

**Date of Report:** September 12, 2023

**BURNED-AREA REPORT  
HAYDEN FIRE 2023**

SALMON-CHALLIS NATIONAL FOREST



*Hayden Fire Photo from Inciweb, 7/30/2023*

**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:** Hayden Fire

**B. Fire Number:** 2023-IDSCF-023084

**C. State:** Idaho

**D. County:** Lemhi

**E. Region:** 4

**F. Forest:** Salmon-Challis

**G. District:** Leadore

**H. Fire Incident Job Code:** \_\_\_\_\_

**I. Date Fire Started:** July 19, 2023

**J. Date Fire Contained:** Est October 1, 2023

**K. Suppression Cost:** \$21,400,000 (as of 8/31/23)

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

- 1. **Fireline repaired (miles):** See table below
- 2. **Other (identify):** See table below

*Fire line status (in miles) for the Hayden Fire, as of 8/21/2023. Fire suppression repair is in progress.*

	Completed - Inspected	Completed - Ready for Inspection	No Repair Needed	Total
Access or Improved Road			3.8	3.8
Completed Dozer Line	2.86	0.02		2.9
Completed Hand Line	7.94		0.38	8.3
Completed Mixed Construction Line	0.67		0.53	1.2
Completed Road as Line	18.5		10.58	29.1
Repair Line	3.13			3.1
<b>Total</b>	<b>33.1</b>	<b>0.02</b>	<b>15.3</b>	<b>48.4</b>

#### M. Watershed Numbers:

*Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170602040602	Middle Hayden Creek	11,565	6492	56%
170602040601	Upper Hayden Creek	20,167	8484	42%
170602040507	Mill Creek	11,547	2339	20%
170602040603	Bear Valley Creek	19,724	3409	17%
170602020307	Morse Creek	11,672	846	7%
170602040510	Zeph Creek-Lemhi River	39,243	2607	7%

#### N. Total Acres Burned:

*Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	24,176
OTHER FEDERAL	0
STATE	0
PRIVATE	0
<b>TOTAL</b>	<b>24,176</b>

**O. Vegetation Types:** Approximately 76% of the burned area consists of forested cover types, with the dominant tree species being Lodgepole Pine and Douglas Fir. Approximately 22% of the fire burned in open cover types, including sagebrush, barren, and grass/forb cover types.

COVER TYPE	ACRES	PERCENT
Lodgepole Pine	6627	27.4%
Douglas-fir	6490	26.8%
Spruce/Fir	2603	10.8%
Mountain Big Sage	1800	7.4%
Conifer/Mountain Big Sage	1448	6.0%
Whitebark Pine	1166	4.8%
Barren	1083	4.5%
Bunchgrass/Fescue	866	3.6%
Fescue/Conifer	692	2.9%
Grass/Forb	465	1.9%
Mountain Big Sage/Fescue	189	0.8%
Fescue	165	0.7%
OTHER COVER TYPES (0.5% of burned area or less)	583	2.4%
<b>TOTAL</b>	<b>24,176</b>	

**P. Dominant Soils:** Soils in the burned area are described based on Landtypes shown in the table below.

LT	LANDTYPE DESCRIPTION	ACRES	PERCENT
Q109a	Weakly dissected cryic mountain slopeland in quartzite, moist sites	3184	13.2%
Q109b	Moderately dissected cryic mountain slopeland in quartzite, moist sites	2691	11.1%
VB	Alluvial valley bottoms including alluvial fans, terraces, and floodplains	2457	10.2%
Q109bs-1	Moderately dissected cryic mountain slopeland in quartzite, dry sites	1340	5.5%
Q120bs-1	Moderately dissected mountain slopeland in quartzite, warm and dry sites	1096	4.5%
Q120an	Weakly dissected mountain slopeland in quartzite, cold and moist sites	1065	4.4%
Q125	Benchy mountain slopeland, hot-dry sites	940	3.9%
Q109as-1	Weakly dissected cryic mountain slopes in quartzite	921	3.8%
Q120as-1	Weakly dissected mountain slopelands in quartzite, warm and dry sites	823	3.4%
Q120bs	Moderately dissected mountain slopelands in quartzite	818	3.4%
V109bs-1	Moderately dissected cryic mountain slopeland, dry sites	621	2.6%
Q120as	Weakly dissected mountain slopeland in quartzite, hot and dry sites	558	2.3%
Q111bs-1	Moderately dissected glacial troughlands in quartzite, dry sites	555	2.3%
Q120a	Weakly dissected mountain slopeland in quartzite, cool and moist sites	533	2.2%
Q109-1	Cryic ridgelands in quartzite, moist to dry sites	505	2.1%
Q111cr	Rocky, strongly dissected glacial troughlands in quartzite	498	2.1%
Q120cr	Rocky, strongly dissected, mountain slopeland in quartzite	461	1.9%
Q109cr	Strongly dissected, rocky, cryic mountain slopeland in quartzite	399	1.6%
Q110d	Steep rocky cirque headwall in quartzite	397	1.6%
V109a	Weakly dissected cryic mountain slopeland, moist sites	394	1.6%
Q111b	Moderately dissected glacial troughlands in quartzite, moist sites	350	1.4%
Q109	Cryic ridgelands in quartzite, moist sites	308	1.3%
Q120bR	Rocky, moderately dissected, mountain slopeland in quartzite	303	1.3%
Q111as-1	Weakly dissected glacial troughlands in quartzite, cold and dry sites	299	1.2%
Q109d	Cryic headlands in quartzite, moist to wet sites	291	1.2%
V125	Benchy mountain slopeland, hot-dry sites	245	1.0%
60Q	Strongly glaciated lands in quartzite	218	0.9%
Q110w	Cirque basinlands in quartzite, moist to wet sites with lakes	204	0.8%
V126bs	Moderately dissected foothill lands, cool and moist	202	0.8%
V120bs	Moderately dissected mountain slopeland, hot and dry sites	199	0.8%
V120bs-1	Moderately dissected mountain slopeland, warm and dry sites	191	0.8%
Q109c	Strongly dissected cryic mountain slopeland in quartzite, moist sites	175	0.7%
Q111bR	Rocky moderately dissected glacial troughlands in quartzite	149	0.6%
Q109as	Weakly dissected cryic mountain slopeland, very dry sites	145	0.6%
OTHER LANDTYPES (0.5% of burned area or less)		638	2.6%
<b>TOTAL</b>		<b>24,176</b>	

