Forest Service

Gifford Pinchot National Forest

501 E 5th St, Bldg 404
Vancouver, WA 98661
360-891-5001
Fax: 360-891-5045

File Code: 2520 **Date:** October 16, 2020
Route To:

Subject: Initial BAER Request, Gifford Pinchot National Forest

To: Regional Forester

Enclosed is our Burned-Area Emergency Response Report for the Big Hollow Fire. The Big Hollow Fire started in early September 2020 and is located north of the town of Carson, within the Mount Adams Ranger District of the Gifford Pinchot National Forest within Clark County, WA. The Fire burned a total of 24,996 acres, of which 24,147 acres burned on National Forest System (NFS) land.

Values at risk evaluated by the BAER team include life and safety, forest service roads and trails, critical habitat of Lower Columbia steelhead and, cultural resources, and the spread of noxious weeds.

Our request for $75,975 will allow for installation of warning signs, road and trail stabilization, noxious weed detection and removal, and cultural monitoring and compliance for proposed activities. All recommended BAER treatments are needed to protect life, property, and natural resources at risk.

TREATMENT	REQUEST
Lands	$28,795
Roads and Trails	$35,150
Protection and Safety	$11,450
Total	**$75,975**

I have reviewed the plan and determined that treatments are emergency in nature and the actions will have insignificant impacts. Please contact J.D. Jones at 541-219-0782 if you have any questions.

ERIC VEACH
Forest Supervisor

Enclosure: Initial BAER Request, Castle Rock Fire

cc: Dave Olson, Erin Black, Joshua Jones, Mailroom Gifford Pinchot

Date of Report: 10/13/2020

Big Hollow Fire - 2020

BURNED-AREA REPORT

Gifford-Pinchot National Forest

PART I - TYPE OF REQUEST

A. Type of Report

☒ 1. Funding request for estimated emergency stabilization funds

☐ 2. No Treatment Recommendation

B. Type of Action

☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

☐ 2. Interim Request #___

☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Big Hollow

B. Fire Number: WA-GPF-000864

C. State: Washington

D. County: Clark

E. Region: 06

F. Forest: Gifford Pinchot

G. District: Mt Adams

H. Fire Incident Job Code: P6NKP020

I. Date Fire Started: 9/8/2020

J. Date Fire Contained: Estimated 10/22/2020

K. Suppression Cost: $15,000,000

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

1. **Fireline repaired (miles):** 0 miles repaired as of today
2. **Other (identify):** Road surface aggregate from fire suppression repair, Place water bars and repair portions of the 5407, 5700610, 3105, and 3107. $60,000

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
1708000203	Upper Lewis River	68,710	2,399	1.7
1708000204	Middle Lewis River	85,564	13,571	9.5
1707010510	Wind River	143,483	9,028	6.3

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
GIFFORD PINCHOT NFS	24,147
WA STATE LAND	847
TOTAL	24996

O. **Vegetation Types:** Abies amabilis (pacific silver fir) vegetation zone, and some of the lower elevation areas are within the Tsuga heterophylla (western hemlock) zone. The Trapper Creek Wilderness ranged from western hemlock zone down near GMS and 64 road/30 road area, and Sister Rocks RNA and the higher elevations of the wilderness are dominated by pacific silver fir.

P. **Dominant Soils:** Soils information derived from the Gifford Pinchot National Forest Soil Resource Inventory, GIS analysis, and Lidar analysis. Soils are derived from volcanic ash deposits and colluvial deposits from weathered bedrock of volcanic sediments, tuffs, and breccia. Steep hillslopes dominate the

fire with over 70% of the burned area measuring greater than 30 percent slope. Potential for surface erosion is moderate when exposed to bare mineral soil except in the valley bottoms where erosion potential is slight.

Big Hollow Fire was intense enough to remove the duff layer and consume organic matter in the surface layer. Areas with high rock content and sandy soil are at greatest risk of creating a water repellant layer, volatilization of essential soil nutrients, destruction of soil biological activity, and vulnerability to water and wind erosion prior to reestablishing adequate vegetation cover on the burned site. Soils have moderate erosion potential, and many are at risk of fire damage. Soils in the Skamania County Soil Survey (1990) rate a potential of Moderately Susceptible for damage by wildfire in the burned area. These are similar to soils near Siouxon Creek on the Gifford Pinchot National Forest.

Soils in High Soil Burn Severity that are most susceptible to fire damage are Soil Mapping Units (SMU) 41, 4140, 4151 north of Siouxon Creek because of sand textures combined with higher gravel properties and steep hillslopes. Soils less susceptible yet still at risk include SMU 22, 56, 7, 81, 82, and 91 due to either sand textures or higher gravel amounts and steep slopes. SMU 21, 58, 85, 93 and 94 are also at risk on gentle topography, less than 30 percent slope.

Q. **Geologic Types:** Geologic history in the burned area (USGS Geologic Map i2005, 1993) is shown in volcanic flows of Tertiary andesites, basalts, and pyroclastic flows. More recent events are shown in Quaternary flows of andesite and basalt. Some steep slopes are prone to landslides from weakened pyroclastic and basalt bedrock. Landslides occupy large amounts of Big Hollow and Dry Creek watersheds. Also known in Siouxon Creek is a large active landslide towards the western edge of the fire perimeter. Unstable landforms and landslides are still being discovered across the watershed.

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

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	30
INTERMITTENT	127

S. **Transportation System:**
Trails: *National Forest (miles):* 33
Roads: *National Forest (miles):* 57 (25.9 miles maintenance 1 , 31.1 miles maintenance 2-5)

PART III - WATERSHED CONDITION

A. **Burn Severity (acres):**

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	GPNF	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned/ Very Low	13,534		589		14,125	56
Low	3,404		49		3,453	14
Moderate	4,848		178		5,026	20
High	2,361		31		2,392	10
Total	24,147		847		24,996	

B. Water-Repellent Soil (acres): Water repellent soils developed on approximately 20% of the fire area. Of that amount approximately 8% occur in areas of steeper slopes. The ash derived soils present within the fire perimeter have a natural level of water repellency when dry.

C. **Soil Erosion Hazard Rating:** Moderate: 23860 acres Slight: 482 acres

D. **Erosion Potential:** Approximately three quarters of High (1800 acres) and Moderate (3900 acres) Soil Burn Severity occurred on slopes greater than 30%.

E. **Sediment Potential:** 2.6 cubic yards of potential sediment contribution from gently sloping terrain and 208 cubic yards of potential sediment contribution on steeper slopes.

