Date of Report:

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: Divide Complex (Balsinger and Ellis)

B. Fire Number: 2021-MTHLF-005079

C. State: Montana

D. County: Meagher, Cascade

E. Region: Northern

F. Forest: Helena-Lewis and Clark

G. District: Belt Creek – White Sulphur Springs

H. Fire Incident Job Code: P1N5FU21 (0115)

I. Date Fire Started: 7/8/2021

J. Date Fire Contained: Estimated 10/29/21

K. Suppression Cost: $18,468,373

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

1. **Fireline repaired (miles):** None to date
2. **Other (identify):** None to date

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

Fire Name	HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
BALSINGER	100301050302	Pilgrim Creek	18273.4	943.6	5.2
BALSINGER	100301030801	Upper Tenderfoot Creek	26125.5	117.4	0.4
BALSINGER	100301050301	Tillinghast Creek	22208.4	7706.0	34.7
ELLIS	100301030605	Ellis Canyon	10560.4	1065.0	10.1
ELLIS	100301030705	Blacktail Creek-Smith River	19164.0	158.7	0.8

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	BALSINGER ACRES	ELLIS ACRES	TOTAL ACRES
NFS	7743.6	147.7	7891.3
OTHER FEDERAL	0	0	0
STATE	232.4	0	232.4
PRIVATE	791.0	1076.0	1867.0
TOTAL	**8767.0**	**1223.7**	**9990.7**

O. Vegetation Types: Alpine fir, lodgepole, Douglas-fir, park-like grasslands

P. Dominant Soils: Moderately developed upland soils and rock scree occur on 77% of the fire area, while park like grassland mollic soils cover 18% area, and grassy bottomland soils with aquic conditions account for 5% area. Cryic, very cold conditions restrict the growing season. Dominant upland soils include Eutric Haplocryalfs and Ustic Haplocryepts. Grassland prevalent types include Ustic Calcicryolls, Ustic Argicryolls, and Lithic Haplocryolls. The latter soil types commonly occur where bedrock pitch parallels the surface.

Q. Geologic Types: Belt metasediments

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	BALSINGER MILES OF STREAM	ELLIS MILES OF STREAM
PERENNIAL	7.9	0
INTERMITTENT	3.6	3.6
EPHEMERAL	0	0
OTHER	0	0

S. **Transportation System:**

Balsinger Fire:
Trails: *National Forest (miles):* 1.7 *Other (miles):* 0
Roads: *National Forest (miles):* 19.1 *Other (miles):* 6.8

Ellis Fire:
Trails: *National Forest (miles):* 0 *Other (miles):* 0
Roads: *National Forest (miles):* 0.4 *Other (miles):* 1.3

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Fire Name	Soil Burn Severity	NFS	Other Federal	State	Private	Total	% within the Fire Perimeter
Balsinger	Unburned	1985	0	24	132	2140	24%
Balsinger	Low	2894	0	150	527	3571	41%
Balsinger	Moderate	1815	0	46	89	1949	22%
Balsinger	High	1051	0	12	44	1107	13%
Balsinger	**Total**	**7745**	**0**	**232**	**791**	**8767**	**100%**
Ellis	Unburned	11	0	0	80	91	7%
Ellis	Low	76	0	0	732	808	66%
Ellis	Moderate	50	0	0	224	275	22%

Fire Name	Soil Burn Severity	NFS	Other Federal	State	Private	Total	% within the Fire Perimeter
Ellis	High	10	0	0	40	50	4%
Ellis	**Total**	**148**	**0**	**0**	**1076**	**1224**	**100%**
GRAND TOTAL		***7894***	***0***	***232***	***1867***	***9991***	

B. Water-Repellent Soil (acres): Not observed

C. Soil Erosion Hazard Rating: Balsinger has 14% of the area with severe hazard for erosion. Ellis has 5% with moderate to severe erosion hazard.