**Q. Geologic Types:** Geologic types in the burned area are defined by Landtype Geology.

	ACRES	PERCENT
Quartzite Landtypes	19,635	81%
Alluvial Landtypes	2457	10%
Volcanic Landtypes	2084	9%
Granitic Landtypes	0	0%

**R. Miles of Stream Channels by Order or Class:**

STREAM TYPE	NATIONAL FOREST	OTHER
Perennial	38.6	0
Intermittent/Ephemeral	35.5	0
Other	0	0

## S. Transportation System:

<b>TRAILS (miles)</b>	<b>National Forest</b>	<b>Other</b>
Motorized Trails	7.5	0
Snow Trails	0.9	0
Non-motorized Trails	5.0	0

<b>ROADS (miles)</b>	<b>National Forest</b>	<b>Other</b>
Open Roads	17.1	0
Closed roads	7.7	0
Unauthorized Routes	24.1	0

## PART III - WATERSHED CONDITION

### A. Burn Severity (acres):

BARC Model: The BAER Team used BARC (Burned Area Reflectance Classification) data derived from the Forest Service Geospatial Technology and Applications Center, BAER Imagery Support Program as a basis for analyzing burn intensity (vegetative scorch) and soil burn severity (fire impacts to the soil).

The BARC dataset was derived from a comparison of Sentinel-2B satellite imagery on 8/13/2023 with pre-fire Sentinel-2A satellite imagery from 7/12/2023. At that time, the Hayden Fire had burned 24,176 acres.

The original classification thresholds of the BARC model are as follows:

**Unburned 1-91, Low 92-142, Moderate 143-219, High 220-254**

Burn Intensity: BARC data verification of burn intensity (defined as vegetative scorch) was conducted by the BAER Team during a field visit on 8/18/2023. It was determined that the original BARC model had overestimated the amount of moderate burn intensity, particularly in open sagebrush cover types. Classification values of the BARC256 dataset were adjusted to better match observations made during field verification. Despite these adjustments, some minor discrepancies still exist between observed burn intensity and the adjusted BARC model.

The adjusted classification thresholds are as follows:

**Unburned 1-91, Low 92-169, Moderate 170-222, High 223-254**

Soil Burn Severity: Soil burn severity sampling was conducted during the 8/18/2023 field visit to establish a relationship between burn intensity as shown in the BARC model and the effects of the fire on the soil (burn severity). The BAER Team determined that high soil burn severity occurred in areas of high burn intensity within forested cover types including lodgepole pine, spruce/fir, and Douglas fir. High burn intensity within other cover types (open cover types such as sparse forest and sagebrush) generally resulted in only moderate soil burn severity, although small, isolated areas of high severity occurred where prolonged smoldering occurred on the ground. Likewise, moderate burn intensity in forested cover types resulted in moderate burn severity, while moderate burn intensity in open cover types resulted in low burn severity. Therefore, the BARC classification thresholds were not changed, but the following assumptions were made and applied to the soil burn severity model:

- All high intensity within lodgepole, spruce/fir, Douglas fir, and whitebark pine cover types is high severity.
- All high intensity within any other cover type is moderate severity.
- All moderate intensity within lodgepole, spruce/fir, Douglas fir, and whitebark pine cover types is moderate severity.
- All moderate intensity within any other cover type is low severity.
- All low intensity is low severity.
- The model does not show small, isolated areas of high severity.

