Date of Report and Type: 12/07/2017; *Interim #1*

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 #__
  - ☐ 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)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name(s):
Gibralter Ridge
Caribou

B. Fire Number:
Gibralter Ridge – MT-KNF-000161
Caribou – MT-KNF-000174

C. State:
Montana

D. County:
Lincoln

E. Region:
01-Northern

F. Forest:
01-14 Kootenai

G. District(s):
Fortine
Rexford
Three Rivers

H. Fire Incident Job Code:
Gibralter Ridge – P1K86W
Caribou – P1K96G

I. Date Fire(s) Started:
Gibralter Ridge – 8/7/2017
Caribou – 8/11/2017

J. Date Fire Contained:
Gibralter Ridge – 10/31/2017 (projected)
Caribou – 10/30/2017 (projected)

K. Suppression Cost:
$21.4 million

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

1. **Dozer Fireline repaired (miles):**
   Gibralter Ridge – 10
   Caribou – 357

2. **Excavator Fireline repaired (miles):**
   Gibralter Ridge – None
   Caribou – None

3. **Other (identify):**
   Gibralter Ridge – Rebuilt or repaired 20 miles of aggregate roads, eight miles of asphalt roads, and six miles of native surface roads. Repaired five miles of hand lines. Repaired one and a half acres of dozer constructed safety zone. Felling fire-damaged trees along roads and fire perimeter (unknown amount). Seeded burn out acres and contingency lines (unknown amount).

   Caribou - Rebuilt or repaired 175 miles of native surface roads, 34 miles of aggregate roads, and eight miles of asphalt roads. Repaired six miles of fuel breaks, five miles of hand lines, and one mile of fence line. Felling hazard trees along roads and fire perimeter (unknown amount). Seeded burn out acres and contingency lines (unknown amount).

M. Watershed Numbers:

Table 1: Acres Burned by Watershed – Gibralter Ridge

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170101010801	Upper Grave Creek	28,222.3	2,817.9	10%
170101010802	Lower Grave Creek	20,024.8	6,790.1	34%
170101010803	Therriault Creek	13,520.2	1,798.7	13%
170102060405	Upper Whale Creek	10,180.7	1,532.9	15%

Table 2: Acres Burned by Watershed – Caribou

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
170101010506	Bloom Creek	39,350.6	649.5	2%
170101010604	Linklater Creek	1,702.4	1,702.4	7%
170101010606	Lake Koocanusa	26,085.1	879.8	3%
170101010901	Sink Creek	7,882.4	3,692.1	47%
170101010902	Young Creek	14,814.5	10,331.8	70%
170101030102	East Fork Yaak River	40,409.8	7,215.5	18%
170101010904	Dodge Creek	10,766.2	293.2	3%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership – Gibralter Ridge

OWNERSHIP	ACRES
NFS	12,787.6
OTHER FEDERAL	0
STATE	0
PRIVATE	151.9
TOTAL	12,939.6

Table 3: Total Acres Burned by Ownership – Caribou

OWNERSHIP	ACRES
NFS	20,287.6
OTHER FEDERAL	0
STATE	1,058.8
PRIVATE	3,418.0
TOTAL	24,764.4

O. Vegetation Types:

Gibralter Ridge is dominated by mixed conifer forest interspersed with minor inclusions of shrublands,

grasslands, and sparse alpine vegetation. Dominant species in the mixed conifer component are western larch and subalpine fir.

Caribou is dominated by mixed conifer forest with very minor inclusions of grasslands and shrublands. Dominant species in the mixed conifer component are western larch, subalpine fir, and Douglas fir.

P. Dominant Soils:

Despite variable parent materials and landscape position, soil textures on the Gibralter Ridge and Caribou fires are consistently silt loams or very fine sandy loams due to their volcanic ash component. They are often deep and well drained with a large gravel component, interspersed with occasional areas of rock outcrop. Landforms on the Caribou fire are gently to moderately sloping glaciated mountain sideslopes and ridges, whereas the Gibralter Ridge fire is dominated by steeper, dissected mountain slopes and drainages.

Q. Geologic Types:

Soils on the Gibralter Ridge and Caribou fires are dominantly derived from Belt Supergroup metasedimentary rocks overlain by a discontinuous layer of volcanic ash. Glacial till deposits, alluvial fans, and colluvium derived from metasedimentary siltite, quartzite, and argillite are the dominant parent materials.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class – Gibralter Ridge

STREAM TYPE	MILES OF STREAM*
PERENNIAL	8.6
INTERMITTENT	23.9
EPHEMERAL	0
OTHER (DEFINE)	0

*miles calculated from National Hydrologic Dataset have not been field verified

Table 4: Miles of Stream Channels by Order or Class – Caribou

STREAM TYPE	MILES OF STREAM*
PERENNIAL	24.4
INTERMITTENT	26.9
EPHEMERAL	1.7
OTHER (DEFINE)	0.5

*miles calculated from National Hydrologic Dataset have not been field verified

S. Transportation System:

Gibralter Ridge

Trails: *National Forest (miles):* 14.3 *Other (miles):* 0
Winter Trails: *National Forest (miles):* 1.5 *Other (miles):* 0
Roads: *National Forest (miles):* 9.9 *Other (miles):* 0.5
Roads: *National Forest Collector and Arterial: 7.6 miles*

Caribou

Trails: *National Forest (miles):* 7.2 *Other (miles):* 0
Winter Trails: *National Forest (miles):* 0 *Other (miles):* 0
Roads: *National Forest (miles):* 99.0 *Other (miles):* 15.5
Roads: *National Forest Collector and Arterial: 82.1 miles*

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership – Gibralter Ridge

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within Fire Perimeter
Low	6,621.5	0	0	26.8	6,648.4	51%
Moderate	2,060.1	0	0	0	2,060.1	16%
High	284.4	0	0	0	284.4	2%
Unburned	3,811.1	0	0	125.0	3,936.1	30%
No Data	10.5	0	0	0.1	10.5	< 1%
Total	12,787.7	0	0	151.9	12,939.6	100%

Table 5: Burn Severity Acres by Ownership – Caribou

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within Fire Perimeter
Low	9,496.7	0	319.9	1,423.0	11,239.5	45%
Moderate	5,279.3	0	312.9	669.9	6,262.1	25%
High	1,313.8	0	357.8	265.4	1,937.0	8%
Unburned	4,197.9	0	68.2	1,059.6	5,325.8	22%
No Data*	0	0	0	0	0	0%
Total	20,287.6	0	1,058.8	3,418.0	24,764.4	100%

*Unverified BARC imagery contained 2694 acres of no data values due to known sensor failure issues with Landsat 7. These no data areas were re-assigned amongst the four burn severity classes using a weighted average of the known values for the remainder of the fire area.