D. **Erosion Potential:** Sheet and rill erosion will be expected on open forested slopes if a summer thunderstorm were to occur. The risk is highest initially and reduces over time for at least 3 years as the burned area stabilizes, soils recover infiltration and vegetation re-establishes. Rainfall thresholds to trigger debris flow and surface erosion are typically half inch rainfall in 30 minutes that can generate overland flows which mobilize ash and bare soil. Using NOAA Atlas 2, the 2 year 1 hour storm is roughly 0.69 inches, which puts natural rainfall rates in the range to generate erosion. Steep slopes with high severity with long slope runs and where channels converge have the highest erosion potential. The grassland parks will have relatively lower potential since spring greenup will likely produce robust revegetation. South facing slopes will have slower recovery and thus prone to longer periods for potential erosion. WEPPcloud erosion runs on Tillinghast watershed showed roughly 500 tons per year collectively for this 11,000 acre area.

E. Sediment Potential: Using the WEPPCloud erosion run, the Tillinghast watershed could produce 940 tons per year of sediment if a large thunderstorm were to occur.

F. Estimated Vegetative Recovery Period (years): On the Balsinger and Ellis fires, grasses are expected to recover within one to three years, based on the extent of low severity burn and the likelihood that root structures are still intact. Overstory mortality was extensive, and shrubs and conifers are expected to recover in twenty to fifty years.

G. Estimated Hydrologic Response (brief description): The Balsinger and Ellis fires moved quickly when driven by high winds and caused extensive overstory mortality, but much of the soil burn severity was low to moderate and fine root survival is likely to be high. The onset of cooler weather and rainfall helped to moderate and contain the fires, and the resulting moisture is expected to help break down any hydrophobicity in the soils (if any exists, as none was observed during field visits). Potential damaging events of concern in the future are peak flows in 2022 due to spring runoff and late summer thunderstorms.

Tillinghast Creek in the Balsinger burn area is likely to see flashier hydrologic response and increased peak flows, especially during intense rain events. The reduced understory and overstory vegetation in both fires are expected to result in increased overland flow, rilling, and erosion, which should be somewhat moderated by the presence of downed wood that was not fully consumed. Ground cover vegetation is expected to re-establish quickly due to the extensive low to moderate soil burn severity in both fires, and therefore partial hydrologic recovery is expected to occur as soon as the first growing season after the fire. Full hydrologic recovery is not expected for several decades as shrubs and conifers recover, due to the extensive overstory mortality.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Balsinger Fire and Ellis fires both started on July 8, 2021 and were managed as the Divide Complex. The lightning-caused Balsinger Fire is located in the northwest of the Little Belt Mountains, about 5 miles west of the town of Neihart, and burned primarily on US Forest Service lands. Periodic days of heavy rain (August 2, 8 and again starting August 17) reduced Balsinger Fire activity significantly, although the northern edge currently remains uncontained due to rugged terrain.

The Ellis Fire, the cause of which is under investigation, is located in the Dry Range about 2.5 miles southwest of the Smith River. The Ellis fire started on Forest Service lands and burned onto adjacent private ranches, with 88% of the final burn area on private. The Ellis Fire was contained more quickly (70% containment by July 24) and was put into patrol status on August 1.

The initial burn severity map was produced using burned area reflectance classification (BARC) imagery from August 13, processed by the Forest Service Geospatial Technology and Applications Center in Salt Lake City, Utah. The BAER team initiated fieldwork to ground-truth the satellite imagery on August 18 and visited the southern edge of the Balsinger burn area. Cold, rainy weather had set in by this time, reducing fire behavior significantly, and dense fog prevented viewing the burn from nearby overlooks. Due to wet conditions and the limited USFS infrastructure within the two fires, the team focused primarily on assessing soil burn severity at Balsinger Fire on August 18 and 19. Additional field review of archeological critical values at Balsinger occurred on August 20. Due to the lower burn severity, limited critical values, limited access, and small acreage on Forest Service, fieldwork was not conducted at the Ellis Fire. Resource advisors who had worked on both fires provided on-the-ground knowledge of critical values at both fires.

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):** There is high risk to any members of the public or USFS employees accessing the Balsinger burn area via trails due to extensive dead standing trees and snags. The probability of damage or loss is *possible* and the magnitude of consequences *major*, resulting in *high risk*. **The recommended treatment is hazard signage at the Pilgrim Creek and Tillinghast trailheads and at other trail entrances to the Balsinger burn perimeter.**

   Public access to Forest Service lands in the Ellis Fire burn area is very limited, due to surrounding private land and lack of roads or trails, and therefore human life or safety risk is minimal.

