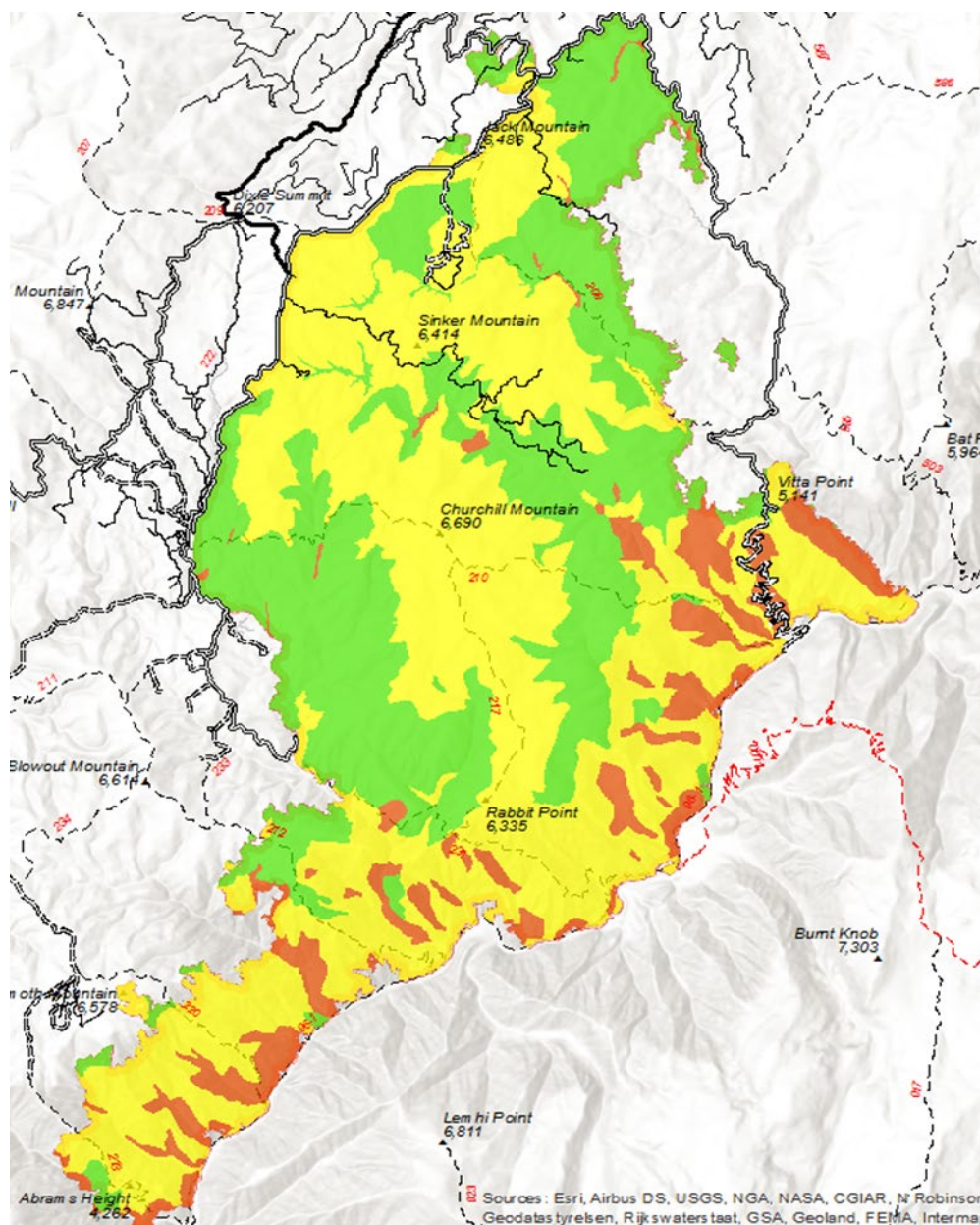
Soil Burn Severity	NFS	Riparian Interest	State	Private	Total	% within the Fire Perimeter
Unburned	8,907	14	-	8	8,951	20
Low	14,244	3	-	60	14,307	32
Moderate	19,705	-	-	25	19,730	45
High	1,390	-	-	-	1,390	3
Total	44,246	17	-	93	44,356	100