B. Water-Repellent Soil (acres):

Gibralter Ridge – 1308
Caribou – 3715

C. Soil Erosion Hazard Ratings:

Table 5: Soil Erosion Hazard Ratings – Gibralter Ridge

Soil Erosion Hazard	Acres	% Within Fire Perimeter
Slight	522.1	4%
Moderate	1261.2	10%
Severe	2325.3	18%
Very Severe	7418.2	57%
Not Rated	1420.7	11%
Total	12947.5	100%

Table 66: Soil Erosion Hazard Ratings – Caribou

Soil Erosion Hazard	Acres	% Within Fire Perimeter
Slight	389.5	2%
Moderate	12426.8	50%
Severe	6221.8	25%
Very Severe	2175.0	9%
Not Rated	788.8	3%
Total	24764.4	100%

D. Erosion Potential (tons/acre):

Gibralter Ridge – 0.126 (Min = 0, Max = 5.99)
Caribou – 0.006 tons/acre (Min = 0, max = 0.35)

E. Sediment Potential (yards^3/miles^2):

Gibralter Ridge – 59.4
Caribou – 4.6

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period (years): 1-3 grasses, 10-15 shrubs, 20-50 conifers

B. Design Chance of Success (percent): 80% depending on site and treatment

C. Equivalent Design Recurrence Interval (years): 25

D. Design Storm Duration (hours): 6 and 24

E. Design Storm Magnitude (inches):
2 year: 6 hour – 0.86" and 24 hour – 1.57"; 100 year: 6 hour – 1.97" and 24 hour – 3.22"

F. Design Flow (cfs/mile^2): Q25 pre-fire – 40 cfs/mi^2

G. Estimated Reduction in Infiltration (percent):
Gibralter – 10%
Caribou – 18%

H. Adjusted Design Flow (cfs/mile^2): Q25 post-fire – 97 cfs/mi^2

PART V - SUMMARY OF ANALYSIS

Introduction/Background:
The Gibralter Ridge Fire is 12,940 acres with 40 percent perimeter containment as of October 9, 2017. This lightning caused-fire is located seven miles east of Eureka, Montana. Approximately 18% of the area within the fire perimeter burned at moderate and high soil burn severities.

The Caribou Fire is 24,753 acres with 75 percent perimeter containment as of October 9, 2017. This lightning caused-fire is located 18 miles northwest of Eureka, Montana. Approximately 33% of the area within the fire perimeter burned at moderate and high soil burn severities.

The primary values at risk from post-fire effects due to the Gibralter Ridge and Caribou fires are: human life and safety, transportation infrastructure (roads and trails), bull trout habitat, and native vegetation communities. The primary threats caused by the fire include increased runoff, which is expected to intensify the first 2-3 years following the fire until the burned watersheds recover. Accelerated hillslope erosion will occur as a result of amplified runoff and decreased infiltration rates. However the precipitation regime for the fire areas will help mitigate the post-fire erosion with most of the annual precipitation falling as snow at high elevations with rain at lower elevations with few rain-on-snow event to influence spring melt and runoff dynamics. Additional threats originating from the destabilized hillslopes throughout the burned area include falling trees and rolling rocks.

A. Critical Values/Resources and Threats:
A comprehensive list of potential values at risk within or directly downstream of the Gibralter Ridge and Caribou fires was compiled through consultation with local management and resource specialists and through BAER team field reconnaissance. Following guidance in interim directive 2520-2017-1, the BAER assessment team evaluated a list of values through field assessment and subsequent analysis to identify the critical values that may be treated under the BAER program. These critical values were then assigned a level of risk defined by the probability of damage or loss and the magnitude of consequences (Table 11). Presence of critical values with unacceptable risks signify a burned-area emergency exists. The characterization of the probability of damage or loss is based on the watershed response analysis completed during the BAER assessment. Critical values having a *Very High* or *High* risk rating are addressed through emergency stabilization actions known to effectively mitigate potential threats or minimize expected damage as described below. *Intermediate* risk areas are typically addressed through coordination with local, state, and other federal cooperators. Additionally, critical warning signs may be recommended in some areas with an *Intermediate* risk. No treatments are identified for values rated *Low* and *Very Low*.

Table 7: Critical Value Risk 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

Gibralter Fire

1. **Human Life and Safety (HLS):**
   - **a.** ***High*** risk to **life and safety** of travelers along routes within and downslope from hillslopes burned at a moderate to high severity due to an increased threat of flooding, debris flows, hazard trees, and rockfalls. The highest identified risks are on NFS roads 114, 756, and 7018. Treatment recommendation is installation of warning signs at major access points to the fire area. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S01)*
   - ***b.*** ***High*** risk to **life and safety** of travelers along routes within and downslope from hillslopes burned at a moderate to high severity due to an increased threat of flooding, debris flows, hazard trees, and rockfalls. The highest identified risks are on NFS trails 26, 74, 333, and 335. Treatment recommendation is installation of warning signs at major access points to the fire area. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S02)*
   - **c.** ***High*** risk to **life and safety** of the public, cooperators, and FS and contracted personnel implementing BAER treatments exists on Winter Trails SNO95A, SNO314, and SNO349 due to the threat of increased avalanche potential, debris torrents, and/or hazard trees. Treatment recommendation is installation of warning signs at major access points. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S04)*
   - ***d.*** ***High*** risk to **life and safety** of FS and contracted personnel implementing BAER treatments associated with emergency road treatments. Treatment recommendation is falling of hazard trees where work is being conducted. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: R05)*
   - ***e.*** ***High*** risk to **life and safety** of FS and contracted personnel implementing BAER treatments associated with trail storm proofing. Treatment recommendation is falling of hazard trees where storm proofing work is being conducted. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: T02)*
   - ***f.*** ***Intermediate*** risk to **life and safety** of forest visitors from hazard trees at the Birch Creek Recreation site. Treatment recommendation is installation of warning sign at the site. Probability of damage or loss is unlikely, magnitude of consequences is major. *(Treatment: S03)*