F. **Estimated Vegetative Recovery Period (years):** 5-10 years

G. **Estimated Hydrologic Response (brief description):**

A. Estimated Vegetative Recovery Period	5-10 years
B. Design Chance of Success	85 %
C. Equivalent Design Recurrence Interval	10 years
D. Design Storm Duration	6 hours (design storm) 24hrs (snowmelt)
E. Design Storm Magnitude	3.0 inches
F. Design Flow	133 cfs / mi^2
G. Estimated Reduction in Infiltration	30 %
H. Adjusted Design Flow	Adjusted Design Flow – 2x of design flow for 1st year after fire for moderate and high severity burn area

Wind River watershed: The drainages of Big Hollow, Dry Creek, the lower half of Bourbon Creek and a small catchment to Dry Creek in the Wind River watershed have moderate to high risk to downstream water quality. Road crossings in the high severity burn areas in the headwater area of Big Hollow drainage may serve as a trigger point from culvert/prism failure releasing debris flow downstream.

Middle Lewis River watershed: The lower half of Chinook Creek drainage, upper and middle drainages of Siouxon Creek and West Creek drainage (tributary to Siouxon Creek) have low to moderate risk to downstream water quality.

Upper Lewis River watershed: The drainage of Timber Creek has a high risk to the 64 road crossing. Small catchment in the headwater of Drift Creek, middle Drift Creek drainage along with tributary stream Timber Creek combined have low to moderate risk to downstream water quality.

Ash, sediment and debris will be the major contributors to downstream water quality in all of the watersheds. Some of the channel's morphology in the lower gradient reaches may alter due to deposition of ash, sediment, and debris. Water quality will temporarily be negatively affected during significant rainfall events

PART V - SUMMARY OF ANALYSIS

Introduction/Background

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

A comprehensive list of potential values at risk within or directly downstream of the Big Hollow burned area was compiled through consultation with local management and resource specialists and through BAER Team on the ground assessment. Following guidance in Interim Directive 2520- 2020-1, the BAER assessment team evaluated this list of values through field assessment and subsequent analysis to identify the critical values (FSM 2523.1 – Exhibit 01) that may be treated under the BAER program (See project file for BAER Critical Values). The critical values were then assigned a level of risk defined by the probability of damage or loss coupled with the magnitude of consequences using the risk assessment matrix (FSM 2523.1 – Exhibit 02). The 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 by the BAER Assessment. Critical values having a "Very High" or "High" risk rating include recommended emergency stabilization actions known to mitigate potential threats or minimize expected damage, which are described below. "Intermediate" risk areas were identified and discussed with the recommended treatment consisting of coordination with local, state, and other federal cooperators. Additionally critical warning signs are recommended in some areas with an intermediate risk. No treatments were identified for values when the analysis resulted in a "low" or "very low" risk rating.

Table 5: Critical Value Matrix

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Life/ Property/ Resources	Critical Value	Threat to Value	Probability of Damage or Loss	Magnitude of Consequence	Rationale for Magnitude	Risk	Treatment Options Considered	Recommended Treatment
Life and Safety	SIOUXON TRAILHEAD, BIG HOLLOW TRAILHEAD, PARADISE HILLS TRAILHEAD #153, PARADISE RIDGE TRAILHEAD #124, LOWER SIOUXON TRAIL #130D, HORSESHOE RIDGE TRAIL #140, CHINOOK CREEK TRAIL #130A, WILDCAT TRAIL #156, OBSERVATION PEAK TRAILHEAD - - Loss of life or injury to humans	Hazard trees falling across parking lot	Very Likely	Major	Failure involves trees > 6" dbh, with direct impacts to designated recreation area with high concentrations of stationary use (humans in the parking lot)	Very High	*Site closure to ensure public safety; *Immediate hazard tree mitigation - identify and fell hazard trees- Non BAER implement hazard tree mitigation in Spring 2021 prior to site opening	*Site closure to ensure public safety; To effectively close need a gate put at 57 and 5701 road junction for most effectiveness. One of the most popular places on the forest. Non-BAER implement hazard tree mitigation in Spring 2021
Property - Other	SIOUXON TRAILHEAD, BIG HOLLOW TRAILHEAD, PARADISE HILLS TRAILHEAD #153, LOWER SIOUXON TRAIL #130D, -- Significant property damage	Hazard trees falling on signage	Very Likely	Major	Failure involves trees > 6" dbh, with direct impacts to designated recreation area with high concentrations of stationary use (vehicles parked at trailhead, fee tube, information board, site sign)	Very High	*Immediate hazard tree mitigation - identify and fell hazard trees *Replace signs after tree fall on them *Site closure to ensure public safety; implement hazard tree mitigation in Spring 2021 prior to site opening	*Site closure to ensure public safety; More cost efficient to replace signs. Non-BAER implement hazard tree mitigation in Spring 2021 prior to site opening

Life and Safety	SIOUXON TRAIL #130, BIG HOLLOW TRAIL #158, PARADISE HILLS TRAILHEAD #153, LOWER SIOUXON TRAIL #130D, HORSESHOE RIDGE TRAIL #140, CHINOOK CREEK TRAIL #130A, WILDCAT TRAIL #156, HUFFMAN PEAK TRAIL #129, DRY CREEK TRAIL #194 , OBSERVATION/OBSERVATION PEAK TRAILS #132/132A, TRAPPER CREEK TRAIL #192, RIM TRAIL #202, #198 , BIG SLIDE TRAIL #195 - Loss of life or injury to humans	Hazard trees falling across trail	Very Likely	Major	Failure involves trees > 6" dbh, with direct impacts to designated recreation area with high concentrations of stationary use (humans/stock animals along trail)	Very High	*Close trail to ensure public safety.	*Close trail to ensure public safety. Gate at 5701 should be effective. Non-BAER Clear as part of routine maintenance in Spring /Summer 2021
Property - Trails	SIOUXON TRAIL #130, BIG HOLLOW TRAIL #158, CHINOOK CREEK TRAIL #130A, WILDCAT TRAIL #156, DRY CREEK TRAIL #, OBSERVATION/OBSERVATION PEAK TRAILS #132/132A , TRAPPER CREEK TRAIL #192, RIM TRAIL #202, #198 - Damage to trail prism on SBS H and M and steep locations	Water and erosion	Likely	Moderate	moderate property damage (loss of trail tread)	High	*Install appropriate size/type of drainage structure to adequately accommodate increased storm runoff *Close trail to ensure public safety. Assess trail conditions in Spring/Summer 2020	*Install appropriate size/type of drainage structure to adequately accommodate increased storm runoff *Close trail to ensure public safety.
Life and Safety	All Trails within and nearby burn in SBS Low	Hazard Tree falling across trail	Likely	Major	Failure involves trees > 6" dbh, with direct impacts to designated recreation area	Very High	*Immediate hazard tree mitigation - identify and fell hazard trees *Site closure to ensure public safety; implement hazard tree mitigation. *Hazard tree mitigation in Spring 2021 prior to site opening	Close portions of trail that easily connect to locations with SBS H an M.

