

August 30, 2018

EXECUTIVE SUMMARY

The Lake Christine Fire started in the early evening of July 3, 2018 one mile north of Basalt, Colorado. The fire is human caused and has affected State, Private, and BLM lands as well as the White River National Forest. An initial assessment addressing approximately 5600 acres of National Forest System (NFS) lands was submitted to the regional office on August 1, 2018; the regional office approved 18,347 for implementation of emergency treatments to address noxious weeds, life/safety, and storm patrol for roads and trails.

Since the initial assessment, an additional 6988 acres of NFS lands burned; this interim request addresses the additional acres as well as the Basalt Mountain road which the initial BAER team was unable to survey due to fire suppression activity.

This follow-up BAER assessment is based on available BARC data from July 21, 2018 and July 31, 2018. Of the total burned acres assessed, 14% were unburned, 19% were of low burn severity, 50% were moderate burn severity, and 18% were of high burn severity.

Burn Severity By Ownership as of July 31, 2018:

Soil Burn Severity for the Lake Christine Fire				
Soil Burn Severity	Acres by Severity on NFS Lands	Acres by Severity on BLM Lands	Acres of Severity on State Lands	Acres of Severity on Private Lands
High	1810 (21%)	49 (5%)	188 (8%)	173 (20%)
Moderate	3729 (44%)	727 (71%)	1398 (63%)	418 (49%)
Low	1439 (17%)	201 (19%)	537 (24%)	174 (20%)
Unburned	1498 (18%)	55 (5%)	98 (4%)	92 (11%)
Total	8476	1032	2221	857

The USFS is responsible for addressing risks on NFS lands. This report focuses on risks and proposed treatments to address threats to values at risk on NFS lands, but also provides relevant information to help identify potential threats downstream of the fire. Proposed treatments focus on threats to life/safety, roads and trails, and minimizing the spread of noxious weeds into burned areas which could detrimentally affect native plant communities.

In this interim assessment, the BAER team identified an additional \$140,335 in emergency stabilization treatments to address post-fire threats from the Lake Christine Fire.

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- 1. Funding request for estimated emergency stabilization funds
- 2. Accomplishment Report
- 3. No Treatment Recommendation

B. Type of Action

- 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- 2. Interim Report # 1
 - Updating the initial funding request based on more accurate site data or design analysis
 - Status of accomplishments to date
- 3. Final Report (Following completion of work)

This report will retain information from the initial request. Any additional information or updates for this interim request will be reflected in blue font.

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Lake Christine

B. Fire Number: CO-EAX-000215

C. State: CO

D. County: Eagle

E. Region: 02

F. Forest: White River NF

G. District: Sopris RD

H. Fire Incident Job Code: PNLX5W (1502)

I. Date Fire Started: July 3, 2018

J. Date Fire Contained: 90% contained as of August 30, 2018

K. Suppression Cost: \$17.4 million as of August 30, 2018

L. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): Waterbarring has not occurred as fire is only 90% contained

2. Fireline seeded (miles): Same as above

3. Other (identify): Safety zones, staging areas, drop points to be repaired after suppression activities are complete.

M. Watershed Number:

Sixth field sub-watersheds and named streams in the assessed burned area

4 th level watershed	6 th level sub-watershed	HUC	Major named streams in the sub-watershed	Total acres	Acres burned	Percent burned
Roaring Fork of the Colorado River	Blue Creek – Roaring Fork	140100040802	Roaring Fork River, Blue Creek	37,775	6,353	17%
	Taylor Creek – Fryingpan River	140100040507	Fryingpan River, Center Creek	22,541	890	4%
	Mill Creek – Cattle Creek	140100040902	Mill Creek, Cattle Creek	27,425	4,175	15%

N. Total Acres Burned:

NFS Acres(5,682) Other Federal (1,032) State (2,225) Private (857)
 NFS Acres(8,509) Other Federal (1,033) State (2,225) Private (851)

O. Vegetation Types: The dominate vegetation type present include, Pinyon-Juniper Woodlands, Montane Forest and Shrublands, and Subalpine Spruce-Fir Forests. Presence of these vegetation is largely controlled by elevation. Lower elevations are a mix of pinyon-juniper and gambel oak. As elevation increases, vegetation transitions to aspen and then becomes more dominant with spruce-fir replacing the aspen and gambel oak. There are some open grass meadows and shrub hillsides. Figure 1 below shows vegetation types in the assessment area.

P. Dominant Soils: Dominant soil types within the fire perimeter include the Doughspon, Fughes, Scout and Tolby series. The soils are in the order of mollisols and inceptisols. The Doughspon series consists of deep, moderately well or well-drained soils formed in glacial till derived from basalt. The Fughes series consists of very deep, well drained soils that formed in alluvium and slope alluvium derived principally from shale, and interbedded sandstone and shale. The Scout series consists of very deep, somewhat excessively drained soils that formed in till, colluvium, slope alluvium, and residuum from sandstone, conglomerate, basalt, quartzite, rhyolite, andesite and tuff. And the Tolby series consists of very deep, excessively drained, rapidly permeable soils that formed in coarse textured stony colluvium from acid igneous rocks.

Dominant soil types within the additional acres assessed include the Cowdrey, Wetopa, Peeler, and Seitz series. The soils are in the order of mollisols, alfisols and inceptisols. The Cowdrey series consists of very deep, well drained soils formed in thick, fine textured noncalcareous glacial till or slope alluvium derived principally from clay shale. The Wetopa series consists of deep, well drained soils that formed in residuum derived from interbedded sandstone and shale with surface basalt. The Peeler series consists of very deep, well drained soils that formed in slope alluvium, and colluvium derived from granite and granitic gneiss. And the Seitz series consists of very deep, well drained soils that formed in noncalcareous colluvium or slope alluvium derived from granite, gneiss, mica schist, rhyolite, andesite, trachyte, interbedded sandstone/shale and basalt.

Soil structure and fine roots were impacted by fire in high soil burn severity areas. Loss of the litter/duff layer and compromised structural integrity will exacerbate post fire erosion and will inhibit recovery in areas where these effects were most pronounced. Areas that remained unburned and those that experienced low burn severities were found to have a more natural structure (generally subangular) with more organic matter and higher amounts of soil moisture. Recovery of small amount grasses and forbs was observed throughout the

burned area and over the range of burn severities. Consumption of heavy surface fuels will likely detrimentally affect soil productivity over small areas but, overall, it is not believed that long term soil productivity will be an impediment to the continued recovery of plants during successive growing seasons. Debris Flows and high rates of erosion are likely within drainages that experienced moderate to high soil burn severity, especially in steep drainages where ground cover consumption was high.

Q. Geologic Types: The geology of the Lake Christine Fire is old boulder and landslide deposits from the Holocene and late Pleistocene era. This resulted in geology of angular boulders and cobbles of basalt and unsorted, unstratified gravel, sand, silt, clay and rock debris. Formations found within the fire perimeter include the Chinle, Eagle Valley, Mancos shale and Dakota sandstone formations. Please see "Geology of the Basalt Area, Eagle and Pitkin Counties, Colorado by Edward George Welder (1954)" at the following website (https://scholar.colorado.edu/print_theses/54/).