2. **Property (P):**
   - **a.** ***Very High*** risk to FS **property** with loss of emergency ingress/egress from flooding and damage to NFSR 756 at stream crossings. Treatment recommendation is culvert upsizing at Mud Creek crossing, installation of road stabilization measures at the Sherman Creek crossing, and storm inspection. Probability of damage or loss is likely, magnitude of consequences is major. *(Treatments: R01, R02, and R04)*
   - **b.** ***High*** risk to FS **property** from increased flows and slope destabilization. Undersized culverts on NFS collector roads within the fire area are likely to plug and severely damage road infrastructure with loss of NFS investment. Treatment recommendation is storm inspection. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: R01)*
   - **c.** ***High*** risk to FS **property** along the Whitefish Divide (#26), Cat Creek (#333) and Gibralter Ridge (#335) trails proximal to areas burned at a moderate to high severity due to an

increased threat of erosion of trail tread. Treatments recommendation is trail stabilization. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: T01)*

3. **Natural Resources (NR):**
   a. ***High*** risk for accelerated hillslope erosion and increased overland flows which may impact short-term **hydrologic function**. Emergency response is captured through road and trail treatments. Probability of damage or loss is likely, magnitude of consequences is moderate. *(Treatments: R01, R02, R04, and T01)*
   b. ***High*** risk to **native plant communities** due to the threat from the spread of noxious weeds and invasive plant species. Known noxious weed and invasive plant populations (spotted knapweed, Dalmatian toadflax, yellow toadflax, Canada thistle, musk thistle, bull thistle, St. Johnswort, and houndstongue) exist within and immediately adjacent to high and moderate soil burned areas.
   c. ***Low*** risk of **loss of bull trout critical habitat**. The main threat to bull trout habitat or populations is from debris flows, but would result in recoverable and localized impacts Probability of damage or loss is possible, magnitude of consequences is minor. No treatment is recommended.
   d. ***Low*** risk to **soil productivity** from increased soil erosion within areas that burned at moderate to high severity. Result from the erosion and sedimentation models indicate low levels of soil erosion and sedimentation and low magnitude of consequences. The mosaic nature of the fire and naturally occurring slope breaks will reduce the amount of soil transported out of the burn area. The fire is expected to impact soil quality by eroding exposed soil and nutrient-rich ash off-site, as well as by increasing the potential for spread of noxious weeds and invasive plant species. Probability of damage or loss is unlikely, magnitude of consequences is minor. No treatment is recommended.

4. **Cultural and Heritage Resources:**
   a. ***Intermediate*** risk of further damage to an **historic cabin site**, which was burned. Probability of damage or loss is possible, magnitude of consequences is moderate. No treatment is recommended.
   b. ***Low*** risk of damage to other **historic sites**. Probability of damage or loss is possible, magnitude of consequences is minor. No treatment is recommended.

Caribou Fire

1. **Human Life and Safety (HLS):**
   a. ***High*** risk to **life and safety** of travelers along routes within and downslope from hillslopes burned at a moderate to high severity due to an increased threat of flooding, debris flows, hazard trees, and rockfalls. The highest identified risks are on NFS roads 303, 470, and 7220. Young Creek will experience higher peak flows intensified by additions of large woody debris from adjacent burned areas and potential sediment bulking. Treatment recommendation is installation of warning signs at major access points to the fire area. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S01)*
   b. ***High*** risk to **life and safety** of travelers along routes within and downslope from hillslopes burned at a moderate to high severity due to an increased threat of flooding, debris flows, hazard trees, and rockfalls. The highest identified risks are on NFS trails 22, 58, 59, 73, and 325. Treatment recommendation is installation of warning signs at major access points to the fire area. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S02)*
   c. ***High*** risk to **life and safety** of FS and contracted personnel implementing emergency BAER treatments associated with roads. Treatment recommendation is falling of hazard trees where work is being conducted. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: R03)*

d. ***High*** risk to **life and safety** of FS and contracted personnel implementing emergency BAER treatments associated with trail stabilization. Treatment recommendation is falling of hazard trees where storm proofing work is being conducted. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: T03)*

e. ***High*** risk to **life and safety** of forest visitors from hazard trees at the Lake Geneva and Moose Lake designated dispersed recreation sites due to fire weakened trees. Treatment recommendation is removal of imminent hazard trees up to 2.5 tree lengths in locations directly adjacent to congregation areas and worksites. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: S03)*

2. **Property (P):**
   a. ***High*** risk to FS **property** from increased flows and slope destabilization downstream of the high and moderate soil burn severity. Undersized culverts on NFS collector roads within the fire area are likely to plug and severely damage road infrastructure with loss of NFS investment. Treatment recommendation is storm inspection. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatments: R01 and R02)*
   b. ***High*** risk to FS **property** along the Geneva Lake (#22), Young Creek (#58), Robinson Mountain (#59), and Dodge Summit (#325) trails proximal to areas burned at a moderate to high severity due to an increased threat of erosion of trail tread. Treatments recommendation is trail stabilization. Probability of damage or loss is possible, magnitude of consequences is major. *(Treatment: T01).*

3. **Natural Resources (NR):**
   a. ***High*** risk to **native plant communities** due to the threat from the spread of noxious weeds and invasive plant species. Known noxious weed and invasive plant populations (spotted knapweed, Dalmatian toadflax, yellow toadflax, Canada thistle, musk thistle, bull thistle, St. Johnswort, and houndstongue) exist within and immediately adjacent to high and moderate soil burned areas.
   b. ***Intermediate*** risk for accelerated hillslope erosion and increased overland flows which may impact short-term **hydrologic function**. Emergency response is captured through road and trail treatments. Probability of damage or loss is likely, magnitude of consequences is moderate. (*Treatments: R01, R02, T01, and T02)*
   c. ***Low*** risk to **soil productivity** from increased soil erosion within areas that burned at moderate to high severity. Result from the erosion and sedimentation models indicate low levels of soil erosion and sedimentation and low magnitude of consequences. The mosaic nature of the fire and naturally occurring slope breaks will reduce the amount of soil transported out of the burn area. The fire is expected to impact soil quality by eroding exposed soil and nutrient-rich ash off-site, as well as by increasing the potential for spread of noxious weeds and invasive plant species. No treatments were recommended.

4. **Cultural and Heritage Resources:**
   a. ***Low*** risk of damage to **historic sites**. Probability of damage or loss is possible, magnitude of consequences is minor. No treatment is recommended.

B. Emergency Treatment Objectives: Mitigate and protect, to the extent possible, threats to personal injury or human life of forest visitors and Forest Service employees by raising awareness through posting hazard warning signs on roads, improving stream crossings, and communicating the hazards of flooding, debris flows, and rock fall. Provide safe access to the burned area for personnel implementing authorized BAER response actions and communicate threats to cooperating agencies and community groups. Consider temporary closures to protect public users of NFS lands and recreation facilities.

Protect or minimize damage to NFS investments in roads and trails infrastructure by installing drainage features capable of withstanding potential increased stream flows, debris flows, and slope failure. Minimize damage to key NFS travel routes.