Property - Trails	SIOUXON TRAIL #130- Damage to trail bridges	burnt dead trees falling on bridge	Likely	Moderate	Potential loss of 4 bridges from >20" diameter trees	High	*Fell hazard trees around bridges. * Remove Bridges. *Repair bridge after falling trees damage	*Fell hazard trees around bridges.
Cultural Resources	Historic and cultural sites within fire perimeter	Vandalism to cultural sites	Likely	Major	Ethnographic information show there is known locations within fire perimeter. If fire burned over sites and now are visible by trails vandalism is possible	Very High	Current locations are unknown due to fire accessibility. keep trails closed until evaluated. If sites found. Evaluated treatment action: signage, slashing, etc.	Recommend to close trails for safety as well as to protect cultural resources until evaluated.
Natural Resources - T&E habitat	Lower Columbia Steelhead big hollow and dry creek	Loss of soils that reduces vegetation recovery and increases sediment inputs into perennial waters with Endangered Species.	Likely	Minor	Potential to effect individuals but not entire ESU	Low		No BAER Treatment - However storm inspection and response will benefit
	Trapper Creek Rec Residences	Flooding and Debris Flow						Not a BAER Critical Value. Coordinate and share flood and debris flow assessments with owners.
Property - Roads	FSR 6800, 5800, 6406, 5401	Road Failure or Diversion at stream crossings and drainage culverts along	Likely	Major	Moderate: If road failure or diversion occurred at high risk stream crossings, the loss of property would be	High	Strom Inspection and Response (RT2), Install appropriate size/type of drainage structure to adequately accommodate increased	Strom Inspection and Response (RT2)

		FSR below M and High SBS could cause substantial property damage			considered moderate. Others would require cleaning		storm runoff, remove culverts.	
Natural Resources - Native Plants	Native and naturalized plant communities (Trail 132 - Sister Rocks RNA and then through Trapper Creek Wilderness, 195, 198, 192, 209, and 133, Forest Road 5701, near the junction of trails 130 and 130D, in the Siouxon Creek, Road 58, where it borders Sister Rocks RNA)	EDRR Herb-Robert, yellow archangel, vochin knapweed noxious weeds at high risk of expansion and impact to native communities	Likely	Major	Major: Aggressive invasive weeds. If established are likely to cause major disruption of native plant communities. degradation of Wilderness and RNA character/values	Very High	In key locations along trails and roads with H to M near or in the wilderness or along patch leading to wilderness, Early Detection Rapid Response, Manual removal if found, seed, monitor over time,	EDRR, manual removal, seed due to nature and location of noxious weed
Natural Resources - Native Plants	Native and naturalized plant communities (equipment staged outside of fire area, and dozer lines in within the fire)	Spread of invasive plants into native habitats from post- fire conditions. Used by heavy equipment during fire suppression.	Possible	Minor	Very few locations of heavy equipment staged outside fire area. No dozer lines were used on fire.	Low		
Resources - Hydraulic Function	Loss of hydrologic function in high to moderate soil burn severity.	loss of hydraulic function in h to m SBS	Very Likely	Minor	Low magnitude	Low		
Resources - Soil Productivity	Loss of soil productivity in high to moderate soil burn severity.	Loss of soil productivity in high to moderate soil burn severity.	Likely	Moderate	Moderate change of loss of soil in m and h SBS	High	mulch, seed, no treatment because of terrain	No Treatment; Terrain

B. Emergency Treatment Objectives:

The primary objective of this Burned Area Emergency Response Report is to recommend prompt actions deemed reasonable and necessary to effectively protect, reduce or minimize significant threats to human life and safety, property, and unacceptable degradation to natural resources and cultural resources. The application of these BAER treatments are expected to minimize on-site and downstream damages to the identified critical values previously mentioned. The emergency treatments being recommended by the Big Hollow Fire BAER Team are specifically designed to achieve the following Results:

Proposed Land Treatments:

1. Promote and protect native and naturalized vegetative plant communities by reducing the spread of noxious weeds (l1a – Early Detection and Emergency Response (EDRR) – Burned Area)
2.

Proposed Channel Treatments:
There are no proposed channel treatments.

Proposed Road and Trail Treatments:

1. Protect road and trail investments from becoming damaged due to increased post-fire runoff (Trail Stabilization and Trailhead protection - Trails: Siouxon #130, Big Hollow #158, Paradise Hills Trail #153, Paradise Ridge Trail, Lower Siouxon #130D, Horseshoe Ridge Trail #140, Chinook Creek Trail #130A, Wildcat Trail #156, Huffman Peak Trail #129, Dry Creek Trail #194, Observation Peak Trails #132/132A, Trapper Creek Trail #192, Rim Trail #202, Sunshine Trail #198, Big Slide Trail #195) (RT2 – Storm Inspection and Response).
2. Reduce sedimentation into streams degrading water quality (RT2 – Storm Inspection and Response).

Proposed Protective/Safety Treatments

1. Protect human life and safety by raising awareness through posting hazard warning signs at recreation sites, trailheads, trails (Trails: Siouxon #130, Big Hollow #158, Paradise Hills Trail #153, Paradise Ridge Trail, Lower Siouxon #130D, Horseshoe Ridge Trail #140, Chinook Creek Trail #130A, Wildcat Trail #156, Huffman Peak Trail #129, Dry Creek Trail #194, Observation Peak Trails #132/132A, Trapper Creek Trail #192, Rim Trail #202, Sunshine Trail #198, Big Slide Trail #195) and when entering burned area traveling road 6800, 5700, 5701, 5400 (P1a – Road Hazard Signs, P1b – Trail/Recreation Hazard signs).
2. Protect human life and safety by temporarily closing Road 5701 (needs a gate), and Road 6800 (gate present) and Siouxon Trail (P10 – other – Administrative Closure).