R. Miles of Stream Channels by Order or Class: 0 miles perennial; 21 mi total Intermittent/10 mi NFS land

S. Miles of Stream Channels by Order or Class: 0.87 miles perennial; 17 mi total Intermittent; 10 mi total ephemeral

T. Transportation System

Trails: 2.3 miles
Trails: 7.9 miles

Roads: 7.9 miles
Roads: 7.6 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 665 (12%) (unburned) 1715 (30%) (low) 2521 (44%) (moderate)
782 (14%) (high)

B. Water-Repellent Soil (acres): 1,555 acres

C. Soil Erosion Hazard Rating (acres):

416 (no rating) 2,435 (slight) 2,723 (moderate) 109 (severe)

D. Erosion Potential: 3.3 tons/acre

E. Sediment Potential: 1,483 cubic yards / square mile

Supporting information regarding these estimates is available in the soils special report. The final soil burn severity map is displayed in Appendix A.

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 1753 (12%) (unburned) 456 (30%) (low) 1175 (44%) (moderate)
1117 (14%) (high)

B. Water-Repellent Soil (acres): 1,037 acres

C. Soil Erosion Hazard Rating (acres):

77 (no rating) 292 (slight) 2235 (moderate) 0 (severe)

D. Erosion Potential: 3.3 tons/acre

E. Sediment Potential: 1,536 cubic yards / square mile

Supporting information regarding these estimates is available in the soils special report. The final soil burn severity map is displayed in Appendix A.

PART IV - HYDROLOGIC DESIGN FACTORS

- A. Estimated Vegetative Recovery Period, (years): 3-5 years
- B. Design Chance of Success, (percent): 80%
- C. Equivalent Design Recurrence Interval, (years): 10 year
- D. Design Storm Duration, (hours): 1 hour
- E. Design Storm Magnitude, (inches): 0.85 inches
- F. Design Flow, (cubic feet / second/ square mile): See Table 2 below
- G. Estimated Reduction in Infiltration, (percent): See Table 1 below
- H. Adjusted Design Flow, (cfs per square mile): See Table 2 below

Table 1: The soil burn severity acres and percentages by modeled watershed

Modeled Sub-Watershed	Unburned acres	UB %	Low acres	Low %	Moderate acres	Mod %	High acres	High %
0	33	18	8	4	95	50	52	28
2	610	21	791	27	1238	43	261	9
3	109	6	405	22	1195	66	92	5
4	212	32	88	13	348	53	11	2
5	4	2	35	17	131	65	31	15
6	4069	70	480	8	1195	21	74	1
8	470	59	61	8	201	25	68	9
9	24	24	4	4	43	42	31	30

Table 2: Wildcat5 modeled pre- and post- fire peak flows (Q) by watershed

Sub-Watershed Number	Pre-fire Q (cfs)	Post-fire Q (cfs)	Bulked post-fire Q (cfs)	Relative Increase Post-fire Q (Post Q /Pre Q)	Pre-fire time to peak (min)	Post-fire time to peak (min)
0	0.1	45	56	563	65	34
2	13	480	600	46	65	35
3	0	408	510	5100	No flow	37
4	0	91	114	1139	No flow	35
5	0	54	69	685	No flow	34
6	0.4	364	400	1062	67	37
8	9	106	117	13	65	35
9	0.3	27	33	122	65	34

Table 3: The soil burn severity acres and percentages for additional modeled watershed

Modeled Sub-Watershed	Unburned acres	UB %	Low acres	Low %	Moderate acres	Mod %	High acres	High %
10	24	4	52	9	344	62	134	24
11	92	10	141	15	359	37	368	38
12	545	39	163	12	326	23	378	27
13	11	6	13	8	35	20	113	66
14	436	64	57	8	67	10	119	18
15	645	90	30	4	44	6	5	0.7

Table 4: Wildcat5 modeled pre- and post- fire peak flows (Q) for additional modelled watersheds

Sub-Watershed Number	Pre-fire Q (cfs)	Post-fire Q (cfs)	Bulked post-fire Q (cfs)	Relative Increase Post-fire Q (Post Q /Pre Q)	Pre-fire time to peak (min)	Post-fire time to peak (min)
10	0.38	95	119	313	64	37
11	1	146	183	178	64	37
12	4	165	206	53	66	38
13	1.3	53.6	67	52	64	32
14	0.1	39	43	429	N/A	37
15	0.1	14.2	16	156	N/A	35

The hydrologic modeling results indicate an increase in flows and faster timing during intense thunderstorms. The post-fire peak flow estimates may be conservative due to factors such as high infiltration rates in limestone and similar underlying sedimentary geology types, undulating topography with a high degree of depressions and other low gradient areas, reservoirs and diversions, and the very low density and disjoint stream network. Additional information pertaining to the hydrology modeling is available in the hydrology specialist report.

PART V - SUMMARY OF ANALYSIS

A. **Describe Critical Values/Resources and Threats:** Threats to critical values and determination of risk was based on the following matrix from FSH 2523.

BAER Risk Assessment

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

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):

- Very likely. Nearly certain occurrence (90% - 100%)
- Likely. Likely occurrence (50% - 89%)
- Possible. Possible occurrence (10% - 49%)
- Unlikely. Unlikely occurrence (0% - 9%)

Magnitude of Consequences:

- Major. Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.
- Moderate. Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.
- Minor. Property damage is limited in economic value and/or to few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.

Critical Value: Human life/safety

Hazard Trees: Threats to life and safety, exist within the burned area as Forest users will be exposed to significantly increased risk of hazard trees. The burned area is popular with recreationists due to its close proximity to Basalt and other communities in the Roaring Fork Valley. The majority of recreation use is on the Mill Creek, Cattle Creek, Basalt Mountain and Ditch trails, and NFSR 524. The high visitation results in a higher threat to human life and safety from hazard trees as well as direct and indirect effects of flooding and debris flows.

Hazard trees are also of concern on the Cattle Creek road (NFSR 509.1) as this road provides the only access to private inholdings with 8 cabins. Hazard trees will need to be addressed in areas where BAER treatments will occur for the safety of the workers.

Debris Flow Hazard: The debris flow hazard will increase in the years following the fire. The USGS debris flow model was used to estimate debris flow potential. However the model is not calibrated to the broken terrain with discontinuous flow paths present in the southern portion of the fire. Consequently, it appears that the debris flow potential is over-estimated by the model. Conversations with Dennis Staley at the USGS confirmed this concern. Debris flows may still occur and causing life/safety concerns and damage to property, but the degree of threat is difficult to discern.

Debris Flow Hazard: A new debris flow model was completed by the USGS on the northern portion of the fire. The topography in the northern portion of the burn area is much more similar to the topography of the watersheds analyzed during model development in this follow-up assessment. As such, the USGS believes that model estimates more closely reflect the on-the-ground reality in that part of the Lake Christine burn area than in the unique southern portion. The model indicates high debris flow potential on the northern end in the vicinity of the Cattle Creek (NFSR 509.1) and Basalt Mountain (NFSR 524.1) roads.