2. **Property (P):** There is high risk of damage to the Pilgrim Creek trail (#304) within the Balsinger perimeter. A total of 0.7 miles of trail runs through moderate or high severity burn area and is *likely* to see increased erosion with *moderate* consequences, resulting in *high risk*. **The recommended treatment is trail stabilization work by hand crews along 0.7 miles of the Pilgrim Creek trail in the Balsinger Fire.**

   There is very minimal Forest Service infrastructure within the Ellis Fire perimeter, and therefore no risk to property critical values.

3. **Natural Resources (NR):**There is high risk to native plant communities from the threat of noxious weeds and invasive plant species, particularly along areas of suppression disturbance and in several open parks and meadows that burned at moderate or high severity and are adjacent to known invasive plant populations. The probability of damage or loss is *likely* and the magnitude of consequences is *moderate*, resulting in *high risk*. **The recommended treatment is weed detection monitoring and early detection, rapid response herbicide application.**

4. **Cultural and Heritage Resources:**The Balsinger Fire burned through meadows at Harley Park and Onion Park that were previously more obscured from the road and are now more accessible to dispersed camping. This has resulted in increased risk of public looting of archeological artifacts known to exist at these sites. The probability of damage or loss is *likely* and the magnitude of consequences is *moderate*, resulting in *high* risk. **The recommended treatment is temporary area**

closure signage that indicates the meadows are closed for rehabilitation, with lightweight fencing such as cordage strung between posts.

B. Emergency Treatment Objectives: The objectives of the proposed treatments include: raise awareness of public safety risks along trail corridors in the burn area, mitigate risk of spread of invasive plants into burned or disturbed areas, and protect newly exposed cultural heritage sites at risk of looting.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 80%
Channel: None proposed
Roads/Trails: None proposed
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	80	80
Channel	N/A	N/A	N/A
Roads/Trails	N/A	N/A	N/A
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): The invasive plants no-action treatment cost is estimated at up to $88,700 based on backpack or vehicle spraying of the area proposed for treatment in the Balsinger Fire. This assumes treatment would be conducted three years later, with a 15% increase of treatment area per year post-fire. No cost estimate is placed on cultural resource damage, or on potential loss of life that would be mitigated by hazard signs.

F. Cost of Selected Alternative (Including Loss): EDRR Suppression ($8,820) + EDRR BAER ($7,725) + trail drainage stabilization ($2800) + hazard warning signs ($800) + area closure signs and fence materials ($1000) = $21,145

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Kate Condon
Email: katherine.condon@usda.gov **Phone(s)**: 406-495-3724

Forest BAER Coordinator: Scott Nagel
Email: scott.nagel@usda.gov **Phone(s):** 406-495-3723

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

Skill	**Team Member Name**
Team Lead(s)	Kate Condon
Soils	Vince Archer
Hydrology	Anne Dunckel
Engineering	
GIS	Lori Wollan
Archaeology	Emma Chambers-Koenig
Weeds	Nathan Baver
Recreation	
Other	

H. Treatment Narrative:

Land Treatments: Weed detection monitoring and herbicide ground application are recommended in areas of suppression-related ground disturbance and in areas adjacent to known weed populations that burned at moderate or high severity. Potential infestations include but are not limited to houndstongue, Canada thistle, musk thistle, and bull thistle.

P1a. Invasives EDRR: Early detection, rapid response (EDRR) needs to occur following the first precipitation event and continue throughout the subsequent growing season. Documentation of weed locations, by species, and other observations regarding density and spread will be recorded following the guidelines in NRM and GIS corporate databases. The estimated treatment needed includes: 309 acres where weeds could spread from documented infestations into the fire area at a cost of $25 per acre for a **total BAER EDRR cost of $7,725.** The estimated cost per acre is based on the assumption that much of the targeted acreage will only require a brief survey and not an eradication treatment.