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 70% **Channel:** N/A **Roads/Trails:** 75% **Protection/Safety:** 80%

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	70	75	80
Channel	N/A	N/A	N/A
Roads/Trails	80	85	90
Protection/Safety	85	90	95

E. Cost of No-Action (Including Loss): Critical values identified in Section A would be damaged or lost. Cost of the no action is estimated to be $653,000

F. Cost of Selected Alternative (Including Loss): Total cost of the action alternative (including loss) is $138,000.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: J.D. Jones
Email: joshua.d.jones@usda.gov **Phone(s)** 541-219-0782

Forest BAER Coordinator: same as team leader
Email: **Phone(s):**

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

Skill	Team Member Name
Team Lead(s)	J.D. Jones
Soils	Aldo Aguilar
Hydrology	Mike McConnel, Diane Hopster
Engineering	Hailu Gabriel and Rithy Bein (t)
GIS	Kim Viera, Dino Borghi
Archaeology	Matthew Mawhirter
Weeds	Andrea Montgomery (t)
Recreation	Andrea Durham (t), Lauren Marsh (t)
Fish	Greg Robertson (t)
PIO	Gala Miller (t)

H. Treatment Narrative:

Land Treatments:

L1 - Invasive Weed Detection and Treatment: Invasive plant detection and treatment will occur within Trapper Creek Wilderness and Sister Rocks RNA, with focus on trails with known occurrences of invasive species, and along moderately-high intensity burned key road segments, including FSR 58, from the junction with the 64 road, south to beyond where it borders the RNA, along primary travel routes including FSR 64, 57, and associated spurs roads. Non-native, invasive plants are known to occur in this area, and EDRR will be necessary to prevent dispersal and spread into newly burned 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. Key species that will targeted for survey and control, such as herb-robert (*Geranium robertianum*), knapweeds (*Centaurea* spp.), and yellow archangel (*Lamiastrum galeobdolon*), are able to survive, establish and spread even in moderately burned areas. These species are all EDRR species on the south zone of the Gifford Pinchot National Forest, and Washington State Noxious Weed Ranks of A, which requires treatment by law (*Centaurea nigrescens*) and B (*Geranium robertianum*, *Centaurea stoebe* ssp *micranthos*, and *Lamiastrum galeobdolon*) considered a State priority for treatment in areas where the species are not widespread). 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. No treatments for suppression as there were no dozers used.

Locations: 1) Forest Roads 64, 58, 57 and spurs through SBS M and H; 2) Sister Rocks RNA and Trapper Creek Wilderness through SBS M and H; 3) trails passing through areas of moderate to high burn severity, including Big Hollow Trail 158, and trails 130 and 130D near the trailhead on FSR 5701, adjacent to the known occurrence of yellow archangel. In total 20 acres will need treatment.

Cost for EDRR Treatment:
Skamania County Noxious Weed Control Program – seasonal crew (~ 7 workers), for one 10-hour day, 2X/year, for the purpose of herbicide treatment of knapweed and yellow archangel
($1200.00/day) x 2 days $2400
Skamania County Noxious Weed Control Program – seasonal crew (~ 7 workers) for an additional two, 10-hr. days once/year, for the purpose of detection and treatment of invasive species along major travel corridors within moderate-high severity burn areas $2400
Forest Service Salary for detection surveys along trails with high likelihood to serve as vectors of spread; field coordination of all treatments; herbicide use oversight/tracking; and manual pulling in Wilderness
GS7 (193.35/day) x 15 days $ 2900.25
GS7 (193.35/day) x 10 days $ 1933.50
GS11 (465.47/day) x 1 days $ 465.47
Total request: **$10,099.22**

Table 8. Recommended treatment for invasive plant EDRR

Treatment	Units	Unit Cost	# of Units	Total Cost
Invasive Plant Surveys/detection	Acres	$19.87	327 acres	$6499.22
Invasive Plant treatments	Acres	$180.00	20 acres	$3,600
			Total	$10,099.22

L2. Invasive – Native Seeding – Is recommended in places where (1) invasive species are known to occur along major travelways, and where moderate-high severity burn has opened up extensive habitat subject to quick colonization and spread of invasive species (see species above). Using a combination of native seeding of quick-growing native grasses *in combination with* EDRR weed treatment is the most cost effective and effiecient to prevent extensive establishment of new and expanded invasives plant populations in the short term; (2) in three locations where moderate-high severity burns occurred in the headwaters of streams hosting populations of Forester Sensitive and Northwest Forest Plan Survey and Manage Category A species *Corydalis aquae-gelidae*, including Bourbon Creek, Big Hollow Creek, and Siouxon Creek. Application of native seed over ~ 2 acres per headwaters site will help stabilize soils, resulting in less erosion, sediment carriage, and deposition downstream. Minimizing sediment deposition and volatility of flows is important for *Corydalis* because the species is an aquatic system obligate, growing at the margins of streams, and is most often found high up in stream systems where volatility of flow and depth of deposition is low, and the species is therefore able to persist in the highly dynamic streamside zone. Maintaining *Corydalis* populations in headwater areas is particularly important because these populations act as a seed source to all downstream areas. The headwaters of Bourbon Creek is within Trapper Creek Wilderness, and maintaining *Corydalis* in the headwaters of this stream is important to maintaining this element of biodiversity, which is a wilderness value. Maintaining habitat within the headwaters of Big Hollow and Siouxon Creeks is similarly important to downstream areas that are largely within Late Successional Reserve.

A specific type of native seed is necessary for rapid establishment and ease of production and application. The native seed Rx consists of a mix of *Elymus glaucus* (blue wildrye), *Bromus carinatus* (mountain brome), and *Deschampsia elongata* These species are considered "workhorse species" for re-vegetation because of their ability to rapidily establish, ease of production and application.

Focal area for re-vegetation/application of seed of 32.7 acres.
Application by hand; GS-7, 20 days of work at 193.35, total cost $3867.00

Average cost of native seed = 12.00/lb - Application rate = 30 lbs/acre Seed cost: $13,932

Table 9. Recommended treatment for invasive plants and maintaining Corydalis aquae-gelidae - native seeding

Item	Units	Unit Cost	# of Units	Acres	Total Cost
GS-7 Technician	Days	$193.35	20 days	32.7	$3,867
Seed Cost	lb	$12.00	Application rate: 30 lbs/acre	32.7	$13,932
				Total	$17,799

Channel Treatments: None proposed.

Roads and Trail Treatments:

RT2 – Storm Inspection and Response:
Immediately upon receiving heavy rain and spring snowmelt the FS will send out patrols to identify roads that may be in impacted by high flows, and debris. Observations of rocks and sediment plugged culverts are identified and corrected before they worsen or jeopardize motor vehicle users and/or road tread. The road patrol personnel bring heavy equipment necessary to mechanically remove any obstructions from the roads and culvert inlets and catch basins where necessary. All excess material and debris removed from the drainage system shall adhere to the sidecasting as reviewed by the archeologist and hydrologist.

Roads within the Big Hollow Fire contain drainage structures that cross streams located in watersheds having areas of high to moderate soil burn severity. These flood source areas have a greater potential for increased runoff and debris flows. These increases in flows pose a threat to the existing crossings which may result in plugging culverts or exceeding their maximum flow capacity. If these flows plug drainage structures the result could be unacceptable erosion and debris torrents further down the drainage from the failure of the fill slope of the road.