- Some discrepancies still exist because of error associated with the BARC model and cover type mapping.

The following shows some typical examples of each intensity/severity class observed:

High Intensity/High Severity

North-facing slope along Kadletz Creek, in lodgepole pine forest (8/18/2023). Full consumption of fine material and thick ash on the ground.



Moderate Intensity/Moderate Severity

Ridgetop of south-facing slope along Kadletz Creek, in lodgepole pine forest (8/18/2023). Some needles remain in the trees.



Moderate Intensity/Low Severity

South-facing sagebrush hillslope along Kadletz Creek, sagebrush mostly consumed (8/18/2023), but little heat transferred into the soil.



Low Intensity/Low Severity

Open forest of Douglas fir burned at low intensity near the Hayden Creek Bridge (8/18/2023).



Table 3: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal	State	Private	Total	% within the Fire Perimeter
Unburned	6749	0	0	0	6749	27.9%
Low	9869	0	0	0	9869	40.8%
Moderate	5822	0	0	0	5822	24.1%
High	1736	0	0	0	1736	7.2%
<b>Total</b>	<b>24,176</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>24,176</b>	

A. **Water-Repellent Soil (acres):** Approximately 1800 acres. Water repellent soils are likely present in areas of high burn severity in lodgepole and spruce/fir cover types, as well as some localized areas of moderate burn severity where heavy ground fuels caused extended periods of smoldering.

B. **Soil Erosion Hazard Rating:** Landtype Association Erosion Hazard Ratings for the burned area are shown in the table below:

LTA Erosion Hazard Rating	Acres	Percent
Low	12,641	52%
Moderate	6831	28%
High	4704	19%
Very High	0	0%
<b>TOTAL</b>	<b>24,176</b>	

C. **Erosion Potential:** Up to 1.4 tons/acre\*

\* Based on ERMIT modeling for high burn severity on representative slopes of the Hayden Fire, at the 20% probability that the sediment yield will be exceeded.

D. **Sediment Potential:** Up to 664 cubic yards/square mile

E. **Estimated Vegetative Recovery Period (years):** 1-3 (grasses), 2-5 (woody), 10-50 (conifers)

## F. Estimated Hydrologic Response (brief description):

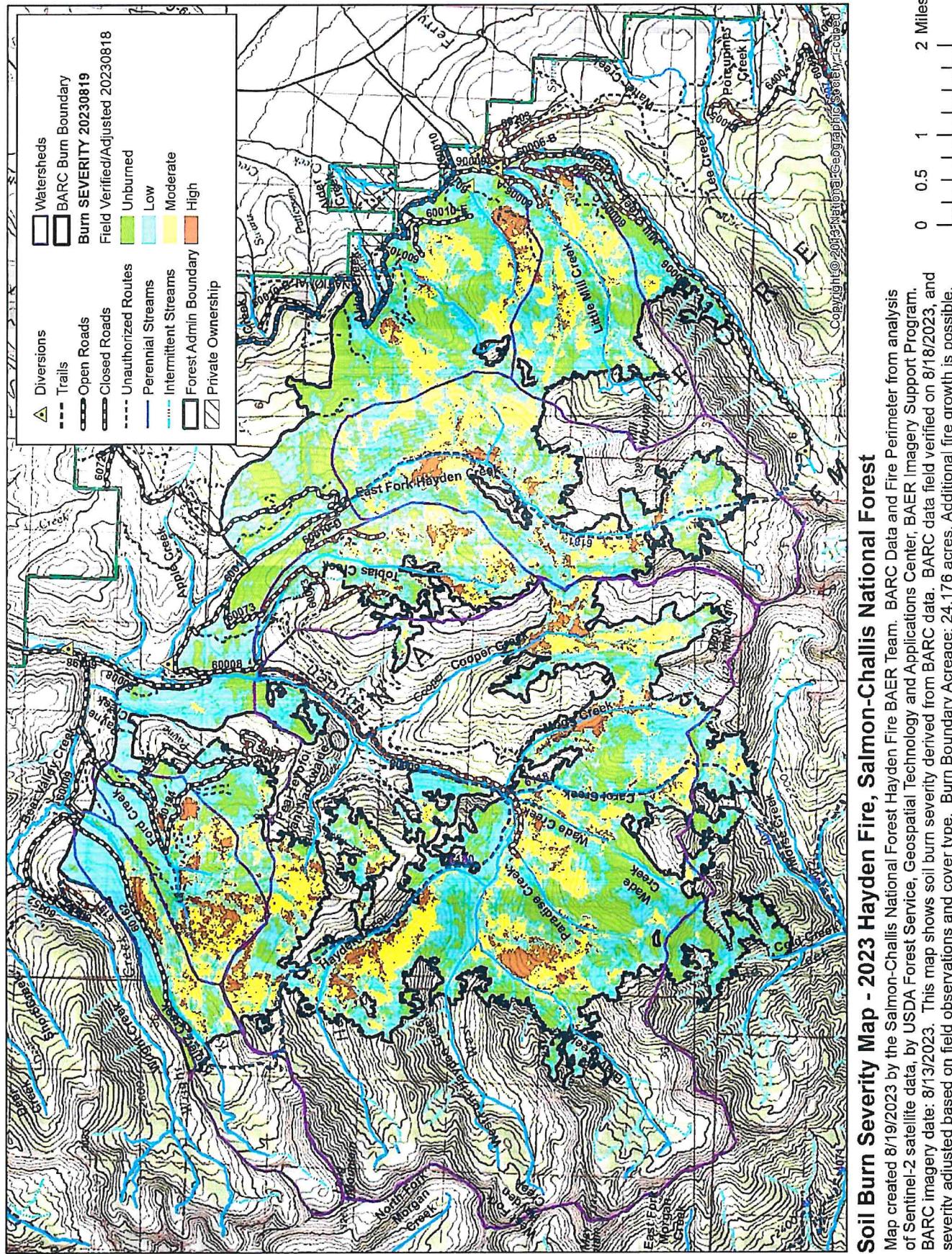
The upper portions of many of the drainages within the burned area are alpine in nature, with high peaks, alpine lakes, and rock, and the lower portions of these drainages and many of the south-facing slopes within the burned area consist of open slopes of sagebrush and bunchgrasses. Forests exist at mid-elevations and on north-facing aspects. As a result of this variability in cover type, the Hayden Fire burned in a patchy mosaic pattern, with most of the high severity burn occurring in the thick forests that occur in the middle elevations of the drainages. As a result, individual watersheds generally did not experience high percentages of high burn severity (see table below):