Emergency Determination: The probability of loss is Possible and the magnitude of consequence is Major for threats to life/safety on Forest Service lands from hazard trees; the BAER risk is High.

Critical Value: Property

Roads

There are 7.9 total miles of NFS Roads within the burn perimeter. NFSR 524 is the only road considered in this assessment; the Cattle Creek Road (NFSR 509) is downstream of areas where fire growth is still occurring and will be addressed in follow up BAER assessments.

The Cattle Creek road (NFSR 509.1) is immediately downstream of extensive areas of high and moderate burn severity (see soil burn severity map). The steep slopes with contiguous areas of high and moderate burn severity are expected to have substantially higher erosion and increased flood flows that would damage the road prism. This road provides access to a popular Forest Service trailhead, and is the only access route to private inholdings with eight cabins.

Due to fire suppression activities, the BAER team was unable to conduct a full assessment of the risk of increased erosion/sediment, and flooding on NFSR 524. However cursory observations indicated a high potential for road impacts following storm events due to relief culverts on NFSR 524 already having compromised capacity which will be exacerbated by increased erosion and sediment delivery from areas of high and moderate soil burn severity on steep slopes. Impacts include damage to the road and/or loss of access due to severe erosion of the road surface, or deposition of sediment or debris. NFSR 524 is also likely to exacerbate the risk of flooding and erosion by collecting surface water, concentrating it and delivering it to hillslopes in areas without defined stream channels which would result in the formation of gullies. Failure of the relief culverts would cause substantial damage to the road as well as substantial soil erosion and loss of soil

productivity through the development of gullies.

The BAER team completed an assessment of the Basalt Mountain road and identified site specific treatments to protect the road surface as well as prevent the development of gullies downhill of drainage outlets.

Trails

Basalt Mountain lies in close proximity to Aspen, Basalt, Carbondale and Glenwood Springs. Basalt Mountain is important as recreation activities there help to sustain socio economic benefits related to recreation. The area is popular year round for both motorized and non-motorized activities such as; mountain biking, hiking, hunting, cross country skiing, snowmobiling, motorcycling and OHV riding.

There are 7.85 miles of trail within the burn area. Trails are at considerable risk of erosion and loss of trail tread where they traverse steep slopes in areas of high and moderate burn severity(totals approx 5 miles). Loss of the trail tread would be a loss of property that would require substantial investment to rebuild. Due to fire suppression activities, the BAER team was unable to conduct a full assessment of the risk of increased erosion/sediment, and flooding. The following trails were involved in the fire to some degree: 1905, 1909, 1911, 1913, 1938, 1938.1, and 3524.1.

Forest Service Administrative Site

The historic Basalt Forest Service Work Center exists downstream of the burned area adjacent to a small drainage; this property will be addressed under Cultural Resources.

Emergency Determination: An emergency was determined for Property. For roads and trails, the probability of loss is Very Likely/Likely and the magnitude of consequence would be Moderate. The BAER risk is **Very High/High**.

Critical Value: Natural Resources

Soil productivity: While wildfire will have a negative effect on soil productivity and vegetative recovery, over time it is expected that natural processes will result in the most effective revegetation of these soils. However the burned soils are prone to the spread of noxious weeds which do not provide as effective groundcover as native vegetation for protection from raindrop impact during summer thunderstorms. For this reason threat of loss of native plant communities is also considered a threat to soil productivity.

Emergency Determination: The probability of loss is Possible, and the magnitude of consequence is Moderate; the risk is Intermediate. With an intermediate risk BAER treatments would not be warranted for soil productivity alone, but treatments to maintain native plant communities would also address soil productivity threats.

Water Quality:

Soil erosion and subsequent sediment increases are predicted throughout and downstream of the burn area. The cumulative effect of increased peak flows and sediment laden flows from the burned areas increases the risk of degraded water quality on the Forest and various downstream values at risk, particularly effects on the Frying Pan and Roaring Fork Rivers which are both gold medal fisheries. An effort to inform the local agencies and water users about water quality degradation the following has been initiated. Effects to water quality will be of short term duration, recovering to pre-fire conditions over time with the worst impacts occurring in the first year, and declining over subsequent years. During this time there is likely potential for degradation of water quality downstream of moderate and high soil burn severity areas.

Emergency Determination: The probability of loss is Very likely and the magnitude of consequence is Minor on NFS lands. The risk is Low; therefore no BAER emergency exists on NFS lands.

Native or Naturalized Plant Communities

Throughout the Lake Christine fire noxious weeds have been documented prior to the start of the fire. Noxious weed are present throughout the road and trail corridors. Cheat grass, (*Bromus tectorum*) Houndstongue (*Cynoglossum officinale*), Spotted Knapweed (*Centaurea stoebe*), Mullen, (*Verbascum thapsus*), Common Tansy (*Tanacetum vulgare*), Canada Thistle (*Cirsium arvense*), Musk Thistle (*Carduus nutans*), Sulfer cinquefoil (*Potentilla recta*) and Bull Thistle (*Cirsium vulgare*) are known to occur within the burn area and along adjacent access routes to the burn; locations are displayed on Figure 1 below.

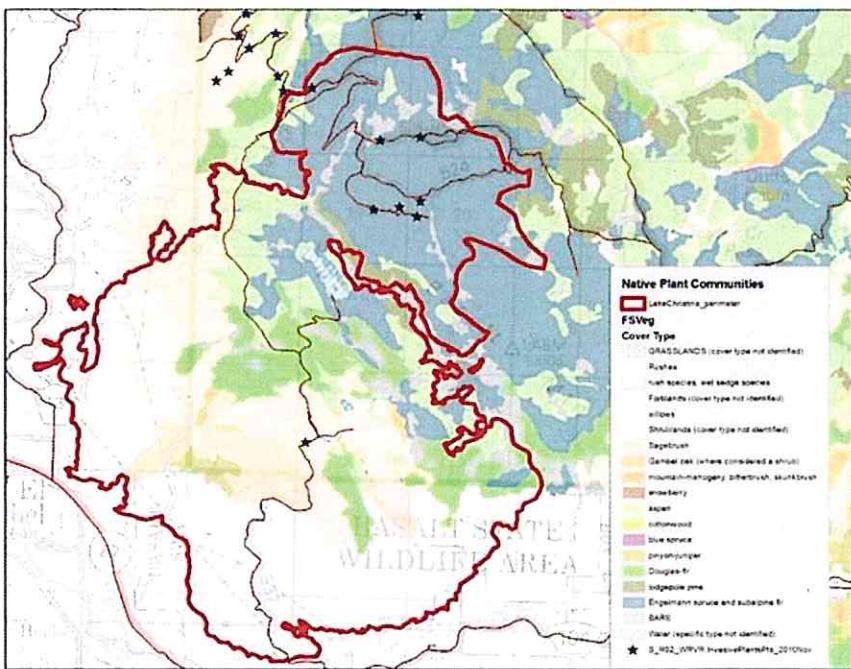


Figure 1: Location of known weed populations and vegetation types in the assessment area.