Engineering, Recreation, and District personnel will survey the roads within the fire perimeter after high-intensity winter storms in 2020 before they are snowed out of the area and spring 2021 runoff. Survey will inspect road, surface condition, ditch erosion, and culverts/inlet basins for capacity to accommodate runoff flows. Storm inspection/response will keep culvert and drainage features and functions 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 general labor. This request also includes felling danger trees along the portion of road to be worked on to mitigate safety concerns. Total request is for $11,100.

Locations:
Check locations on 9 miles of road where SBS was H and/or M above FSR - 6800000, 5800000, 5700001, 6406000, 5401000.

It is expected that storm patrol will be needed an estimated 10 days from fall 2020 to spring 2021 to inspect 9 miles of road SBS H to M in steep terrain.

Table 10. Recommended treatment cost for storm inspection and response.

Item	Unit	Unit Cost	# of Units	Cost
Hydrologist/Engineer Inspection/patrol	Days	$600	10	$6,000
Road Crew Mobilization/ Demobilization/rental equipment Response	Days	$1,700	3	$5,100
		Total Storm Inspection and Response Cost		$11,100

RT13 - Trail Stabilization/drainage – Work is limited to portions of trails impacted by high and moderate SBS and have a high risk of loss from erosion from being built on steep slopes. Work will include installing drainage (rolling grade dips, grade reversals, nicks) water bars and snagging trees as appropriate for worker safety. This work is necessary to protect the trail assets by diverting anticipated increase in surface runoff off the trail. This request also includes felling danger trees along the portion of trail to be worked on to mitigate safety concerns. 5.2 miles of trail are on steep slopes in SBS High and Moderate within the fire. Total request is for $20,800.

Table 11. Recommended treatment for trail stabilization

Trail Name & #	Units	Unit Cost	# of Units	Total Cost
Sections of trail on SBS M and H on steep hill slope: Siouxon #130, Big Hollow #158, Paradise Hills Trail #153, Paradise Ridge Trail, Lower Siouxon #130D, Horseshoe Ridge Trail #140, Chinook Creek Trail #130A, Wildcat Trail #156, Huffman Peak Trail #129, Dry Creek Trail #194, Observation Peak Trails #132/132A, Trapper Creek Trail #192, Rim Trail #202, Sunshine Trail #198, Big Slide Trail #195	Miles	4,000	5.2	$20,800

RT14 Infrastructure protection - Remove trees expected to fall on trail bridges. This will ensure we will not need to replace the bridge after a large >20" diameter tree falls on the bridge. It is also a more economical decision than removing the bridge entirely. Total request is for $3,250.

Table 12. Recommended treatment for infrastructure protection.

Treatment	Units	Unit Cost	# of Units	Total Cost
Tree Removal Locations	Each	$650	5	$3,250

Protection/Safety Treatments:

This treatment will design and install burned area warning signs 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. The warning signs will identify the types of hazards to watch for roads, and trails. This treatment will place closure signs, hazard warning signs and information signs at developed campgrounds, key entry points or trail junctions, and numerous 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 with Forest Engineering Standards at these locations. A Forest Service employee will inspect the signs for visibility, damage, or loss and replace as needed. A Forest Service employee shall also monitor the closure to make sure it is effective, and see if any deficiencies in the closure need to be corrected. 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.

P1 - Road Hazard Signs: Signs will inform users of the dangers associated with entering and recreating within the burned area. Total request is for $1,200

Warning Sign Location: Road 5700, Road 5400, and Road 5800

Table 13. Recommended road hazard signs

Treatment	Units	Unit Cost	# of Units	Total Cost
P1 - Installation of warning sign 30x48	Sign/Post	$400	3	$1,200

P1b- Trail Hazard Signs: In addition to the initial installation, there will be a need to monitor and reinstall signage as it becomes worn or is otherwise damaged. Cost includes supplies and labor to install. Total request is for $2,250

Locations: 1) Siouxon Trail and Trailhead (3 total), Observation Peak Trail and Trailhead, Big Hollow Trailhead, Soda Peaks Trail, Dry Creek Trail, and Paradise Trail.

Table 14. Recommended treatment for trail hazard signs.

Treatment	Units	Unit Cost	# of Units	Total Cost
Trail Hazard Signs	Sign/Post	$250	9	$2,250

P2 - Temporary Closure of Access Roads with Gate: Closure of road 5701 to Siouxon Trail Head by gate. Siouxon Trail is one of the most popular visited locations on the forest and will need a physical barrier to keep people from entering the area. We would be placing the gate about 2 miles from trailhead to prevent people from going into the hazardous zone of the fire. Total request is for $8,000

Location: Junction of 57 and 5701

Table 15. Recommended treatment closure with gate.

Treatment	Units	Unit Cost	# of Units	Total Cost
Temporary Closure Access Roads	Each	$8,000	1	$8,000

I. Monitoring Narrative:

No BAER funding needed for monitoring.