Fig. 1 – Final Soil Burn Severity Map (SBS) for the Dixie Fire



- B. **Water-Repellent Soil (acres):** 13,300 acres: An estimated 30% of the burn area is predicted to exhibit strong, fire-induced water repellency at the mineral soil surface. This surface repellency, though continuous and strong, is expected to be temporary, breaking up within 1 to 3 years. Discontinuous subsurface repellency was found from 2-6cm. Discontinuous background hydrophobicity was noted in unburned areas. Mapped high burn severity is assumed to have strong water repellency below surface but makes up less than 4% of the burn area.
- C. **Soil Erosion Hazard Rating:** Acres in burned area by soil erosion hazard rating in low, moderate, or high classes. Derived from the map units delineated in the Nez Perce National Forest Soil Survey. Water repellency and other fire effects may accelerate erosion.

Fig. 2 – Pre-fire soil erosion hazard for the Dixie Fire



Soil Erosion Hazard (Pre- and Post- Fire)

	Pre-Fire Acres	Percent Pre-Fire	Post-Fire Acres	Percent Post-Fire
Low	15752	35.5	7465	16.8
Moderate	24370	54.9	20234	45.6
High	4234	9.5	16657	37.6

D. 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

D. 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 3% 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):

The potential watershed responses of the Dixie Fire are: 1) an initial flush of sediment and ash, 2) rill and gully erosion in drainages and on moderate and steep slopes within the burned area, 3) increased discharge and peak flows, and 4) sediment deposition and transport in streams within and downstream of the fire. These responses are expected to be mild overall and greatest during initial storm events; they will attenuate over time (3-5 years) as vegetation and other ground cover becomes reestablished and soil hydrophobicity decreases.

Pour Point Pre- and Post-Fire Flow Estimates.

Watershed Name	Method	Watershed Area (ac)	Pre-Fire (cfs)		Post-Fire (cfs)		% Change	
			2yr	10yr	2yr	10yr	2yr	10yr
1194 - 24hr	FireHydro	104	2	18	5	128	150%	598%
1194 - 24hr	WildCat	104	0.49	5	3	11	471%	114%
Blane - 24hr	FireHydro	365	4	37	31	124	606%	236%
Blane - 24hr	WildCat	365	2	16	15	150	771%	838%
Little Mallard	Stream Stats/Story	8,186	70	125	113	203	63%	62%
Little Mallard	Area Scaler/Story	8,186	79	141	129	229	62%	62%
Little Mallard	WEPP Disturbed	8,186	280	410	1400	1900	400%	363%
Little Mallard	Area Scaler/WEPP adjusted		--	--	397	654	400%	363%
Rhett Creek	Stream Stats/Story	12,339	96	171	136	243	42%	42%
Rhett Creek	WEPP Disturbed	12,339	340	500	1200	1700	253%	240%
Rhett Creek	Stream Stats/WEPP adjusted	12,339	--	--	337	581	253%	240%

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Dixie fire started on July 5, 2021 from a thunderstorm system that moved through the Nez Perce-Clearwater National Forest. Due to record drought conditions and unseasonably high temperatures, the storm system resulted in a high number of lightning-caused wildfires. The forest began initial attack on this fire and other small fires that ignited. Dixie and Jumbo were the larger managed incidents. The remote location, steep terrain, limited access, and lack of suppression resources is challenging firefighting efforts and logistical support. As of Sept. 20, the fire was 53% contained, with full containment estimate to be by October 30, 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
Recreationalists, Residents & Forest Employees (Town of Dixie- East Slope)	Possible	Major	High	Threats to people from flooding and debris flows, hazard trees, and rockfall along the road.
Recreationalists & Forest Employees (NFS Road 222, Dixie Road)	Possible	Major	High	Threats to people from flooding and debris flows, hazard trees, and rockfall along the road and dispersed recreation areas.
Recreationalists & Forest Employees (NFS Road 421, Mallard Road)	Possible	Major	High	Threats to people from flooding and debris flows, hazard trees, and rockfall along the road and dispersed recreation areas.
Recreationalists & Forest Employees (NFS Churchill Trails)	Possible	Major	High	Threats to people from flooding and debris flows, hazard trees, and rockfall along the trail, trailheads and dispersed recreation areas.
Recreationalists & Forest Employees (Turnouts on roads and dispersed areas)	Possible	Major	High	Threats to people from flooding and debris flows, hazard trees, and rockfall along the trail, trailheads and dispersed recreation areas.
Recreationalists & Forest Employees (Reserved Sites along the Salmon River)	Unlikely	Major	Intermediate	Threats to people from flooding and debris flows, hazard trees, and rockfall at reserved sites along the Salmon River. S