Soil Burn Severity by Watershed	Outside of burned area	Unburned	Low severity	Moderate severity	High Severity
EF Hayden Creek at FR010 (5076 acres)	37%	13%	25%	21%	5%
Ford Creek at FR009 (1477 acres)	1%	15%	39%	27%	17%
Kadletz Creek at FR009 (2138 acres)	50%	9%	27%	10%	3%
Little Mill Creek at FR010 (2564 acres)	32%	14%	29%	22%	4%
Tobias Creek at FR008 (2002 acres)	31%	18%	27%	17%	6%
Hayden Creek at Tobias Creek (20,174 acres)	58%	10%	16%	12%	4%

It is expected that increased post-fire runoff and erosion will be most pronounced in steep watersheds with a high component of moderate and high severity burn. High intensity, short duration rainfall typically occurs in this area during late summer thunderstorms. It is likely that localized effects will occur in areas of high severity burn and may include sediment and debris delivery to streams, increased peak streamflows, and possibly localized debris flow events.

While most watersheds experienced relatively low percentages of high severity burn, Ford Creek is the exception. This small stream has the greatest likelihood of experiencing a flood event, with 17% of the watershed burned at high severity and 27% of the watershed burned at moderate severity. Because this approximately 1500-acre watershed is predominantly within the forested mid-elevation areas of the Lemhi Range, fire has affected most of the watershed and caused considerable deviation from normal conditions of runoff and soil infiltration. Loss of groundcover in moderate and high severity burned areas along with water repellency in high severity burned areas of this watershed are likely to result in 200 to 400% increases in peak streamflow volumes over the next three to five years, including sediment bulking and potentially debris flow contributions derived from steep hillside drainages (estimated based on professional judgement from past modeling on similar fires and post-fire observations).

Most of the burned area drains into Hayden Creek, one of the largest streams draining the Lemhi Mountains. Because of the large drainage area of this stream and the relatively low percentage of high severity burn in the watershed as a whole, any flood events produced as a result of this fire are not likely to cause major effects downstream on Hayden Creek, other than increased suspended sediment loads and high turbidities.



## Soil Burn Severity Map - 2023 Hayden Fire, Salmon-Challis National Forest

Map created 8/19/2023 by the Salmon-Challis National Forest Hayden Fire BAER Team. BARC Data and Fire Perimeter from analysis of Sentinel-2 satellite data, by USDA Forest Service, Geospatial Technology and Applications Center, BAER Imagery Support Program. BARC imagery date: 8/13/2023. This map shows soil burn severity derived from BARC data. BARC data field verified on 8/8/2023, and severity adjusted based on field observations and cover type. Burn Boundary Acreage: 24,176 acres. Additional fire growth is possible.