P1b. Invasives EDRR – Suppression Repair: Land-based herbicide application by backpack or truck and UTV would occur this growing season with follow-up treatments in the first year post-fire as needed on suppression-related disturbance. These areas were delineated using suppression disturbance lines and points provided by the IMT and resource advisors, and assigned a buffer width based on disturbance type. For example, the rehabilitated handlines are assumed to have a 5 foot total disturbance width while fuel breaks along existing roads were given a width of 30 feet.

The suppression disturbance areas include 12 miles of containment line and 20 acres of slashpiles and draft sites that would need to be walked and backpack sprayed (39 acres at $160/ac). There are also 11 miles of containment line along existing roads that would be driven (43 acres at $60/ac), **for a total suppression repair cost of $8,820.** These estimated costs are based on the assumption that these suppression disturbance areas will require more intensive herbicide treatment.

The total of BAER EDRR plus suppression EDRR is $16,545.

Treatment Type	Treatment Method	Acres	Cost/Acre	Total
P1a. Invasives EDRR	Backpack	309	25	$7,725
P1b. Invasives EDRR – Suppression Repair	Vehicle	43	60	$2,580
	Backpack	39	160	$6,240
P1b. Subtotal				*$8,820*
All Treatments Total				**$16,545**

Channel Treatments: None proposed.

Roads and Trail Treatments:

T1a. Trail Drainage Stabilization: The Pilgrim Creek trail (#304) runs through the Balsinger burn perimeter and 0.7 miles of the trail burned at moderate or high severity. Trail stabilization is proposed on these sections to improve drainage and reduce the risk of erosion and runoff damage to the trail template. Hazard tree removal to ensure safety of the trail crew while working may also be necessary. **Trail stabilization costs are estimated at $4000/mile, for a total cost of $2800.**

Protection/Safety Treatments:

H1. Heritage and Cultural Resource Protection: Temporary area closure signs are recommended at the Harley Park and Onion Park meadows (four signs total at $200 each) as well as lightweight cordage fencing ($200) at an **estimated total cost of $1000.**

S1a. Trail/recreation hazard signs: Warning signage at the Balsinger and Pilgrim Creek trails is recommended at each entrance into the burn perimeter to warn of post-fire risks and help maintain public safety. **A total of four signs are requested at an estimated cost of $200 each for $800 total.**

I. Monitoring Narrative:

No monitoring is proposed with BAER funds for the Balsinger or Ellis fires.