Noxious weeds are present and have the potential to spread throughout all roads, trails, dozer line, hand line and drop points or staging areas within representative native plants communities within the Lake Christine Fire. Areas of moderate to high burn severity could have more aggressive noxious weed invasions and are considered highest priority for treatment.

The spread of noxious weeds would adversely affect multiple resources including native plant communities which in turn affects threatened and endangered species habitat for wildlife and fisheries, as well as soil productivity. Forest Service policy mandates the Forest to minimize the establishment of non-native invasive species to prevent unacceptable degradation of the burned area.

Noxious weeds are present and have the potential to spread throughout all roads, trails, dozer line, hand line and drop points or staging areas within representative native plants communities within the Lake Christine Fire. Areas of moderate to high burn severity could have more aggressive noxious weed invasions and are considered highest priority for treatment. Areas with lower burn severity where noxious weeds are present will also be treated and monitored. In conclusion, the probability of damage is very likely, the magnitude of consequences is major and risk is considered very high to native plant communities from noxious weed infestations.

Emergency Determination: The probability of loss of native plant communities is Very Likely and the magnitude of consequence is Moderate; the BAER risk is **Very High**.

Wildlife: Critical TES Habitat or Suitable Occupied Habitat

An official species list from the U.S. Fish and Wildlife Service was used to determine federally listed species that may be present in the Lake Christine Fire perimeter. After evaluation of the species included on the USFWS list, it was determined that no habitat is present in the Lake Christine fire perimeter for the Mexican Spotted owl, Yellow-billed Cuckoo or Ute Ladies-tresses. Wolverine were included within the fire area, however no wolverine have been documented on this portion of the White River NF, therefore, the species was not evaluated. Consequently, Canada lynx is the only T&E wildlife species evaluated. The species list and additional information is available in the project file.

Canada Lynx

The Lake Christine Fire impacted suitable lynx habitat with the southwest corner of the Red Table Lynx Analysis Unit (LAU). The fire burned at various intensities and in an overall mosaic pattern. Canada lynx have been known to pass through the Red Table LAU, however no resident lynx have been documented in the fire area.

Based on the burn severity type in Canada lynx habitat, the Lake Christine fire will likely create a mosaic of successional stages that will be beneficial for providing foraging and denning habitat for Canada lynx. There may however be short term effects to foraging habitat and understory shelter for prey species. In time, it is expected that as succession progresses, the amount of vegetation will increase providing the necessary cover and forage for snowshoe hares, resulting in an increase in the quality of primary and secondary habitat.

Emergency Determination –The probability is Likely and the consequences are Moderate; the risk is Low; no emergency exists pertaining to federally listed or Forest Service Sensitive wildlife species or their habitats.

Fisheries: Critical TES Habitat or Suitable Occupied Habitat

Cattle Creek contains a Colorado River Cutthroat Trout Conservation Population of green lineage cutthroat (they have a high degree of genetic purity and are being treated as a Threatened species under the ESA).

Within the 7/31/2018 BARC perimeter Cattle Creek stretches 9.9 miles north of the 509 road. According to the BARC map, the fire overlapped a small section of Cattle Creek, 0.13 miles burned a low severity. Burn severity above Cattle Creek was determined to be high. Therefore there is a higher risk of debris flow and sediment entering the creek.

Emergency Determination: The probability of damage to Cattle Creek is considered likely, magnitude of consequences is considered moderate, and the risk is high from increased sediment and debris flows in the creek for Colorado River Cutthroat trout – green lineage. There are no emergency actions recommended to prevent sediment or debris flow. However, stream health monitoring is recommended.

Critical Value: Cultural Resources

Two (2) recorded cultural resource sites were located within the Lake Christine fire perimeter as of July 21st. Neither of these 2 sites were previously determined “eligible” nor remain unevaluated for eligibility to be listed in the National Register of Historic Places, so these sites were not evaluated for BAER. Two other sites were outside of the fire perimeter on July 21st, but due to potential post-fire effects we have included them with the analysis. Due to ongoing fire and suppression activities, one site (5EA2175), a prehistoric open camp, wasn’t safe to monitor. Although fire severity in the area of 5EA2175 appears to be moderate, no potential risks to the site are suspected (due to lack of slope) and no emergency stabilization treatments are recommended.

The site most at risk is the Basalt Work Center downstream of the fire perimeter (5EA892) adjacent to an unnamed wash that drains from the bum area. Debris flow modelling indicates moderate risk for post-fire effects. If flooding or debris flows were to occur, they could have significant effects not only to this cultural resource, but also to human life/safety, and Forest Service property.

At this time, no cultural resource surveys have been identified as necessary to ensure compliance with the National Historic Preservation Act for implementation of BAER treatments.

Emergency Determination: The probability of impacts to the Basalt Work Center is Unlikely, but the magnitude of consequence is Major; the BAER risk is **Intermediate**. Given that impacts to the Basalt Work Center could also affect life/safety and property, it was determined that BAER treatments are warranted.

Summary of BAER Risk Assesment

Values at Risk	VAR Category: <i>life-safety, property, natural resource, cultural resource</i>	Probability of Damage or Loss	Magnitude of Consequences	Risk
Basalt Mtn Road (FS 524)	Property	Very Likely	Moderate	Very High
Mill Creek Trail	Property, life/safety	Likely	Moderate	High
Basalt Mtn Trail Loop	Property, life/safety	Likely	Moderate	High
Cattle Creek Trail	Property, life/safety	Likely	Moderate	High
Ditch Trail	Property, life/safety	Likely	Moderate	High
Soil Productivity	Natural Resources	Likely	Moderate	High
Native plant communities	Natural Resources	Very Likely	Moderate	Very High
Human Life and Safety	Life Safety	Possible	Major	High
Basalt Work Center	Property, Cultural	Unlikely	Major	Intermediate
Critical Habitat for wildlife/plants - Lynx	Natural Resources	Likely	Minor	Low
Water Quality	Natural Resources	Likely	Minor	Low
Powerline (BLM and FS)	Property	Unlikely	Moderate	Low
Pre-historic site (eligible) (1 site)	Cultural	Unlikely	Minor	Very Low
Cattle Creek Road (FS 509) active fire zone	Property, life/safety			Undetermined
Occupied habitat -- Cattle Creek (cutthroat)	Natural Resources			Undetermined
Cattle Creek Road (FS 509)	Property, life/safety	Very Likely	Major	Very High
Occupied habitat -- Cattle Creek (cutthroat)	Natural Resources	Likely	Moderate	High

B. Emergency Treatment Objectives: The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments cannot fully mitigate the post-fire effects of the fire. Detailed information of the treatments summarized below can be found in the specialist reports prepared in support of this funding request. The treatments listed below are those that are considered to be the most effective on National Forest System lands to minimize threats to identified values at risk.