**PART V - SUMMARY OF ANALYSIS****Introduction/Background**

The Hayden Fire started on July 19, 2023 in the upper portion of the Hayden Creek watershed near Paradise Creek. The cause of the fire is undetermined. The fire burned in the Lemhi Mountains, approximately 18 miles west of Leadore, Idaho. The fire initially spread rapidly to the west, then continued to progress primarily to the north and east over the next 2 weeks during unseasonably hot and dry weather conditions. The return of cooler weather, higher humidities, and rainfall during the first week of August allowed firefighters to contain the fire using natural barriers (high peaks and ridges of the Lemhi Mountains) as well as constructed firelines and back burns.

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

Table 4: 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):**

**BAER Value:** Human life and safety on or in close proximity to burned NFS lands

**What is at Risk:** Human life and safety

**Probability** Possible

**Consequences** Major

**Risk** High

**Comments:** Increased risk of hillslope erosion, rockfall, hazard trees, high flows, and debris flows will likely be present for 3 to 5 years following the fire. Forest roads and trails access much of the portion of the burned area, and this area is popular for dispersed camping, motorized and non-motorized trail use, hunting, fishing, and firewood gathering. Increased amounts of deadfall along roads and trails in the burned area are likely to be a concern for at least 5 to 10 years, and potentially longer.

**2. Property (P):**

**BAER Value:** Buildings, water systems, utility systems, road and trail prisms, dams, wells, or other significant investments on or in close proximity to burned NFS lands

**What is at Risk:** Open Forest Roads

**Probability** Likely

**Consequences** Moderate

**Risk** High

**Comments:** 17.1 miles of open Forest system roads exist within the burned area. Most of these roads are at low risk from post-fire effects, but some may experience some level of increased runoff and erosion. The primary concern to the road system is at existing stream crossings where streamflows are likely to increase and the potential for debris flows exists. Major crossings on Hayden Creek, East Fork Hayden Creek, and Kadletz Creek are bridges with adequate width and freeboard to accommodate the expected increase in flows. Many of the smaller drainages cross forest roads at culverts. Of these crossings, the 5 road crossings on Ford Creek are of the highest concern because of the high percentage of high severity burn in the watershed upstream of these crossings. Risk exists at each of these crossings, but the highest risk exists at the lower two crossings, on FR0009 (Bear Valley Creek Road), which is used to access popular destinations along Bear Valley Creek.



*Culverts on Ford Creek. The two culverts on FR195 (upper 2 photos) pose a high risk to the road, with low consequences because of the wide nature of the crossings and the low use level on the road. The lower two culverts on FR0009 (lower 2 photos) pose a high risk to the road, with high consequences because of the constricted nature of the drainage at these locations and the high use level on the road.*

**BAER Value:** Buildings, water systems, utility systems, road and trail prisms, dams, wells, or other significant investments on or in close proximity to burned NFS lands

**What is at Risk:** USFS Trails

**Probability** Likely

**Consequences** Moderate

**Risk** High

**Comments:** A total of 13.4 miles of trails exist within the burned area. Of these trails, two trails pass through areas of high severity burn and are at high risk of erosion and potentially loss:

Carol Creek Trail #6118 is a popular motorized trail connecting Hayden Creek to Morse Creek. Approximately 0.4 miles of this trail passes through or is adjacent to areas of high severity burn, generally along the base of steep slopes.

East Fork Hayden Creek Trail #6181 is a non-motorized trail connecting the Hayden Creek and Mill Creek drainages. Much of this trail passes through a heavily forested valley, where deadfall is a constant issue. Approximately 1 mile of this trail passes through or is adjacent to areas of high severity burn, generally along the base of steep slopes.

**BAER Value:** Buildings, water systems, utility systems, road and trail prisms, dams, wells, or other significant investments on or in close proximity to burned NFS lands

**What is at Risk:** Diversions on National Forest System lands

**Probability** Likely

**Consequences** Moderate

**Risk** High

**Comments:** Several diversions exist on National Forest System lands within or downstream of the burned area. These diversions are maintained and operated by private users under special use permits for use on private lands. Post-fire risks to diversions include increased sediment loads, debris, potential debris flow events, and stream channel migration. The largest of these diversions is on East Fork Hayden Creek just upstream of the confluence with Hayden Creek, serving multiple water users in the Lemhi Valley.

### 3. Natural Resources (NR):

**BAER Value:** Soil productivity and hydrologic function on burned NFS lands

**What is at Risk:** Soil erosion and stream channel function

**Probability** Likely

**Consequences** Minor

**Risk** Low

**Comments:** Increased soil erosion will likely occur in areas of high and moderate burn severity. Ground cover will likely recover quickly (1-3 years) in low and moderate severity burned area, and over a period of 3 to 5 years in high severity burned areas. Post-fire flooding and/or debris flow events are likely to occur to some degree, likely where high burn severity is concentrated in the upper portions of watersheds. It is expected that some drainages will experience localized debris flow events that may alter the hydrologic regime on a localized scale over a scale of decades. However, fire is a natural part of this landscape, and any hydrologic impacts resulting from this fire will not alter the overall natural balance between runoff and erosion on a larger watershed scale.