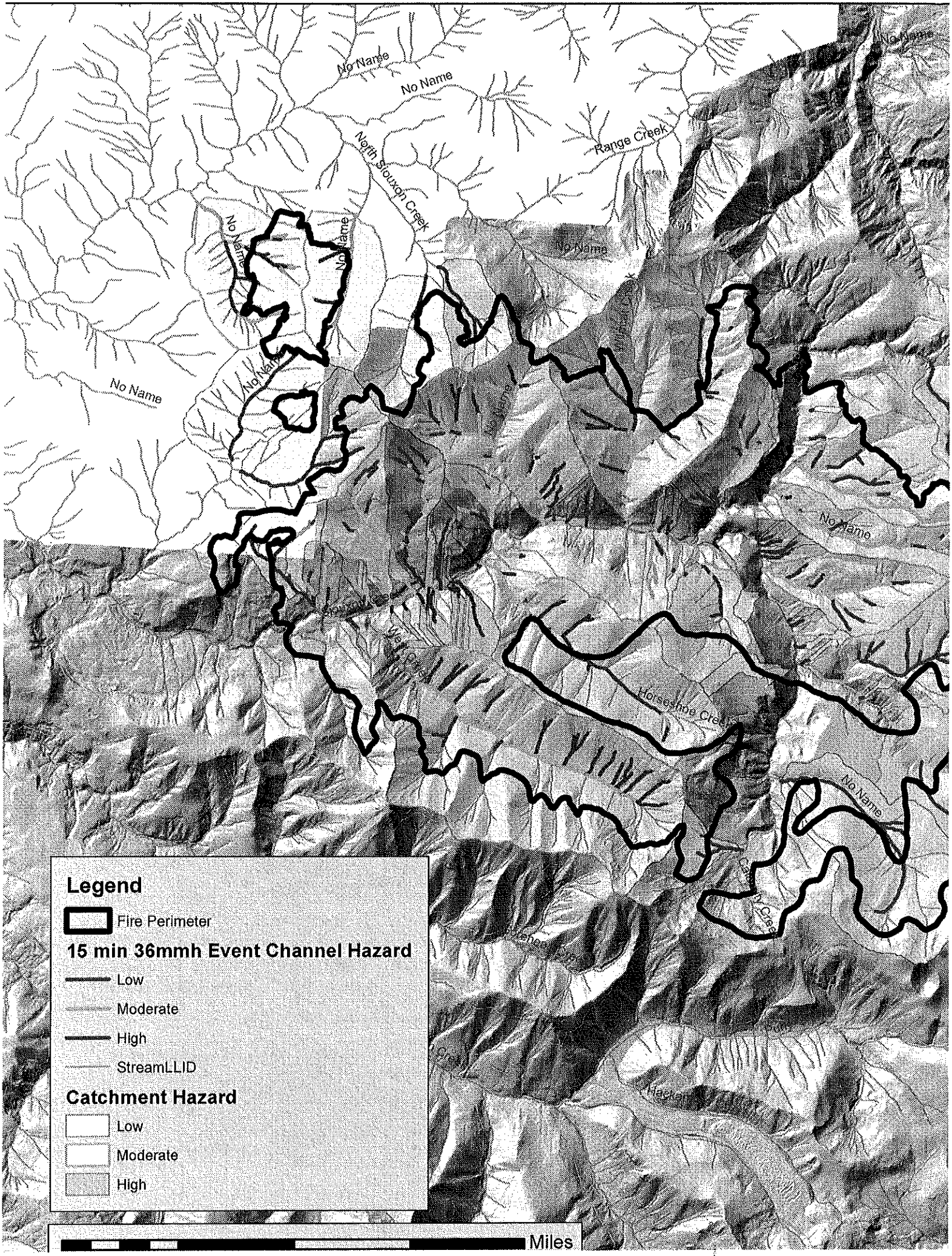
PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
L1a. Invasives EDRR	Acre	32	347	$10,996	$0		$0		$0	$10,996
L2. Invasives - Native Seeding	Acre	544	32.71	$17,799	$0		$0		$0	$17,799
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$28,795	$0		$0		$0	$28,795
B. Channel Treatments										
No Treatments Recommended				$0	$0		$0		$0	$0
				$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										
RT2 - Storm Inspection	Days	600	10	$6,000	$0		$0		$0	$6,000
RT2- Storm Response	Days	1,700	3	$5,100						$5,100
RT13 - Trail Stabilization/drainage	Miles	4,000	5	$20,800	$0		$0		$0	$20,800
RT14 - Infrastructure Protection	Each	650	5	$3,250	$0		$0		$0	$3,250
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$35,150	$0		$0		$0	$35,150
D. Protection/Safety										
P1 - Road Hazard Signs	sign/post	400	3	$1,200	$0		$0		$0	$1,200
P1b - Trail Hazard Signs	sign/post	250	9	$2,250	$0		$0		$0	$2,250
P2 - Closure with gate	each	8,000	1	$8,000	$0		$0		$0	$8,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$11,450	$0		$0		$0	$11,450
E. BAER Evaluation										
Initial Assessment	Report			---	**$30,742.00**		$0		$0	$30,742
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$0	$30,742		$0		$0	$30,742
F. Monitoring										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$75,395	$30,742		**$0**		**$0**	**$106,137**
Previously approved										