2. Property (P):

Value	Probability	Consequence	Rating	Threat
NFS Road 222 (OML:3)	Unlikely	Moderate	Intermediate	Threat to the road from flooding and debris flow. Majority of the road is adjacent to low and some moderate severity.
NFS Road 421 (OML:3 and OML: 2)	Likely	Major	Very High	Threat to the road from flooding and debris flow. Majority of the road is adjacent to low and some moderate severity. Due to grade and undersized culverts, when an event happens it is likely compounding failures of drainage features would result in loss of the road.
NFS Road 9505 (OML: 1)	Unlikely	Minor	Very Low	Threat to the road from flooding and debris flow. Majority of the road is adjacent to low and some moderate severity.

NFS Roads 1194 (OML: 3) and 1190 (OML: 3)	Unlikely	Minor	Very Low	Threat to the road from flooding and debris flow. Majority of the road is adjacent to low and unburned.
NFS Road 1194B (OML: 1)	Possible	Major	High	High debris flow could plug the culvert and overtop the road washing out the culvert and road.
Little Mallard Creek Bridge	Possible	Major	High	Bridge is located below the 421 which may result in heavy slide activity from road failure.
Mallard Creek Trail Bridge & Lehmi Creek Trail Bridge	Unlikely	Minor	Low	Threats to bridge from debris flow.
Churchill Trails (Trails 210 and 217)	Possible	Moderate	Intermediate	Threats to trails from flooding and debris flows.
Boise Bar Trail (#213), #231 Trail and #96 Trail	Possible	Minor	Low	Threats to trails from flooding and debris flows.

3. Natural Resources (NR):

Value	Probability	Consequence	Rating	Threat
Native and Natural Plant Communities	Likely	Moderate	High	Threat to native vegetation from competition from noxious weeds.
Lynx	Possible	Minor	Low	Loss or degradation of designated critical habitat.
Bull Trout, Stealhead, Snakeriver Fall Chinook, Spring Chinook and Sockeye Salmon	Unlikely	Minor	Very Low	Loss or degradation of designated critical habitat and or loss of individuals from increased sedimentation.
Hydrologic Function	Likely	Minor	Low	Sour and other changes in channel morphology and bed composition.
Soil Productivity	Possible	Moderate	Intermediate	Accelerated erosion and increased sediment delivery. Threats to other resources.

4. Cultural and Heritage Resources:

Value	Probability	Consequence	Rating	Threat
Cultural Resources	Likely	Moderate	High	Artifact looting.

B. Emergency Treatment Objectives - Reduce threats to:

1. Reduce unacceptable risks to human life and safety from flooding, debris flows, and other threats such as hazard trees. Taking immediate actions to protect human life is the single overriding objective prior to implementing other actions.
2. Reduce unacceptable risks to roads, trails, and bridge infrastructure due to imminent erosion and flooding post fire events. Prevention of additional loss to infrastructure and a reduction of threats to threatened and endangered species habitat are objectives for the proposed treatments.
3. Reduce unacceptable risks to native and naturalized vegetation communities from the threat of noxious weeds and invasive species.

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

Land 90%

Channel NA

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	NA	NA	NA
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.