**BAER Value:** Critical habitat or suitable occupied habitat for federally listed threatened or endangered terrestrial, aquatic animal or plant species on or in close proximity to burned NFS lands

**What is at Risk:** Chinook, Steelhead, and Bull Trout Habitat

**Probability** Possible

**Consequences** Moderate

**Risk** Intermediate

**Comments:** Most of the burn boundary overlaps with the Upper Hayden Creek, Middle Hayden Creek, and Bear Valley Creek watersheds, which are all PACFISH priority watersheds for Chinook Salmon and steelhead. Hayden Creek and its subdrainages provides high quality spawning and rearing habitat for anadromous Chinook Salmon and steelhead, as well as fluvial and resident life history forms of bull trout and westslope cutthroat trout.

The majority of Chinook Salmon and steelhead production occurs in mainstem Hayden Creek, with a minority occurring in Bear Valley Creek. The prime spawning habitat for anadromous fish is located approximately 5 miles downstream from any high-severity burned areas with considerable unburned or low-severity burned areas to attenuate these impacts. Bull trout spawning is more widely distributed, which should facilitate population resilience and persistence in response to disturbance. Furthermore, Hayden Creek maintains perennial connection with the Lemhi River, and this connectivity reduces the vulnerability of native fish species to fire-related changes in stream habitat.

Overall, the Hayden Fire appears to have mimicked mosaiced natural fire patterns that would have historically occurred in this area and are critical to developing and maintaining quality fish habitat and fish populations by introducing woody material and spawning gravel to the stream systems through increased erosion and debris flow events. It is anticipated that any post-fire storm impacts would be localized and would have a relatively small impact on the overall balance at a larger watershed scale.

**BAER Value:** Native or naturalized communities on NFS lands where invasive species or noxious weeds are absent or present only in minor amounts

**What is at Risk:** Native Plant Communities / Spread of invasive species

**Probability** Likely

**Consequences** Moderate to High

**Risk**                    High

**Comments:** The invasive plant species known to be present in the area have the potential to disrupt native plant community reestablishment in areas otherwise uninfested by noxious weeds. The area burned in the Hayden Fire is of very high value for native plant communities and big game habitat values. The presence of roads and trails within the burned area increases the risk to susceptible areas, particularly in the first year following the fire. Fire suppression impacts, including extensive use of dozer lines and hand lines, also have considerable potential to result in the spread of invasive plants in the burned area of the Hayden Fire. It is important to control the spread of invasive plants into areas burned by the fire.

#### 4. Cultural and Heritage Resources:

**BAER Value:** Cultural resources on NFS lands which are listed on or potentially eligible for the National Register of Historic Places

**What is at Risk:** Historic Properties

**Probability**      Possible

**Consequences**    Moderate

**Risk**                Intermediate

**Comments:** Values at risk relating to Heritage and Cultural Resources include diminished National Register of Historic Places (NRHP) values of sites listed, eligible for listing, or potentially eligible for listing on the NRHP. No heritage and cultural resources were identified as being at high risk as a result of the fire.

#### B. Emergency Treatment Objectives:

- Reduce the risk of loss of Forest road infrastructure.
- Decrease risk to public life and safety within the burned area.

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

**Land:** N/A

**Channel:** N/A

**Roads/Trails:** 80%

**Protection/Safety:** 80%

#### D. Probability of Treatment Success

Table 5: Probability of Treatment Success

	<b>1 year after treatment</b>	<b>3 years after treatment</b>	<b>5 years after treatment</b>
<b>Land</b>	N/A	N/A	N/A
<b>Channel</b>	N/A	N/A	N/A
<b>Roads/Trails</b>	80%	70%	70%
<b>Protection/Safety</b>	75%	75%	75%

**E. Cost of No-Action (Including Loss):** The cost of no action is estimated to be \$72,000 (see VAR Worksheet in project file). This includes replacement costs for 0.5 miles of FR0009 (Bear Valley Creek Road) and 2 culverts (\$65,000) and loss-of-use related to permitted outfitter-guide use in this area (estimated at \$7000). Risks to human life and safety are also present but cannot be quantified.

**F. Cost of Selected Alternative (Including Loss):** The total cost of proposed treatments is \$28,000. Implementing the proposed treatments would reduce the probability of experiencing this loss by 0.40 (40%). The expected benefit of treatment would be \$28,800. Treatment is justified.