PART VII - APPROVALS

Eric H. Black
Forest Supervisor

10/16/2020
Date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North Siouxon Creek
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Horseshoe Cre
No Name
Legend
Fire Perimeter
15 min 36mmh Event Channel Hazard
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Catchment Hazard
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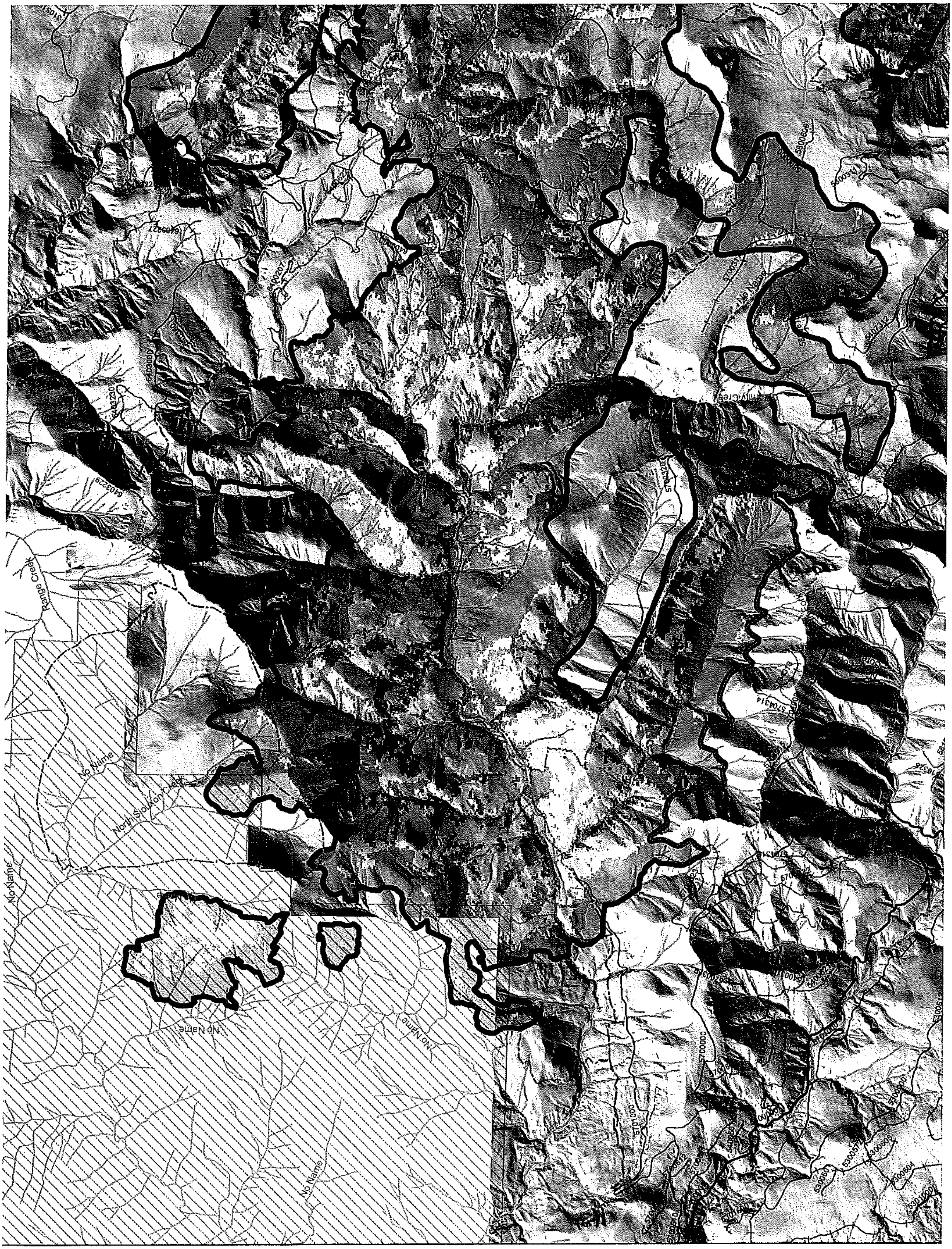
Range Creek
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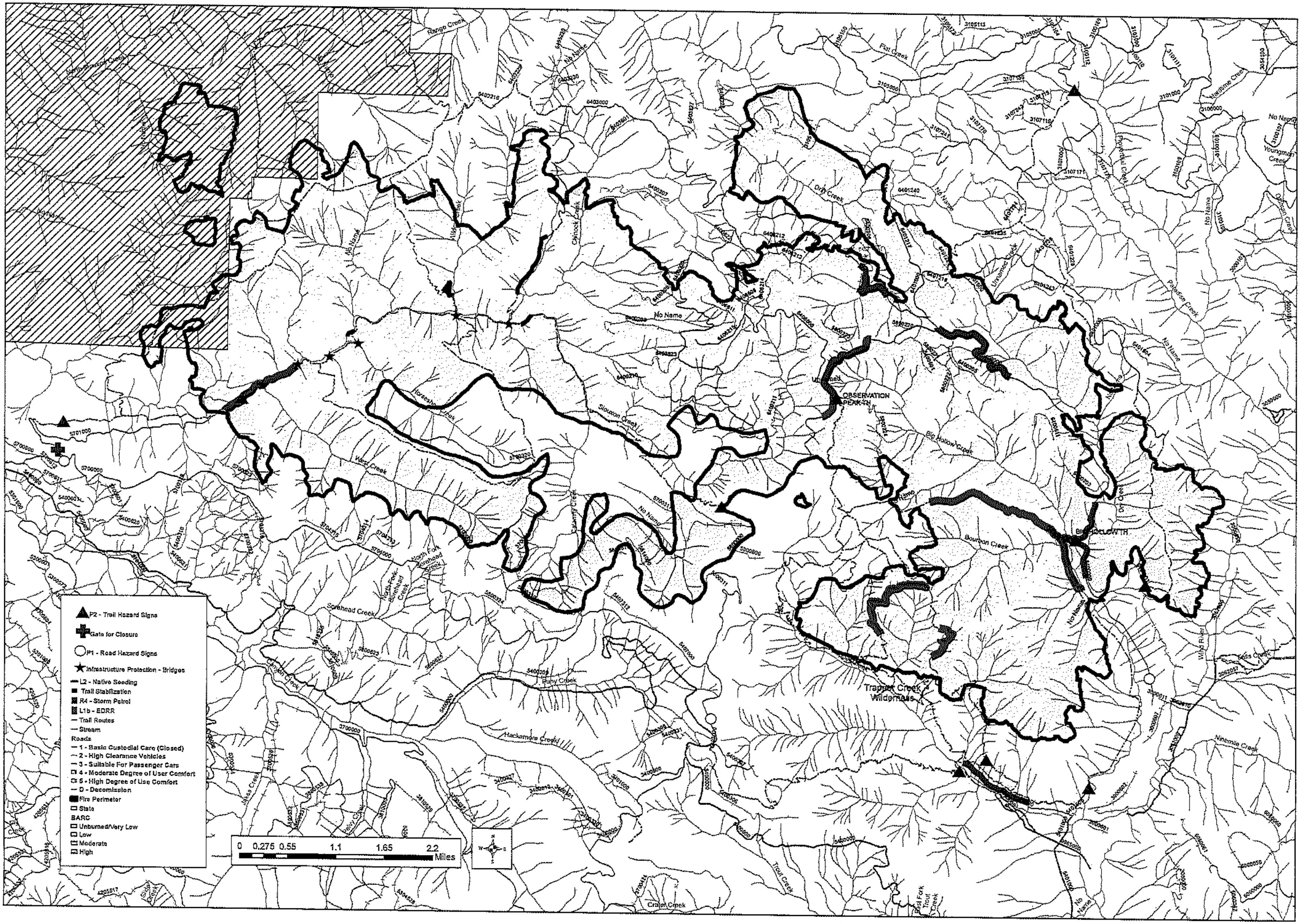
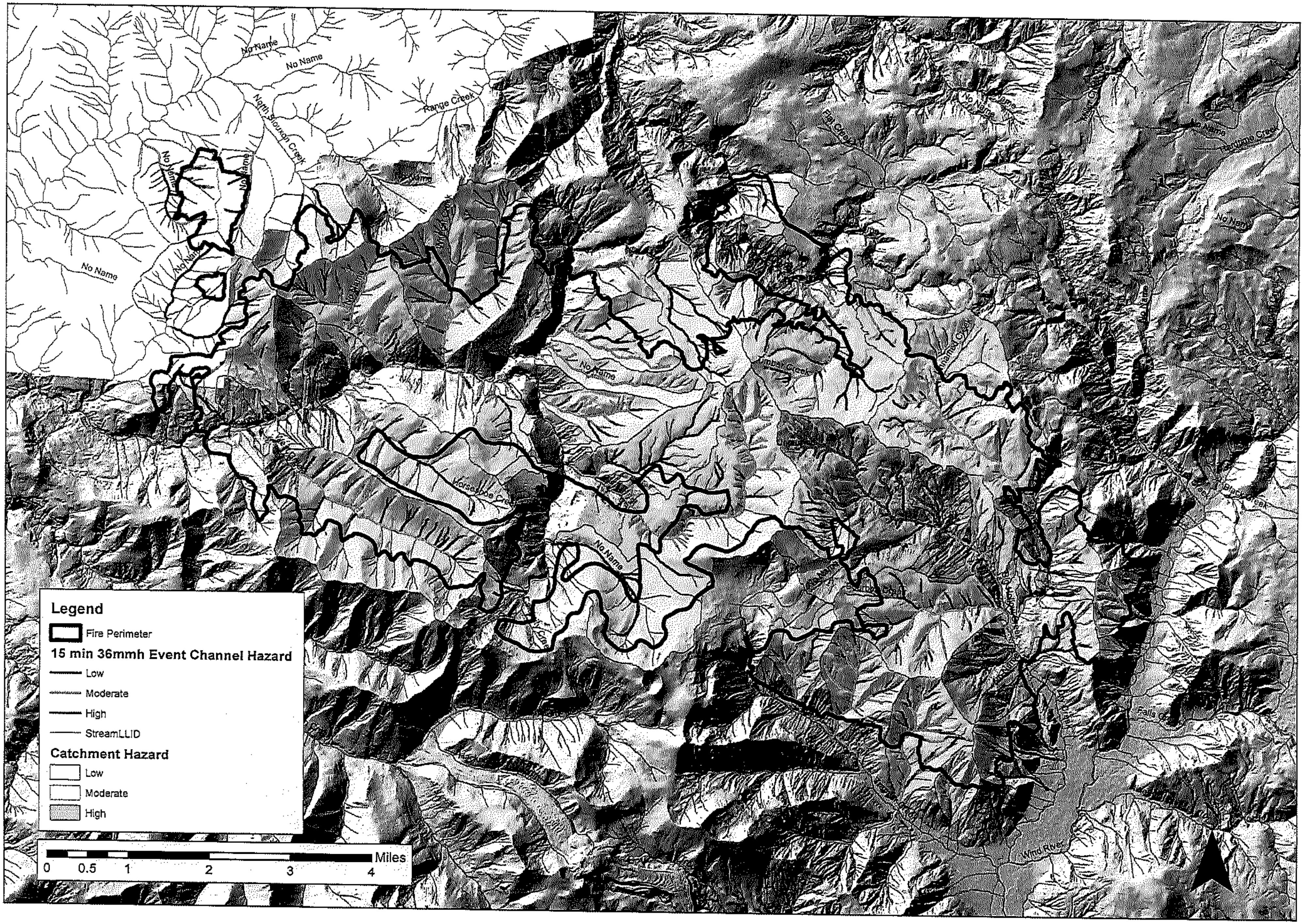