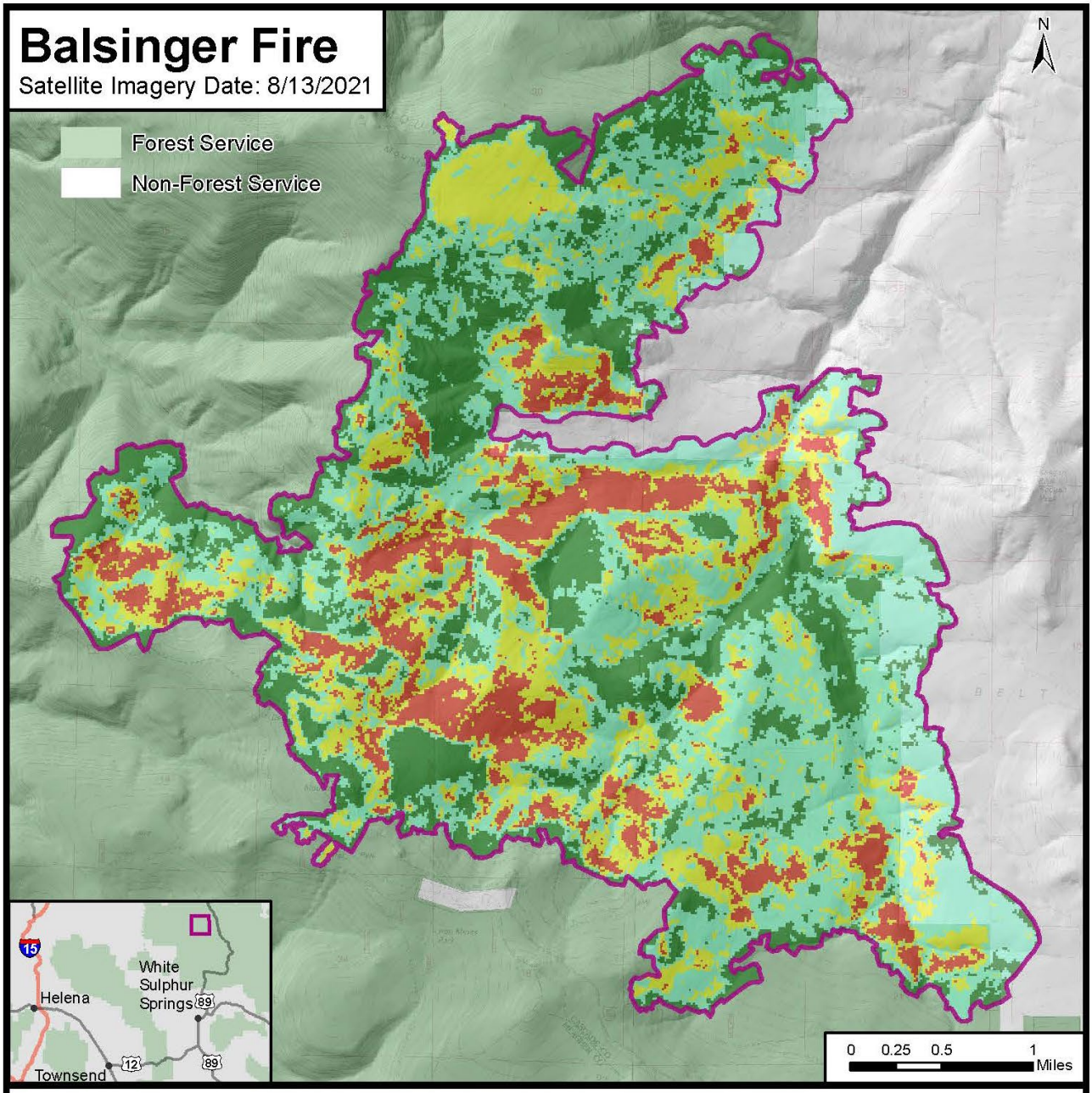
PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

A. Land Treatments										
P1a. Invasives EDRR	acre	25	309	$7,725	$0		$0		$0	$7,725
P1b. Invasives EDRR – Suppression Repair	acre	43	60	$2,580	$0		$0		$0	$2,580
P1b. Invasives EDRR – Suppression Repair	acre	39	160	$6,240	$0		$0		$0	$6,240
Subtotal Land Treatments				$16,545	$0		$0		$0	$16,545
B. Channel Treatments										
				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
T1a. Trail Drainage Stabilization	mile	4,000	0.7	$2,800	$0		$0		$0	$2,800
Subtotal Road and Trails				$2,800	$0		$0		$0	$2,800
D. Protection/Safety										
H1. Heritage and Cultural Resource Protection	sign	200	4	$800	$0		$0		$0	$800
H1. Heritage and Cultural Resource Protection	cord fenci	200	1	$200	$0		$0		$0	$200
S1a. Trail/recreation hazard signs	sign	200	4	$800	$0		$0		$0	$800
Subtotal Protection/Safety				$1,800	$0		$0		$0	$1,800
E. BAER Evaluation										
Initial Assessment	Report			$9,800	$0		$0		$0	$9,800
Subtotal Evaluation				$9,800	$0		$0		$0	$9,800
F. Monitoring										
				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$21,145	$0		**$0**		**$0**	**$30,945**
Previously approved										
Total for this request				**$21,145**						

PART VII - APPROVALS

SARA MAYBEN Digitally signed by SARA MAYBEN
Date: 2021.08.27 13:29:25 -06'00'