Proposed Land Treatments:

The objective of the land treatments are to:

1. Promote and protect native and naturalized vegetative recovery by reducing the spread of noxious weeds (L1); this would also maintain long-term soil productivity.

Proposed Road and Trail Treatments

The objective of the road and trail treatments are to:

Protect road and trail investments from becoming impassable and damaged due to increased post-fire runoff, minimize degradation to water quality and prevent loss of access to private inholdings.

Proposed Protection/Safety Treatments:

The objective of the protection/safety treatments are to:

1. Protect human life and safety by raising awareness through posting hazard warning signs at recreation sites, trailheads, and when entering the burn area.
2. Protect life/safety through an area closure. Limiting public access to the burn area would minimize the potential for loss of life or injury from floods, debris flows, and hazard trees.
3. Protect life/safety and property through storm patrols where the level of risk does not support more intensive treatments.
4. Protect life/safety on the Cattle Creek road which cannot be administratively closed due to access to private inholdings.

5. Protect life/safety along roads and trails by addressing hazard tree removal prior to or in coordination with other needed emergency actions.

Proposed Channel Treatments: There are no proposed channel treatments.

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

Land <u>NA (weeds)</u> %	Channel <u>NA- none proposed</u> %	Roads/Trails <u>90</u> %
Protection/Safety <u>90</u> %		

D. Probability of Treatment Success

Years after Treatment			
	1	3	5
Land	70	75	80
Channel	NA	NA	NA
Roads/Trails	80	90	90
Protection/Safety	90	95	95

E. Cost of No-Action (Including Loss): \$110,250 This cost only reflects monetary loss of roads and trails, it does not reflect loss of life or native plant communities or the historic Basalt Work Center. **This cost would be significantly higher in the norther portion of the fire. Roads: \$456,000 and Trails: \$118,500.**

F. Cost of Selected Alternative (Including Loss): \$140,335

Extensive repair or reconstruction of roads and at increased risk of post-fire effects is estimated to be \$60,000 per mile, and trails are \$15,000 per miles according to the White River Forest Engineer. It was assumed that 50% of the roads and trail traversing through high and moderate soil burn severity would need to be rebuilt if no treatments are implemented. There is a threat to life and safety as well as natural resources that have non-monetary value. As described in this report, increased risk for impacts to life/safety and non-ecological values exists throughout the burned area. These values were not considered in the benefit/cost ratio.

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input checked="" type="checkbox"/> Range	<input checked="" type="checkbox"/> Recreation
<input type="checkbox"/> Forestry	<input checked="" type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	
<input type="checkbox"/> Contracting	<input checked="" type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	
<input checked="" type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

Team Leader: Steve Hunter (sjhunter@fs.fed.us); 970-945-3308;

Team members:

Steve Hunter- Engineering,Hydrology
 Jane Frambach-- GIS
 Liz Roberts—Fish/wildlife/weeds/ecology
 Rebekah Sease—Archaeology (T)

Beth Anderson—Soils
 Kay Hopkins- Recreation
 Tom Fuller—Archaeology
 Kate Jerman—Public Information

H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

Invasive Weed Detection and Treatment: Invasive plant detection and treatment along the Forest Service road and trails, that were of high to moderate burn severity and where non-native invasive plants are absent or present in small amounts, would be necessary to prevent spread and dispersal of non-native invasive plants into newly burned and disturbed areas. Although moderate burned areas may have some intact vegetation or may experience needle fall, it is not sufficient to prohibit the spread and establishment of invasive plants. The focus will be on locations adjacent to known weed sites, where fire suppression may have introduced invasive plants and road systems that have been previously disturbed and will have a greater potential for invasive plants to establish. The road and trail systems are primary vectors for weed spread and Early Detection/Rapid Response (EDRR) will allow treatments to occur before these species are able to spread. An estimated 360 acres will be surveyed.

Storm Patrol: Storm inspection/response will keep road culverts and trail drainage features functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through Forest Service Road Crew, equipment rental, and Forest personnel. Storm patrol is also recommended for the Basalt Work Center. The BAER assessment team feels that there is a low probability of damage occurring, so additional treatments are not warranted at this time. However, if the small drainage adjacent to the work center demonstrates a response to storm events, future preventative measures may be warranted as the magnitude of consequences would be major.

Since the team was unable to do a complete assessment of roads and trails due to fire suppression activity, the only treatment identified in this initial report is storm patrol; additional funds may be requested to improve drainage in follow-up BAER assessments and interim reports.

Protection/Safety Treatments:

Road Hazard Warning Signs and Gates

This treatment will design and install burned area warning signs to support an area closure, and to caution forest visitors recreating and administrative users about the potential hazards that exist within the burned area. It is consistent with the language provided in the BAER Treatments Catalog. This treatment will place closure signs, hazard warning signs and information signs at key entry points or trail junctions, and recreation trailheads. It will inform users of the dangers associated with entering/recreating within a burned area as well as inform them of closures to help ensure that users are able to access available routes in a safe manner.

The purchase and installation of signs at each of the identified locations consistent would be consistent with Forest Engineering Standards at these locations. A Forest Service employee will inspect the signs for visibility, damage, or loss and replace as needed. This treatment will keep Forest users out of the burn area during major storm events and inform users of the dangers associated with entering/driving within a burned area.

ROAD TREATMENTS

1. **Outsloping –** Outsloped road templates disperse water and reduce erosion. Outsloping is useful in most locations, particularly for dispersing surface drainage on flat road grades. Outsloping is often combined with other road treatments including rolling dips and armored crossings to control water.
2. **Drain Dips (with or without armor) –** Roadway dips modify the road drainage by altering the template and allowing surface flows to run off the road to prevent any excessive erosion of the surface. The

armor consisting of rip rap is placed where runoff could possibly cause erosion to the road surface and fillslope.

3. Low Water Crossing – Armored crossings placed at locations where stream channels and/or springs intersect the traveled way within burned areas where heavy erosion potential exists.
4. Ditch Cleaning – The cleanout of drainage ditches is required to remove any debris that may deflect the flow out of the ditch and also to ensure the flow reaches the outflow structure.
5. Rock Armoring – Placement of riprap to protect road fillslope from increased stream flows that leads to the loss of the road itself and to decrease the risk of washing road fill into adjacent streams.
6. Road Template Reshaping – Road surfaces that channel water down the roadway need to be reshaped to shed the increased flows quickly before additional road surface erosion occurs. This will be accomplished by a combination of insloping and removal of berm where water will drain off of the road surface.
7. Fill Removal – Road fill showing signs of failure at increased risk due to increased runoff from burned area above. Remove fill from road section to reduce the likelihood of fill slope failure and the associated landslide. Material generated from this removal to be stored on the roadway for future use.

TRAIL TREATMENTS

Trails may capture increased surface runoff caused by the presence of water repellent soils and lack of effective ground cover to inhibit excessive flow. Flows will intercept system trails and cause severe tread erosion and initiation of soil rutting adjacent to the trails. The trail system would be treated to withstand increased runoff, protecting property, workers and users. Trails recommended for treatment include trails within the areas of moderate and high burn severity, totaling approx. 5 miles.