Protect or mitigate potential post-fire impacts to critical natural resources within the burned area including soil productivity and hydrologic function on NFS lands, and critical habitat for bull trout.

Assist cooperators, and other local, State, and Federal agencies with the interpretation of the assessment findings to identify and address potential post-fire impacts to communities and residences, domestic water supplies, public utilities (including power lines, roads, and other infrastructure).

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

Land N/AClick here to enter text. **Channel** N/A
Roads/Trails 70% **Protection/Safety** 90%

D. Probability of Treatment Success:

Table 8: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	N/A	N/A	N/A
Channel	N/A	N/A	N/A
Roads/Trails	70%	80%	90%
Protection/Safety	90%	90%	90%

E. Cost of No-Action (Including Loss):

Choosing to implement a *No Action* treatment of natural forest recovery comes with associated costs to forest infrastructure and the natural resources and their functions within the Gibralter Ridge and Caribou fire areas. Road reconstruction following failure of culverts and drainage features costs approximately $60,000 per mile while trail reconstruction is variable, but costs roughly $12,500 per mile. The cost of replacing a failed culvert at a stream or drainage crossing proposed for upgrade in this assessment would cost roughly 50% more than the cost of the proposed new culvert due to the need to import fill lost in the culvert failure and repair associated channel damage. Similarly, at sites where this assessment has proposed culvert removal, the cost of repairing the site of a culvert failure would equal or exceed the cost of removal, given that mobilization as well as channel and valley reconstruction would be required in either event, and represent the majority of the contract cost. The ecosystem cost of hundreds to thousands of cubic yards of fine sediment deposited in bull trout habitat streams from a culvert or road failure is difficult to quantify but would be considerable.

In the Gibralter Ridge fire area, road failure is possible to likely on 4.1 miles. There are 8.7 miles of trail at risk from accelerated post-fire erosion. If one assumes 50% loss of structures/road/trail drainage within these areas, replacement costs would be roughly $150,000. This value represents replacement costs only and does not account for damage/loss to ecosystem, economic and social values, which would substantially exceed this number.

In the Caribou fire area, road failure is possible to likely on 19.9 miles. There are 5.3 miles of trail at risk from accelerated post-fire erosion. If one assumes 50% loss of structures/road/trail drainage within these areas, replacement costs would be roughly $621,000. This value represents replacement costs only and does not account for damage/loss to ecosystem, economic and social values, which would substantially exceed this number.

Ecosystem functions within the fire areas include bull trout critical habitat, native plant communities, and soil and hydrologic function, which do not have a clear replacement cost.

F. Cost of Selected Alternative (Including Loss): $201,233

There is a 30% chance the proposed road and trails treatments may not be effective or possibly not implemented prior to the first damaging event. The cost of the selected alternative is estimated using the

funding requested for the road and trails treatment plus this 30% chance of failure (($154,795 + (0.3 *$154,795)) **Skills Represented on Burned-Area Survey Team:**

☒ Archaeology	☐ Botany	☐ Ecology	☐ Economist	☒ Engineering
☒ Fisheries	☐ Forestry	☒ GIS	☒ Hydrology	☐ Range
☒ Recreation	☒ Soils	☒ Team Lead	☒ Weeds	☐ Wildlife

Team Leader: Derek Milner
Email: dmilner@fs.fed.us **Phone:** 406-758-5340 **FAX:** 406-758-3537

Forest BAER Coordinator: John Carlson
Email: jwcarlson01@fs.fed.us **Phone:** 406-283-7634

Core Team Members:

Table 9: BAER Team Members by Skill

Skill	Team Member Name
Team Lead(s)	Derek Milner
Archaeology	Steve Armstrong
Engineering	Annora Nelson
Fisheries	Tim Price
GIS	Jed Gregory
Hydrology	Becca Lloyd
Recreation	Daniel Ward
Soils	Megan McGinnis
Soils	Jori Johnson
Soils	Eric Lovering
Weeds	Perry Stebbins

H. Treatment Narrative: ***Land Treatments:*** *EDRR is necessary to prevent the establishment and spread of high risk noxious weeds into the native plant communities that had minor amounts of noxious weeds within the Gilbralter Fire. EDRR will be used to minimize the potential for new noxious weed infestations and ensure the natural recovery of native perennial grasses and forbs. This treatment will also improve hydrologic function and soil productivity as the native vegetation grows after the fire.*

EDRR treatment would focus on the high and moderate burned areas where priority weed species spotted knapweed, Canada thistle, Saint Johnswort, and orange and meadow hawkweed can spread from fire suppression affected areas onto previously relatively weedfree areas.

The Gibralter Ridge fire affected 26 miles of National Forest System road on the Fortine Ranger District. Ground treatments (truck or UTV mounted sprayer) would occur for weeds along the road sides within the high and moderate burned area where high volume fire traffic could have left propagules of these high priority weed species. Treatments will be prescribed at 7 ounces/acre of aminopyralid with a surfactant for 24 acres along roadsides and 22 acres alongside trails that cross through high and moderate burned areas. These treatments would cost $4,830 and be accomplished with an existing IDIQ contract and Forest Service force account personnel. Aminopyralid has been highly effective on knapweeds. It has been shown to be as effective as picloram, and the lower use rates pose less risk to the environment and it has fewer impacts on non-target plants.

The Caribou fire affected 217 miles of National Forest System road on the Rexford and Three Rivers Ranger Districts. Ground treatments (truck/UTV mounted sprayer) would also occur for weeds along the road sides within moderate and high severity burned area where fire suppression activity could exacerbate weed spread of priority weed species into native plant communities with minor infestations. Treatments will be prescribed at 7 ounces/acre of aminopyralid with a surfactant for 48 acres that access the burned area perimeter. These treatments would cost $6,930 and would be accomplished with an existing IDIQ contract and Forest Service force account personnel.