P2 - Trail Hazard Signs
Gate for Closure
P1 - Road Hazard Signs
Infrastructure Protection - Bridges
L2 - Native Seeding
Trail Stabilization
R4 - Storm Patrol
L1b - EDRR
Trail Routes
Stream
Roads
1 - Basic Custodial Care (Closed)
2 - High Clearance Vehicles
3 - Suitable For Passenger Cars
4 - Moderate Degree of User Comfort
5 - High Degree of Use Comfort
D - Decomission
Fire Perimeter
State
BARC
Unburned/Very Low
Low
Moderate
High
0 0.275 0.55 1.1 1.65 2.2
Miles
Trapper Creek Wilderness
OBSERVATION PEAK TH
Big Hollow Creek
Bourbon Creek
Hackamore Creek
Sorehead Creek
Siouxon Creek
West Creek
Wind River
Trout Creek
Flat Creek
Chinook Creek
Dry Creek
Crater Creek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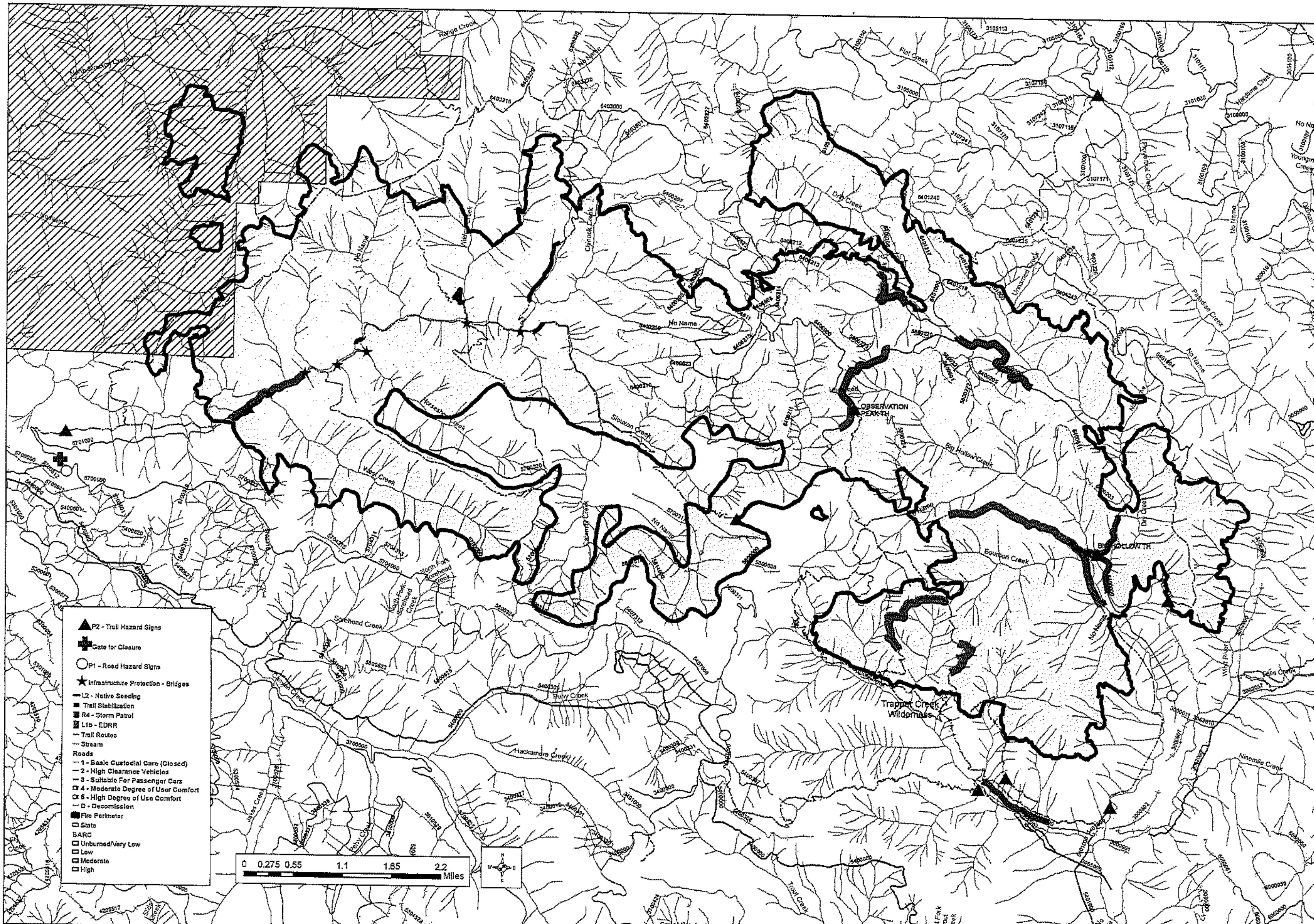
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Range Creek
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Ninemile Creek
Hackamore Creek
Trout Creek
East Fork Trout Creek
Crater Creek
Youngman Creek
Hardtime Creek
Panther Creek
Pete Gulch Creek
Wind River
Jakes Creek
Unnamed Creek
No Name