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: Holly Hampton

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Phone(s) 208-280-8673

Forest BAER Coordinator: Michele Windsor

Email: michele.a.windsor@usda.gov

Phone(s) 208-935-4282

Team Members: Table 7: BAER Team Members by Skill

Skill	Team Member Name
<i>Team Lead(s)</i>	Holly Hampton
<i>Soils</i>	Kyle Johnson, Terry Hardy
<i>Hydrology</i>	Erin Grinde, Matt Robinson & Nate Millet
<i>Engineering</i>	Michael Chan & Kelly Koistinen
<i>GIS</i>	Susy Campbell & Joanne Bonn
<i>Archaeology</i>	Cindy Schacher
<i>Weeds</i>	Alyssa Badertscher & Jon Haupt
<i>Recreation</i>	Doug Olive
<i>Other</i>	

H. Treatment Narrative:

Land Treatments:

P1a & P1b EDRR: Reduce the potential for establishment of new noxious weed infestations in native or naturalized communities, particularly establishment of new noxious weed infestations in highly susceptible burned areas, prevent spread of existing infestations, and decrease rate of spread of weed density from existing infestations.

Invasive plants and weed assessments will be conducted in FY2022 for Early Detection and Rapid Response (EDRR) on any new infestation located within the fire perimeter. Treatments will occur at proper phenology of each species to ensure maximum control. This treatment will be supplemented by natural re-vegetation. Assess areas that have a high potential for weed/invasive species establishment. The fire area falls within an area largely free of noxious weeds and native vegetation is a critical value. Additional critical areas include roads, hand lines, and burned areas where suppression vehicles and equipment traveled through known noxious weed/non-native invasive plant species populations. Disturbed areas within and along the fire

perimeter, such as hand lines, staging areas and ICP will also be prioritized for monitoring and treatment. Acres priority for EDRR are as follows:

Suppression EDRR – 174 acres

- 1) *Dozer Line: 100.6 acres*
- 2) *Handline: 0.8 acres*
- 3) *Road Lines: 61.8 acres*
- 4) *Dozer Push: 0.5 acres*
- 5) *Drop Points: 1 acre*
- 6) *Landing or Log Deck: 7.8 acres*
- 7) *Repair Points: 1.3 acres*

BAER EDRR – 162 acres (acreage calculated from low, moderate, and high severity)

- 8) *Adjacent to Existing Weed Population: 162 acres*

Design/Construction Specifications:

1. Conduct short-term monitoring in FY2022 using early detection and rapid response (EDRR) assessment/monitoring of noxious weed/non-native invasive plant species infestations within the burned area. Monitor the post-fire presence or spread of invasive species throughout the fire area.
2. Inventory/assessment, photos and mapping new noxious weed infestations within burned area using GPS technology (Collector) and upload into the Red River Ranger District GIS Noxious Weeds database.
3. Chemical treatments using pickups, UTVs and backpack spray units will be used on any noxious weeds located within the fire perimeter on NP-C Forest lands. Coordination with Idaho County or other contractors will be conducted to treat noxious weeds found on main access roads to the burn perimeter.

EDRR Treatment Cost Estimate

Item	UOM	Unit cost	# of units	Total Cost
Suppression EDRR	Acre	\$64.34	174	\$11,195
BAER EDRR	Acre	\$200	162	\$32,400
Total				\$43,595

Channel Treatments: None proposed.

Roads and Trail Treatments:

R3 Patrols for Storm Induced Road Hazards

The steep slopes within the Dixie Fire combined with the lack of vegetation in the moderate and high burn severity portions of the fire will potentially lead to soil, rock, wood debris and small organic material being washed down onto the roads from precipitation events. This material could end up in the roadway ditches and plug drainage features causing them to fail. Failure of drainage features such as culverts and rolling dips can lead to loss of access as well as severe damage to roads. While it is unlikely that a single precipitation event 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.

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, road ditches, and flow conveyance structures to provide safe access across FS lands and preserve the infrastructure.

The patrols are used to identify those problems such as debris caught in culvert inlets, plugged or partially plugged culverts, and washed-out roads. Then, after identifying problem areas, to clear, clean, culvert inlets and outlets and/or close those roads that are or have received damage.