Table 10: L01 – Weeds Treatment Types Summary - Gibralter Ridge Fire

TREATMENT DESCRIPTION	TARGET WEED SPECIES	PRESCRIPTION	ESTIMATED ACRES	COST PER ACRE	COST	TIMING
EDRR SUPPRESSION IMPACTS – ROADS	Spotted knapweed, Saint Johnswort, Oxeye daisy	Ground Application on roads in moderate to severe burn areas	24	$100	$2,400	Spring 2018
DETECTION SUPPRESSION IMPACTS – ROADS	Spotted knapweed, Saint Johnswort, Oxeye daisy	Efficacy monitoring for treated acres	24	$5.00	$120	Summer 2018
EDRR SUPPRESSION IMPACTS – TRAILS	Spotted Knapweed, Hawkweed, St. Johnswort, Oxeye Daisy	Ground Application on roads in moderate to severe burn areas	22	$100	$2,200	Spring 2018
DETECTION SUPPRESSION IMPACTS – TRAILS	Spotted Knapweed, Hawkweed, St. Johnswort, Oxeye Daisy	Efficacy monitoring for treated acres	22	$5.00	$110	Summer 2018
TOTAL					**$4,830**	

Table 11: L01 – Weeds Treatment Types Summary - Caribou Fire

TREATMENT DESCRIPTION	TARGET WEED SPECIES	PRESCRIPTION	ESTIMATED ACRES	COST PER ACRE	COST	TIMING
EDRR SUPPRESSION IMPACTS – ROADS	Spotted knapweed, Hawkweed, Saint Johnswort, Oxeye daisy	Ground Application on roads in moderate to severe burn areas	48	$100	$4,800	Spring 2018
DETECTION SUPPRESSION IMPACTS – ROADS	Spotted knapweed, Saint Johnswort, Oxeye daisy	Efficacy monitoring for treated acres	48	$5.00	$240	Summer 2018
EDRR SUPPRESSION IMPACTS – TRAILS	Spotted Knapweed, Hawkweed, St. Johnswort, Oxeye Daisy	Ground Application on roads in moderate to severe burn areas	18	$100	$1,800	Spring 2018
DETECTION SUPPRESSION IMPACTS – TRAILS	Spotted Knapweed, Hawkweed, St. Johnswort, Oxeye Daisy	Efficacy monitoring for treated acres	18	$5.00	$90	Summer 2018
TOTAL					**$6,930**	

Channel Treatments: No channel treatments are proposed.

Roads and Trail Treatments:

Trails

Many of the trails in the burned area are at *High* risk as current trail drainage features are not adequate to address the anticipated increased post-fire runoff. Treatments are needed to provide sustainability of the trails and to prevent off-site impacts.

Trail features will be constructed to standard as defined by USFS Trails Handbook 2309.18. Installation should be designed to last no more than 3 years. Permanent structures are not part of this treatment. If safety risks (e.g. hazard trees) cannot be mitigated for work crews, work will be delayed until threat is reduced or stabilized. Install drainage feature depending on steepness of trail in areas proximate to moderate or high soil burn severity. Hazards within or along the trail route that restrict efficient and safe access to work sites will be mitigated (e.g. rocks and trees). This treatment is designed to stabilize trails for anticipated increases in runoff. The stabilization methods may vary by site but are designed to reduce trail erosion or damage.

Treatment prescriptions include:

- Installation of non-structure water bars
- Installation of non-structure switchback drainage
- Drain dip enhancements

The Gibralter Ridge fire directly impacted 8.7 miles of National Forest System Trails on three NFS trails. All of the distribution of the 8.7 miles of trails and recommended treatments are within or directly adjacent to large high and moderate soil burn severity areas. The trail grades within the area vary from five to 20% and have side slopes of up to 70%. Trail tread in this area is commonly constructed from soils composed of glacial and metasedimentary parent material. Erosion potential on these trails becomes severe when coupled with the effects of wildland fire, putting these trails at *High* risk from impacts to Forest Service property and failure of hydrologic function. The four trails impacted and proposed for treatment are summarized below. Field reconnaissance of the Gibralter Ridge fire showed that the trail system treatments would predominantly require trail stabilization (e.g. installing grade dips and erosion control structures).

The Caribou fire directly impacted 6.9 miles of National Forest System Trails on four NFS trails. All of the distribution of the 6.9 miles of trails and recommended treatments are within or directly adjacent to large high and moderate soil burn severity areas. The trail grades within the area vary from five to 20% and have side slopes of up to 70%. Trail tread in this area is commonly constructed from soils composed of glacial and metasedimentary parent material. Erosion potential on these trails becomes severe when coupled with the effects of wildland fire, putting these trails at *High* risk from impacts to Forest Service property and failure of hydrologic function. The four trails impacted and proposed for treatment are summarized below. Field reconnaissance of the Caribou fire showed that the trail system treatments would predominantly require trail stabilization (e.g. erosion control structures).

Table 12: Miles of NF System Trails Impacted - Gibralter Ridge

TRAIL NAME	TRAIL NUMBER	MILES
WHITEFISH DIVIDE	26	2.8
CAT CREEK	333	2.2
GIBRALTER RIDGE	335	3.7
TOTAL		8.7

Table 13: Miles of NF System Trails Impacted - Caribou

TRAIL NAME	TRAIL NUMBER	MILES
GENEVA LAKE	22	1.9
YOUING CREEK	58	1.8
ROBINSON MOUNTAIN	59	2.4
DODGE SUMMIT	325	0.8
TOTAL		6.9

Table 14 –Trail Treatment Types Summary - Gibralter Ridge

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
T01 – TRAIL STABILIZATION	Miles	$2,517	8.7	$21,898
T02 – HAZARD TREE REMOVAL	Each	$59	74	$4,366
TOTAL				$26,264

Table 15 –Trail Treatment Types Summary - Caribou

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
T01 – TRAIL STABILIZATION	Miles	$2,756	6.9	$19,016
T02 – DRAIN DIP ENHANCEMENT	Each	$256	10	$2,560
T03 – HAZARD TREE REMOVAL	Each	$59	73	$4,307
TOTAL				$25,883

Roads

Road Storm Inspection: Many roads that are vulnerable to damage from post-fire runoff and erosion were not specified for maintenance treatments or culvert protection and upgrades downstream of high and moderate soil burn severity areas. On these roads, the proposed treatment is to evaluate the roads during or immediately after significant runoff-producing events in order to remove obstructions to road drainage and otherwise ensure that road drainage is functioning well enough to avoid severe damage or loss to the infrastructure. The success of this treatment will be monitored. If the treatment of storm inspection is unsuccessful alternatives will be developed for consideration and submitted under an interim request. Roads where this work is proposed will be listed in the specification sheets.

Road Stabilization: In areas with high and moderate burn severity, runoff from burned hillslopes will increase the amount of water and debris in drainage structures. Impacts will likely include sedimentation or blockage of culvert inlets and plugged culverts. Drainage issues were estimated to have a high probability of occurrence at two locations throughout the burned area, and major magnitude of consequences with respect to replacement costs and risk to human life and safety.