**G. Skills Represented on Burned-Area Survey Team:**

- |   |  |   |   |   |
|---|--|---|---|---|
| <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Hydrology  | <input checked="" type="checkbox"/> Engineering | <input checked="" type="checkbox"/> GIS | <input checked="" type="checkbox"/> Archaeology |
| <input checked="" type="checkbox"/> Weeds | <input checked="" type="checkbox"/> Recreation | <input checked="" type="checkbox"/> Fisheries   | <input type="checkbox"/> Wildlife       |   |
| <input type="checkbox"/> Other:           |  |   |   |   |

**Team Leader:** David Deschaine

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**Phone(s):** (208)756-5171**Forest BAER Coordinator:** David Deschaine

Email: david.deschaine@usda.gov

**Phone(s):** (208)756-5171**Team Members:** *Table 6: BAER Team Members by Skill*

Skill	Team Member Name
<i>Team Lead(s)</i>	David Deschaine
<i>Soils</i>	Deanna Stever
<i>Hydrology</i>	Bill MacFarlane/Dave Deschaine
<i>Engineering</i>	Pete Schuldt
<i>GIS</i>	Bill MacFarlane
<i>Archaeology</i>	Matt Nelson
<i>Weeds</i>	Diane Schuldt, Katie Baumann
<i>Recreation</i>	Skeet Townley
<i>Fisheries</i>	Keats Conley

**H. Treatment Narrative:****Land Treatments:**

No land treatments proposed at this time. Treatments to prevent the spread of invasive plants into the burned area will be funded through Fire Suppression Rehabilitation funding or Burned Area Restoration (BAR) funding, with a focus on treating dozer lines and other areas where ground cover was highly impacted during fire suppression.

**Channel Treatments:**

No channel treatments proposed at this time.

**Roads and Trail Treatments:**Ford Creek culverts on Forest Road 60009 (Bear Valley Creek Road)

The two culverts on Ford Creek on FR0009 are the highest risk road crossings in the burned area (Ford Creek Culverts #1 and #2 on the map below, and photos on Page 10 of this report). Both of these 30-inch diameter culverts are undersized for the expected increased flows in Ford Creek as a result of high and moderate burn severity in the watershed (17% high severity, 27% moderate severity). This road is a major access road to the popular area along Bear Valley Creek, a campground, equestrian area, and 3 trailheads, including a National Recreation Trail to Bear Valley Lakes. The valley at this location is somewhat constricted, and overtopping of the road at both of these culverts would likely result in considerable loss of road, which runs parallel to the channel.

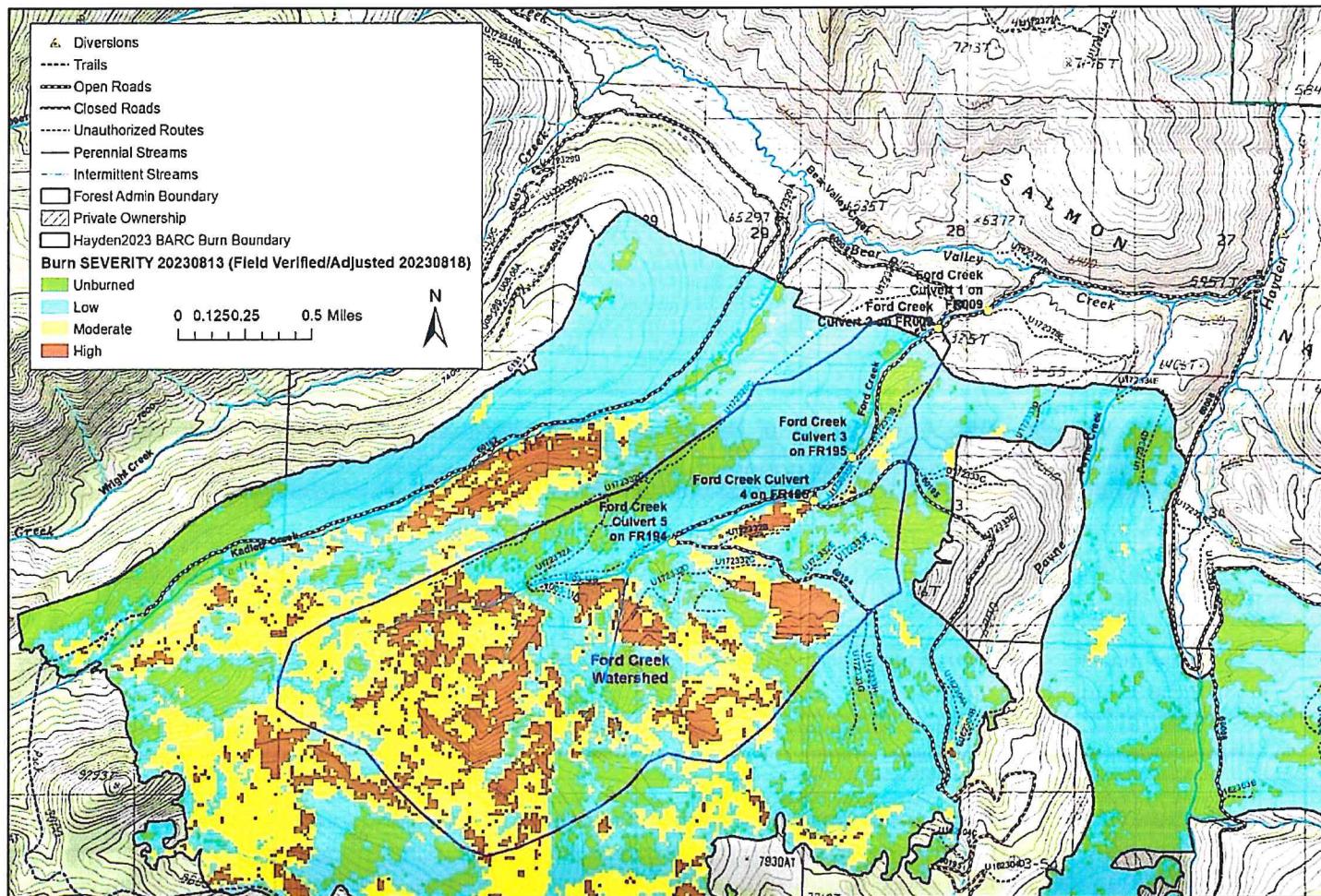
- The existing 30-inch diameter by 30-foot long culvert at the lower crossing would be replaced with a 36-foot long, 42-inch diameter (or squash pipe equivalent) culvert using the same alignment as the existing pipe. One or more rock grade control structures would be constructed below the culvert outlet to stabilize the channel, prevent scour at the outlet, and provide energy dissipation during