Trail stabilization work would included; the installation, cleaning or re-establishment of water and erosion features (waterbars, etc.), construction or reconstruction of retention features where necessary and downslope, stabilizing vegetation has been consumed, hazards within the trail route that restrict access to work sites will be removed (rocks, trees).

Trail treatments will consist of addressing public and employee safety and emergency stabilization actions that were identified during field investigations. Actions for trails includes hazard tree mitigation that will be needed prior to, or in coordination with addressing trail drainage problems. Hazard tree removal in both the Aspen and Conifer component is needed along all trails within the burn area due to the unpredictability of when these trees are going to fall.

Treatments considered, but not carried forward at this time

Colorado River Cutthroat Trout – green lineage: Threats exist to Colorado River Cutthroat Trout from increased sedimentation in Cattle Creek. At the time of this assessment the threat was considered low; however the fire has continued to burn in the Cattle Creek watershed which could elevate the threat to a level warranting treatment. This threat will be assessed in future follow-up BAER assessment. The follow-up assessment identified that a potential threat exists, but is only recommending monitoring at this time. No BAER funds are being requested to address this threat

Road and Trail Treatments: A detailed survey of roads and trails within and immediately downstream of areas of high and moderate soil burn severity may identify additional treatments to protect these investments and maintain access. The additional treatments are identified in the narrative above and the funding request.

I. Monitoring Narrative:

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Storm patrol will monitor the effectiveness of road and trail treatments and identify additional maintenance needs. Storm patrol will also identify if threats to the Basalt Work Center are higher than anticipated as the consequences would be major if post-fire effects were to occur. EDRR will monitor weed establishment and identify if additional treatment is warranted within the first year.

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim # 1

Line Items	Units	Unit Cost	NFS Lands		Other \$	Other Lands		Non Fed \$	All \$
			# of Units	BAER \$		# of units	Fed \$		
A. Land Treatments									
GS-9 Range Specialist	day	330	4	\$1,320	\$0		\$0	\$0	\$1,320
Materials/Supplies	each	5000	1	\$5,000	\$0		\$0	\$0	\$5,000
Fleet 3/4 ton 4x4	day	35	4	\$140			\$0	\$0	\$140
Contract Cost (\$150 per acre x 548 acres) x 45%	acre	150	548	\$36,990	\$0		\$0	\$0	\$36,990
<i>Insert new items above this line!</i>									
<i>Subtotal Land Treatments</i>									
B. Channel Treatments									
<i>Insert new items above this line!</i>									
<i>Subtotal Channel Treat.</i>									
C. Road and Trails									
GS-11 Contract Prep	day	350	5	\$1,750	\$0		\$0	\$0	\$1,750
GS-11 Contract Admin.	day	350	5	\$1,750	\$0		\$0	\$0	\$1,750
Install Drainage Dip	each	220	2	\$440			\$0	\$0	\$440
Install Armored Drainage Dip	each	970	28	\$27,160			\$0	\$0	\$27,160
Install Low Water Crossing	each	1720	2	\$3,440			\$0	\$0	\$3,440
Remove culvert (1'-10' fill)	each	165	13	\$2,145			\$0	\$0	\$2,145
Remove culvert (10'-20' fill)	each	330	1	\$330			\$0	\$0	\$330
Stream diversion/dewatering	each	280	2	\$560			\$0	\$0	\$560
Install rock armor	CY	60	200	\$12,000			\$0	\$0	\$12,000
Road Template Reshaping	mile	550	1.22	\$671			\$0	\$0	\$671
Debris Removal	day	1100	2	\$2,200			\$0	\$0	\$2,200
Mobilization	each	4843	1	\$4,843			\$0	\$0	\$4,843
<i>Insert new items above this line!</i>									
<i>Subtotal Roads</i>									
Trails									
Trail Stabilization- Youth Corps	week	8500	3	\$25,500	\$0		\$0	\$0	\$25,500
<i>Insert new items above this line!</i>									
<i>Subtotal Trails</i>									
D. Protection/Safety									
Hazard Tree Removal- Roads				\$0	\$0		\$0	\$0	\$0
Hazard Tree Removal- Trails				\$0			\$0	\$0	\$25,500
Lg road sign				\$0			\$0	\$0	\$0
Hazard trees-Trails	acre	1300	34.48	\$2,500	\$0		\$0	\$0	\$0
Hazard Trees-Roads	acre	1300	8.92	\$11,596	\$0		\$0	\$0	\$0
<i>Insert new items above this line!</i>									
<i>Subtotal Protection/Safety</i>									
E. BAER Evaluation									
Assessment team				\$14,096	\$0		\$0	\$0	\$14,096
<i>Insert new items above this line!</i>									
<i>Subtotal Evaluation</i>									
F. Monitoring									
<i>Previously approved</i>									
<i>Total for this request</i>									
G. Totals									

PART VII - APPROVALS

1.

Forest Supervisor (signature)

2.

Regional Forester (signature)