This treatment is designed to mitigate threats to Human Life and Safety, National Forest System property, and other values, including emergency access, access for forest visitors and local residents, water quality, aquatic habitat, and soil productivity. Treatments are proposed on the open National Forest roads within and directly below areas of moderate to high burn severity. Treatment prescriptions for road stabilization will consist of installation of a total of 3 sediment/debris racks at two culvert locations.

Stream Culvert Upsizing: Proposed treatments at culverts determined to be undersized for the post-fire design storm (25-year) were determined based on values at risk from failure of the culvert. For culverts determined to be lower in priority and road storm inspection was proposed as the least expensive means of reducing the risk of failure. Where culverts were at elevated risk of failure on roads closed to the public, or at the end of open roads, they were proposed for removal – a relatively inexpensive way of guaranteeing that the road and culvert will not fail. Stream culverts determined to be of higher priority for mitigation were those that were determined to be likely to fail and are on primary routes that access private land. At these sites, culverts were sized for the post-fire 25-year event.

Table16: Stream Culvert Upsizing Estimates – Gibralter Ridge

SITE	PROPOSED STRUCTURE	COST ESTIMATE
FOOTHILLS ROAD #756 – MUD CREEK 1	24" CMP	$7,150
FOOTHILLS ROAD #756 – MUD CREEK 2	24" CMP	$7,150
TOTAL		$14,300

Table 177 - Road Treatment Types Summary – Gibralter Ridge

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
R01 – ROAD STORM INSPECTION	Days	$1,650	10	$16,500
R02 – ROAD STABILIZATION	Each	$500	1	$500
R03 – CONTRACT DESIGN AND ADMINISTRATION	Lump	$3,600	1	$3,600
R04 – STREAM CULVERT UPSIZING	Each	$7,150	2	$14,300
R05 – HAZARD TREE REMOVAL	Each	$600	5	$3,000
TOTAL				$37,900

Table 18 - Road Treatment Types Summary – Caribou

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
R01 – ROAD STORM INSPECTION	Days	$1,650	20	$33,000
R02 – ROAD STABILIZATION	Each	$500	2	$1,000
R03 - CONTRACT DESIGN AND ADMINISTRATION	Each	$1,200	1	$1,200
R04 – HAZARD TREE REMOVAL	Each	$600	5	$3,000
TOTAL				$38,200

Protection/Safety Treatments:

Road and Trail Hazard Warning Signs: Working, traveling, and recreating in burned areas poses an elevated risk to Human Life and Safety. The purpose of this treatment is to acknowledge and alert forest employees and visitors to the existing threats associated with traveling routes (roads and trails) within and downstream of burned areas.

"Entering Burned Area" signs are needed to alert the public to possible threats to life and safety. These signs should contain language addressing risks that warrant heightened awareness such as falling trees, rolling rocks, and flash floods.

These warning signs should be posted in site-specific locations to alert travelers to upcoming dangers such as falling rocks, hazard trees, etc. These signs will be located in strategic intersections to inform the traveler of their current location on the Forest Visitor Map and Motor Use Vehicle Map (MVUM). In most cases, these areas are located adjacent to the fire perimeter.

Table 19 - Protection/Safety Treatment Type Summary – Gibralter Ridge

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
S01 – HAZARD WARNING SIGNS – ROADS	Each	$350	5	$1,750
S02 – HAZARD WARNING SIGNS – TRAILS	Each	$633	8	$5,064
S03 – HAZARD WARNING SIGNS – SNOWMOBILE TRAILS	Each	$987	2	$1,974
TOTAL				$8,788

Table 20- Protection/Safety Treatment Type Summary – Caribou

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
S01 – HAZARD WARNING SIGNS – ROADS	Each	$350	3	$1,050
S02 – HAZARD WARNING SIGNS – TRAILS	Each	$630	10	$6,300
S03 – HAZARD TREE REMOVAL – RECREATION SITES	Each	$1,010	2	$2,020
S04 – HAZARD WARNING SIGNS – RECREATION SITES	Each	$533	4	$2,132

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
TOTAL				$11,502

BAER Evaluation:

Interagency and Implementation Coordination and Consultation: Associated activities obligated under ID-FSM2520-2017-1 need to be considered in the BAER funding request when emergency response actions are authorized. These are accumulated tasks above the normal program of work and generally not accounted for in out-year program planning. Because implementation of approved BAER response actions trigger these required tasks and the unit's allocated budget does not account for these obligations, BAER funding is the appropriate authorization to ensure this coordination and consultation is completed. BAER Implementation requires consultation with cooperating agencies including the State of Montana (Fish, Wildlife, and Parks), National Fish and Wildlife Service, as well as county and city agencies on resource issues regarding the proposed BAER treatments. For the Gibralter Ridge Fire, 2 days (each) are proposed for a GS-11 hydrologist and a GS-11 fish biologist. For Caribou Fire, 2 days (each) are proposed for a GS-11 hydrologist and a GS-11 fish biologist.

Table 21 - Coordination and Consultation Summary – Gibralter Ridge

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
E01 – COORDINATION AND CONSULTATION (GS-11)	Each	$390	4	$1,560
E02 - BAER IMPLEMENTATION SPECIALIST (GS-11)	Each	$650	4	$2,600
TOTAL				$4,160

Table 22 - Coordination and Consultation Summary - Caribou

TREATMENT	UNIT	UNIT COST	# OF UNIT	TOTAL COST
E01 – COORDINATION AND CONSULTATION (GS-11)	Each	$390	4	$1,560
E02 - BAER IMPLEMENTATION SPECIALIST (GS-11)	Each	$650	4	$2,600
TOTAL				$4,160

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.)

L01-Early Detection Rapid Response: Treatment sites will be evaluated annually for the next three years to ensure control methods are meeting resource objectives and to inventory for new invaders. Weed specialist/technicians will visit chemically treated sites after treatment; this is especially important for weed populations that are sprayed to ensure efficacy of herbicide application. Initiate follow-up treatments if additional non-native species or new infestations are discovered. Control will be considered successful upon determination that all noxious weeds have been controlled have not spread beyond their pre-fire locations.

T01-Trail Stabilization: The drainage improvements will be inspected throughout the year after implementation to monitor the effectiveness of water run-off and the trail drainage condition.

R01-Storm Inspection and Response: Monitor the storm-patrol response time to ensure objectives are being met. Identify the type of storm event that mobilizes material.

R02-Road Drainage Reconstruction: Road drainage reconstruction treatment effectiveness will be monitored during storm patrol activities (R01).

R04-Culvert Replacements: Monitoring will be conducted by district personnel and/or members of the Forest Engineering staff. Monitoring will consist of visiting the site after high intensity thunderstorms and/or after spring run off to ensure the replacements culverts are functioning as designed. In addition, photos will be taken during the site visits and a photo log will be established.