high flow events. No populations or critical habitat for bull trout, Chinook salmon, or steelhead are present in Ford Creek, but resident cutthroat trout are present. Culvert installation would eliminate the existing perched outlet and allow for adequate fish passage.

- The existing 30-inch diameter by 20-foot long culvert at the upper crossing would be replaced with a 24-foot long, 42-inch diameter (or squash pipe equivalent) culvert using the same alignment as the existing pipe. One or more rock grade control structures would be constructed below the culvert outlet to stabilize the channel, prevent scour at the outlet, and provide energy dissipation during high flow events. No populations or critical habitat for bull trout, Chinook salmon, or steelhead are present in Ford Creek, but resident cutthroat trout are present. Culvert installation would eliminate the existing perched outlet and allow for adequate fish passage.

This project would be implemented as soon as possible in 2024, prior to the first damaging storm event (typically late-summer thunderstorms). Estimated contract costs include the following:

Contract oversight	\$4,000
Materials	\$10,000
Mobilization	\$2000
Equipment	\$5000
Haul	\$2000
Labor	\$3000
De-watering (Temporary pipe, equipment, materials, and labor)	\$2000
<b>TOTAL</b>	<b>\$28,000</b>



Burn severity map close-up showing the approximately 1500-acre Ford Creek watershed and 5 culverts on Ford Creek.

**Protection/Safety Treatments:****Hazard Warning Signs**

Hazard warning signs will be placed at a few locations to warn visitors of hazards associated with the burned area. These locations include FR6008 (Hayden Creek Road) where it enters the Forest Boundary, FR6010 (Hayden Creek-Mill Creek Road) near Mill Creek, and a couple locations on Forest Trails that cross through the burned area. Because hazard warning signs are already on hand and personnel time for installation is not a BAER expense, no funds are requested.

**I. Monitoring Narrative:**

No monitoring is proposed for BAER implementation on the Hayden Fire.

**PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS**

		NFS Lands				Other Lands				All
		Unit	# of	BAER \$	Other \$	# of units	Fed \$	# of Units	Non Fed \$	
Line Items	Units	Cost	Units	\$						
A. Land Treatments				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Land Treatments</i>				\$0	\$0		\$0		\$0	\$0
B. Channel Treatments				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				\$0	\$0		\$0		\$0	\$0
C. Road and Trails				\$0	\$0		\$0		\$0	\$0
Culvert Replacement (Ford Creek)	contract	28,000	1	\$28,000	\$0		\$0		\$0	\$28,000
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Road and Trails</i>				\$28,000	\$0		\$0		\$0	\$28,000
D. Protection/Safety				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Protection/Safety</i>				\$0	\$0		\$0		\$0	\$0
E. BAER Evaluation				\$0	\$0		\$0		\$0	\$0
Initial Assessment	Report	\$4,000	1	---	\$4,000		\$0		\$0	\$4,000
				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				---	\$0		\$0		\$0	\$0
<i>Subtotal Evaluation</i>				\$0	\$4,000		\$0		\$0	\$4,000
F. Monitoring				\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Monitoring</i>				\$0	\$0		\$0		\$0	\$0
G. Totals				\$28,000	\$4,000		\$0		\$0	\$32,000
Previously approved										
Total for this request				\$28,000						

**PART VII - APPROVALS**

1.

*Charles A. Mark*

Forest Supervisor

*9/13/2023*

Date