Date

9/14/18
Date

Appendix A: Maps

Figure 1: Final Soil Burn Severity Map July 31, 2018

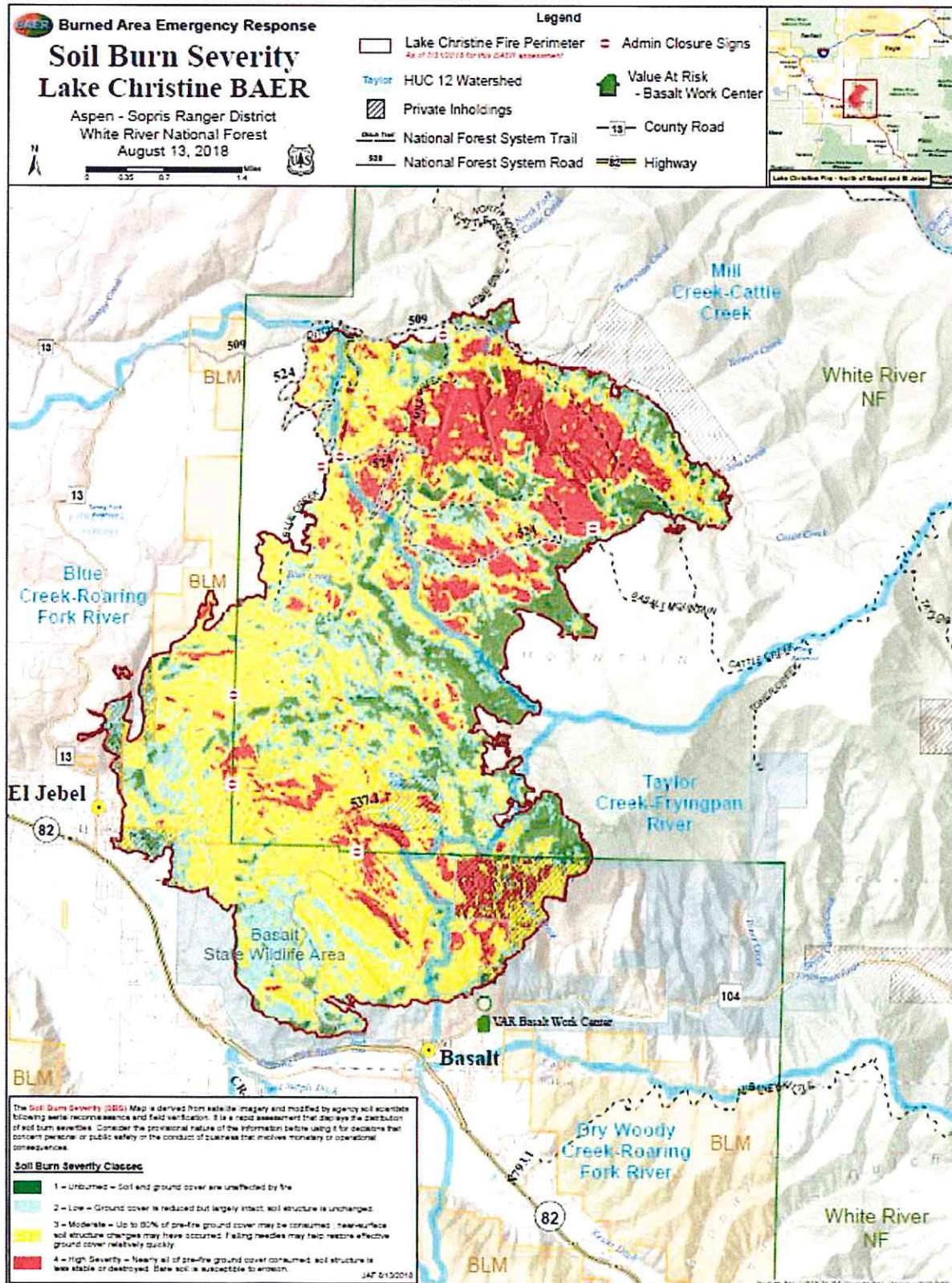


Figure 2: Relative increases in post-fire summer thunderstorm flood flows.