E02-Implementation Coordination: Forest BAER Coordinator will file annual accomplishment report.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

GIBRALTER RIDGE FIRE

Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
L01 Noxious Weed Treatment	Lump	4,830	1	$4,830	$0		$0		$0	$4,830
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$4,830	$0		$0		$0	$4,830
B. Channel Treatments										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
T01 Trail Stabilization	Miles	2,517	9	$21,898	$0		$0		$0	$21,898
T02 Hazard Tree Removal	Each	59	74	$4,366	$0		$0		$0	$4,366
R01 Road Storm Inspection	Days	1,650	10	$16,500	$0					$16,500
R02 Road Stabilization	Each	500	1	$500	$0					$500
R03 Contract Design and Implementation	Lump	3,600	1	$3,600	$0					$3,600
R04 Stream Culvert Upsizing	Each	7,150	2	$14,300	$0					$14,300
R05 Hazard Tree Removal	Each	600	5	$3,000	$0					$3,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$64,164	$0		$0		$0	$64,164
D. Protection/Safety										
S01 Hazard Warning Signs - Roads	Each	350	5	$1,750	$0		$0		$0	$1,750
S02 Hazard Warning Signs - Trails	Each	633	8	$5,064	$0		$0		$0	$5,064
S03 Hazard Warning Signs - Snowmobile Tr	Each	987	2	$1,974	$0					$1,974
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$8,788	$0		$0		$0	$8,788
E. BAER Evaluation										
Initial Assessment	Report			$20,000	$0		$0		$0	$20,000
E01 - Coordination and Consultation	Each	390	4	$1,560	$0		$0		$0	$1,560
E02 - BAER Imp Specialist	Each	650	4	$2,600			$0		$0	$2,600
Insert new items above this line!				—	$0		$0		$0	$0
Subtotal Evaluation				$4,160	$0		$0		$0	$4,160
F. Monitoring										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$81,942	$0		**$0**		**$0**	**$81,942**
Previously approved				$77,112						
Total for this request				**$4,830**						

Total approved in Initial Request $71,112

Total requested in Interim #1 $4,830

PART VII - APPROVALS

1. _____ 12/8/2017
Chris Savage, Forest Supervisor **Date**

2. _____ 12/11/2017
Leanne Marten, Region 1 Regional Forester **Date**

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

CARIBOU FIRE

A. Land Treatments										
L01 Noxious Weed Treatment	Lump	6,930	1	$6,930	$0		$0		$0	$6,930
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$6,930	$0		$0		$0	$6,930
B. Channel Treatments										
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treatments				$0	$0		$0		$0	$0
C. Road and Trails										
T01 Trail Stabilizaiton	Each	2,756	7	$19,016	$0		$0		$0	$19,016
T02 Drain Dip Enhancement	Each	256	10	$2,560	$0		$0		$0	$2,560
T03 Hazard Tree Removal	Each	59	73	$4,307	$0					$4,307
R01 Road Storm Inspection	Days	1,650	20	$33,000	$0					$33,000
R02 Road Stabilization	Each	500	2	$1,000	$0					$1,000
R03 Contract Design and Admin	Each	1,200	1	$1,200						$1,200
R04 Hazard Tree Removal	Each	600	5	$3,000	$0					$3,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$64,083	$0		$0		$0	$64,083
D. Protection/Safety										
S01 Hazard Warning Signs - Roads	Each	350	3	$1,050	$0		$0		$0	$1,050
S02 Hazard Warning Signs - Trails	Each	630	10	$6,300	$0		$0		$0	$6,300
S03 Hazard Tree Removal - Rec Site	Each	1,010	2	$2,020	$0					$2,020
S04 Hazard Warning Signs - Rec Site	Each	533	4	$2,132	$0					$2,132
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$11,502	$0		$0		$0	$11,502
E. BAER Evaluation										
Initial Assessment	Report			$20,000	$0		$0		$0	$20,000
E01 Coordination and Consulations	Each	390	4	$1,560	$0		$0		$0	$1,560
E02 BAER Imp Specialist	Each	650	4	$2,600						$2,600
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$4,160	$0		$0		$0	$4,160
F. Monitoring										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$86,675	$0		**$0**		**$0**	**$86,675**
Previously approved				$79,745						
Total for this request				**$6,930**						