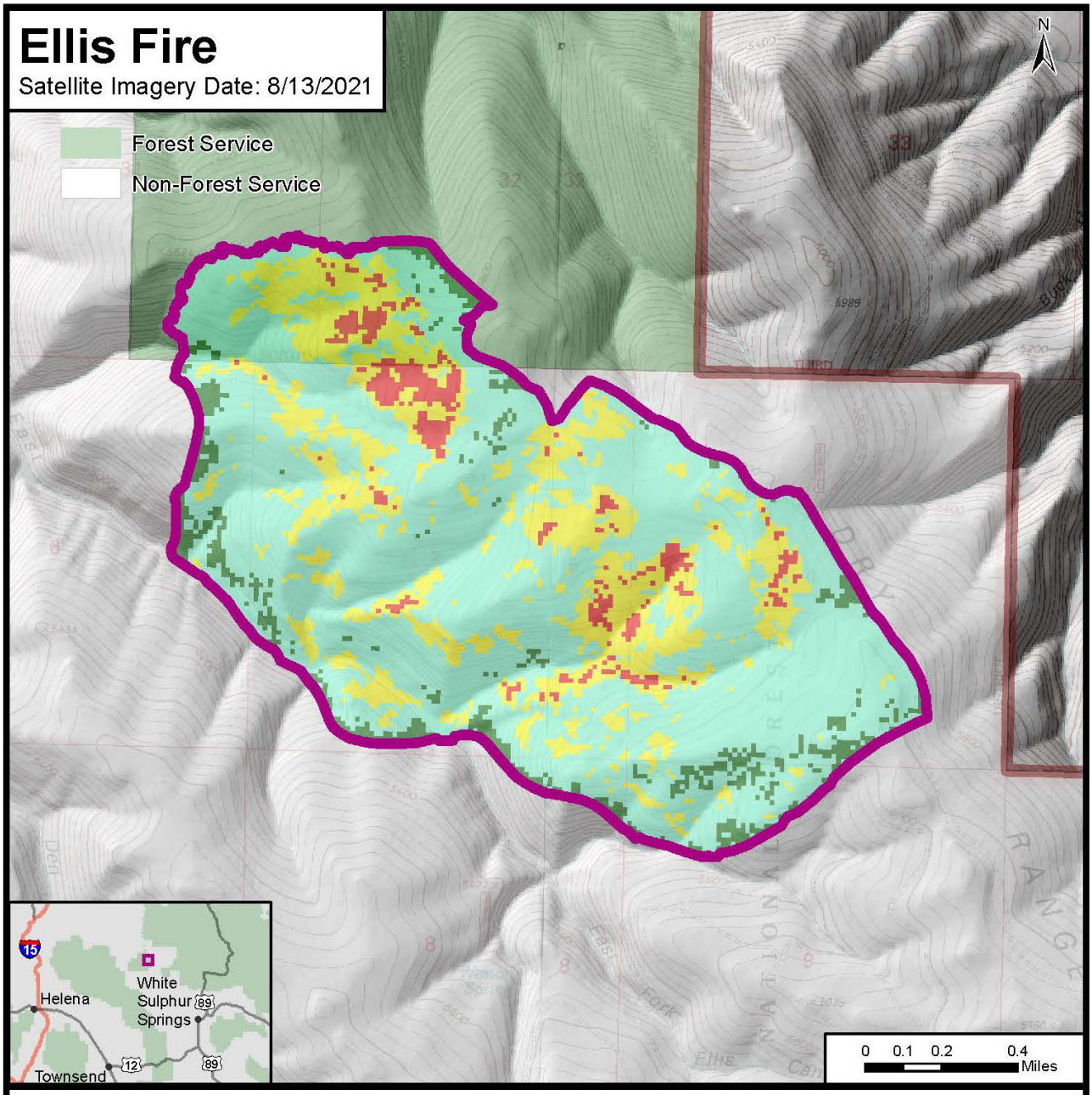
1. _____
Forest Supervisor Date



SOIL BURN SEVERITY

BURNED AREA EMERGENCY RESPONSE (BAER)
Helena-Lewis and Clark National Forest

SOIL BURN SEVERITY ACRES				
High	Moderate	Low	Unburned-Very Low	Total
1,107	1,949	3,571	2,140	8,767



SOIL BURN SEVERITY

BURNED AREA EMERGENCY RESPONSE (BAER)
Helena-Lewis and Clark National Forest

SOIL BURN SEVERITY ACRES				
High	Moderate	Low	Unburned-Very Low	Total
50	275	808	91	1,224

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