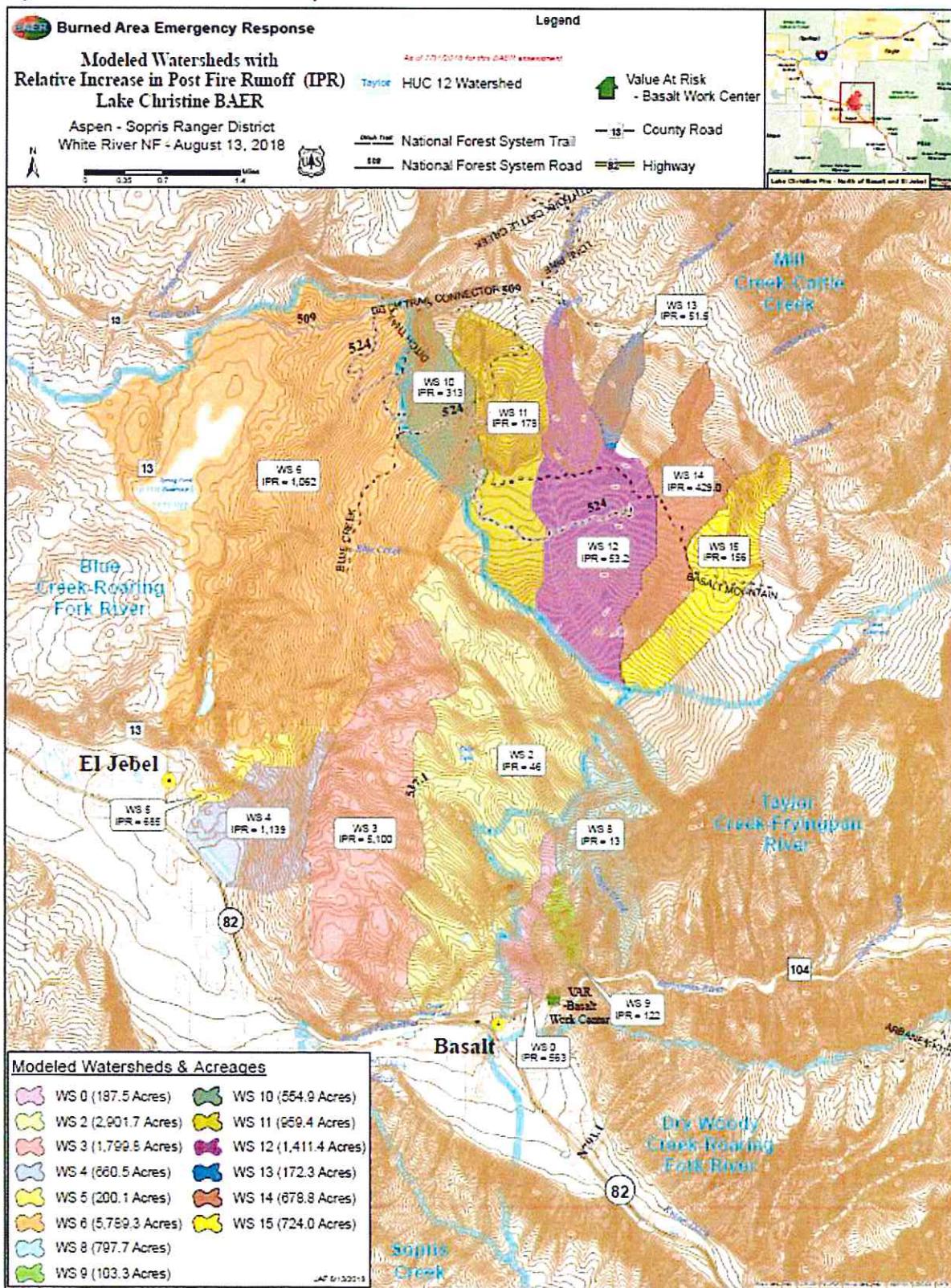


Figure 3: USGS Combined Hazard for Debris Flow Potential

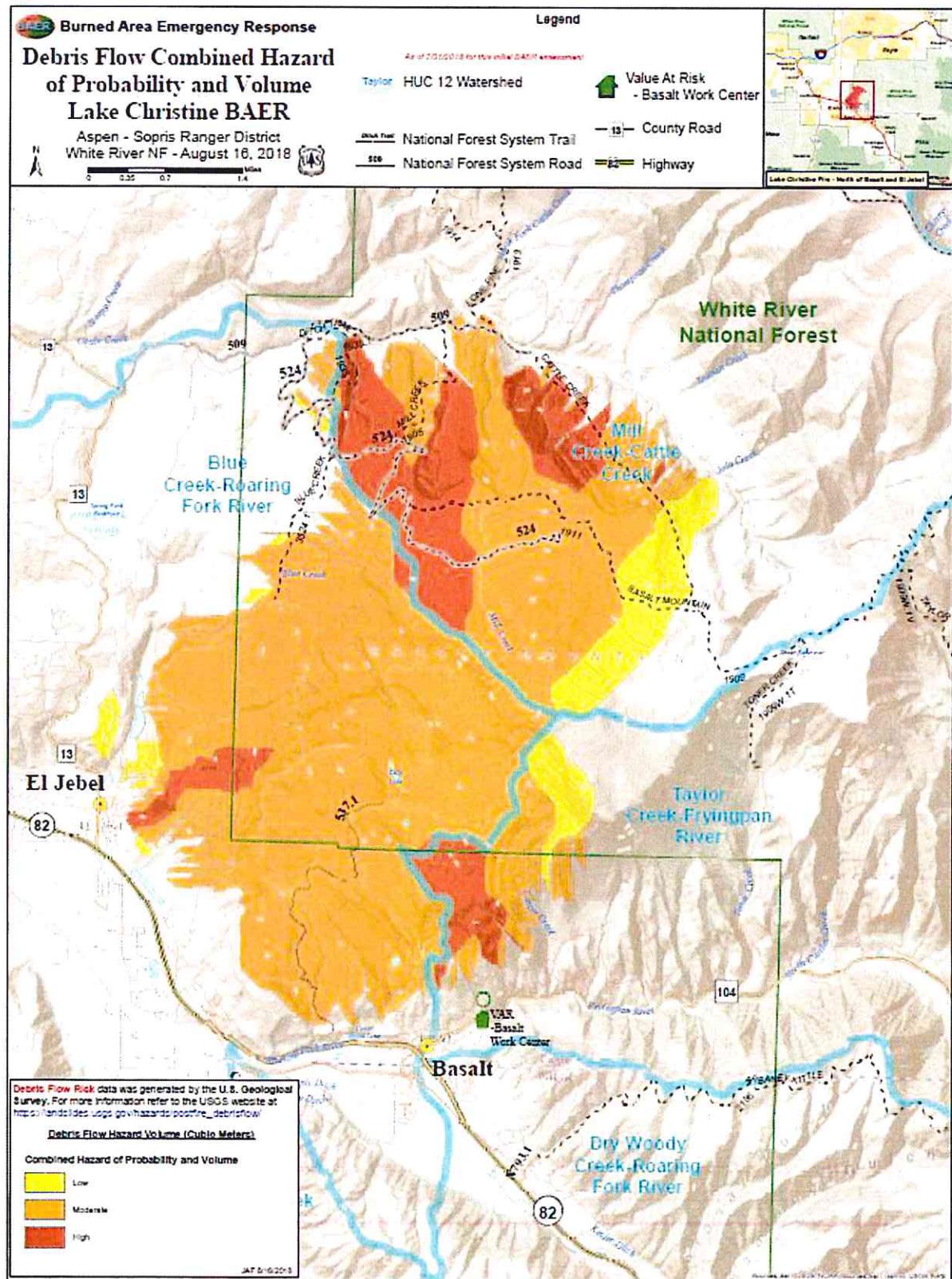


Figure 4: BAER Treatments

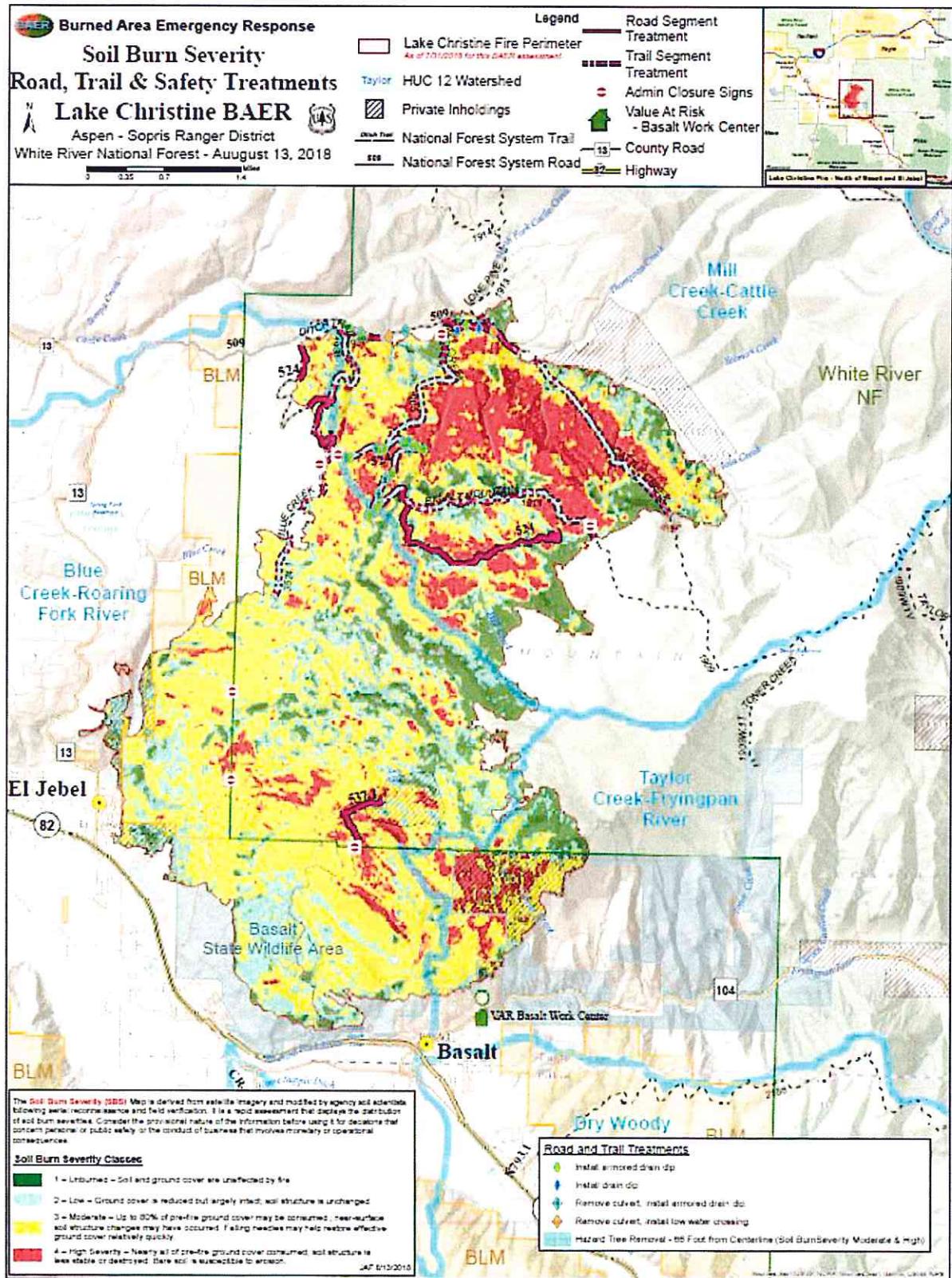


Figure 5: EDRR Survey Areas