Forest personnel will monitor the roads within the fire perimeter during spring melt-off, and during severe storm events throughout the year. Survey will inspect road surface condition, ditch erosion, and culvert inlet/outlet 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.

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.

NFSR #	NAME	Miles/Sites
222	Dixie Road (check for large and small woody debris, rocks, and other organic materials blocking inlets/outlets of undersized culverts).	5 miles/multiple
421	Big Mallard Creek (check for large and small woody debris, rocks, and other organic materials blocking inlets/outlets of undersized culverts).	12 miles/multiple sites along switchbacks of BMC road.
1194B	Tom Brennan (check for large and small woody debris, rocks, and other organic materials blocking inlets/outlets of culvert).	0.5 miles

Road Patrol Cost Estimate

Item	UOM	Unit cost	# of units	Total Cost
Road Drainage Storm Proofing	miles	\$1,389	18 miles	\$25,002

*See Road Drainage Storm Proofing treatment specification form for complete cost description

R14 Excelsior Bale Check Dams

The steep slopes within the Dixie Fire combined with the lack of vegetation in the moderate and high burn severity portions of the fire will potentially lead to soil, rock, wood debris and small organic material being washed down onto the roads from precipitation events. This material could end up blocking drainage features causing them to fail. Failure of these culverts can lead to loss of access as well as severe damage to the road infrastructure, and also to private residences downslope of the steep switchbacks along NFSR 421.

The threat of blocked culverts and compounding failures can be mitigated through the use of Excelsior bale Check dams above the top two culverts. The top two culverts will have a check dam installed to catch movement of sediment, soils, rock, and woody debris.

NFSR #	NAME	Miles/Sites
421	Big Mallard Creek (Check dams for large and small woody debris, rocks, sediment)	12 miles/2 sites along switchbacks of BMC road.

	and other organic materials blocking inlets/outlets of culverts).	
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Excelsior Bale Check Dams Cost Estimate

Item	UOM	Unit cost	# of units	Total Cost
Check Dams	Check Dam	\$1237	2	\$2,474

*See Road Drainage Storm Proofing treatment specification form for complete cost description

Protection/Safety Treatments:

S1a Warning Signs The overall purpose of this treatment is to reduce risks to human life and safety by warning motorists and/or Forest visitors of existing threats while traveling within and downstream of the burned area.

“Entering Burned Area” signs are needed to alert the public of possible threats to their life and safety that exist within or downstream of a burned area. The signs contain language specifying items to be aware of when entering a burn area such as falling trees and limbs, rolling rocks, and flash floods.

Road/trail route markers are needed at points of entry by use of forest system roads into the burned area. These signs inform the traveler of their current location and assist in navigating to safety during times of severe weather and flooding/debris flows.

Warning Signs Cost Estimate.

Item	UOM	Unit cost	# of units	Total Cost
Roadside Signs: “Entering Burned Area Warning”	Number of signs	\$318.91	5	\$1,100

H1 Heritage and Cultural Resource Protection

The primary purpose of resource protection patrols, provided by forest service personnel is to reduce or mitigate the risk of archeological looting during a time (through Fall 2022) when hunters and post-fire “sightseers” are expected to be in the area. The sites identified are eligible or potentially eligible for listing on The National Register of Historic Places. These sites are most vulnerable to looting immediately after a fire when there is no vegetation to help obscure artifact visibility. Cultural resources are scattered throughout the fire area, making area closure difficult. Administrative closures can draw attention to specific site locations.

There is a high risk to cultural resource sites within the burn perimeter as a result of increased potential for looting resulting from increased public access to sites and exposure of previously concealed artifacts and features, and loss of sites and/or site integrity as a result of erosion, runoff, and flash flooding from post wildfire storm events.

Cultural Resource Protection Patrols Cost Estimate

Item	UOM	Unit cost	# of units	Total Cost
Cultural Resource Protection Patrols	site	\$794	12	\$9,528

I. Monitoring Narrative: No monitoring is proposed

[illegible]

1. _____
Forest Supervisor Date