Total approved in Initial Request $79,745

Total requested in Interim #1 $6,930

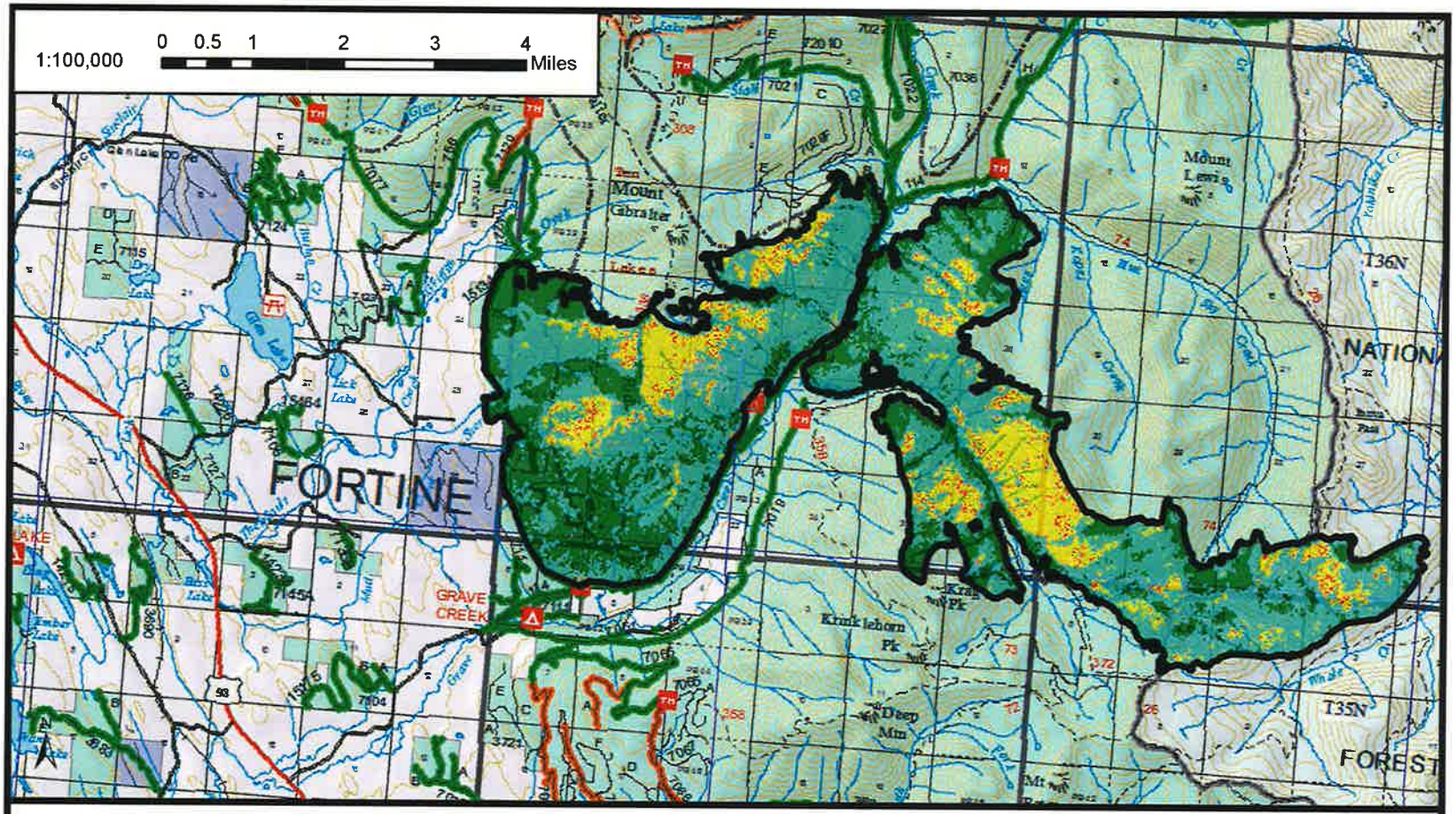
PART VII - APPROVALS

1. _____ /2017

Chris Savage, Forest Supervisor **Date**

2. _____ /2017

Leanne Marten, Region 1 Regional Forester **Date**



SOIL BURN SEVERITY

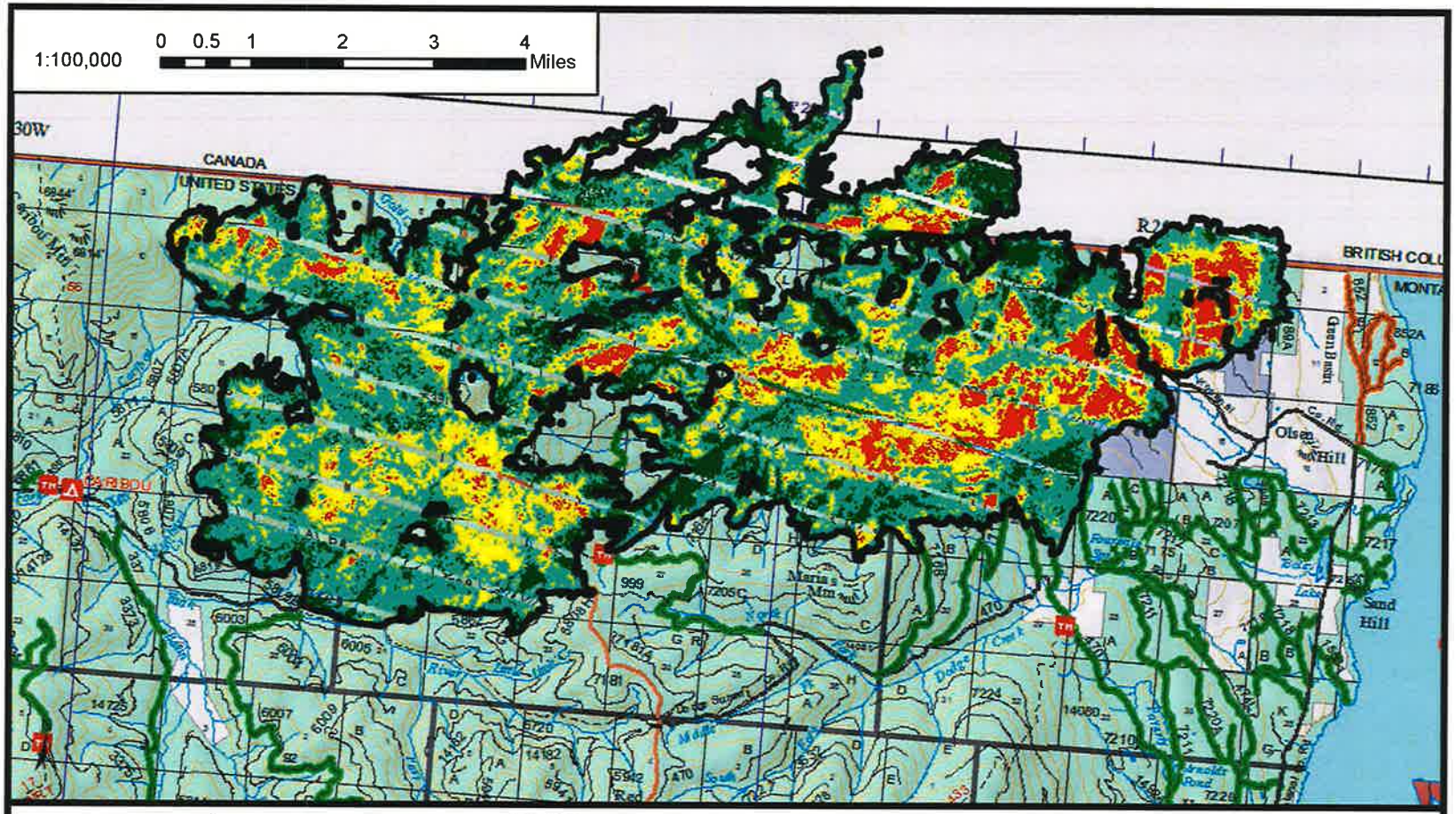
2017 Gibralter Ridge Fire

BURNED AREA EMERGENCY RESPONSE (BAER)

Kootenai National Forest

SOIL BURN SEVERITY ACRES				
High	Moderate	Low	Unburned-Very Low	Total
284	2,060	6,649	3,944	12,937

BAER USDA



SOIL BURN SEVERITY

2017 Caribou Fire

BURNED AREA EMERGENCY RESPONSE (BAER)
Kootenai National Forest

SOIL BURN SEVERITY ACRES				
High	Moderate	Low	Unburned-Very Low	Total
1,725	5,578	10,012	4,744	22,059

- BARC imagery contained 2694 acres of no data values due to known sensor failure issues with Landsat 7.

BAER USDA