Date of Report: 7/25/2021

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

A. Type of Report

☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. No Treatment Recommendation

B. Type of Action

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

☐ 2. Interim Request #___
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Horton

B. Fire Number: AZASF-000613

C. State: AZ

D. County: Greenlee

E. Region: Region 3

F. Forest: Apache-Sitgreaves National Forests

G. District: Alpine RD

H. Fire Incident Job Code: P3N219

I. Date Fire Started: 6/19/2021

J. Date Fire Contained: 07/23/2021

K. Suppression Cost: 4M

L. Fire Suppression Damages Repaired with Suppression Funds (estimates): Click here to enter text.
1. **Fireline repaired (miles):** 10 miles
2. **Other (identify):** Click here to enter text.

M. Watershed Numbers:

Table 1: Acres Burned by Watershed (see soil burn severity map on Figure 1 located at the end of the report)

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
150601010111	Bear Creek-Black River	14,445	3,163	22%
150601010108	Lower Beaver Creek	16,811	4,151	25%
150601010110	Fish Creek	16,378	150	0.9%
150601010107	Upper Beaver Creek	23,893	4,715	20%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	12,180

OWNERSHIP	ACRES
OTHER FEDERAL (LIST AGENCY AND ACRES)	0
STATE	0
PRIVATE	0
TOTAL	12,180

O. Vegetation Types:

Vegetation Type	Acres	%
Aspen (Birch)	1,303	10.7%
Douglas-Fir and Mixed Conifer	4,182	34.3%
Engelmann Spruce and Subalpine Fir	353	2.9%
Ponderosa Pine	3,643	29.9%
White Fir	2,675	22.0%

P. Dominant Soils:

Dominant Soils (>10%)	Acres	%
Udic Haplustalfs	1,808	15%
Typic Glossudalfs	8,009	66%
Mollic Haplocryalfs	2,416	20%

Q. Geologic Types:

Geology	Acres	%
Basalt	10428	86%
Basalt and Cinders	1749	14%

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	5.6
INTERMITTENT	12.7
EPHEMERAL	25.9
OTHER (DEFINE)	0

S. **Transportation System:**
Trails: *National Forest (miles):* .72 *Other (miles):*
Roads: *National Forest (miles):* 12.6 *Other (miles):*

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	1531				1531	12
Low	6317				6317	52
Moderate	4317				4317	35
High	91				91	1
Total						

B. Water-Repellent Soil (acres): 91ac

C. Soil Erosion Hazard Rating: severe 9,379ac., moderate 6,877ac., slight 4,034ac.

D. Erosion Potential: erosion modeling not completed **Sediment Potential:** erosion modeling not completed

F. Estimated Vegetative Recovery Period (years): 2-5 years

G. Estimated Hydrologic Response (brief description): Increased magnitude of peak flows. Increased flood frequency and duration due to relatively large areas of moderate soil burn severity (SBS) and steep erosive slopes. Damaging storms have already occurred which impacted FR26 and continued onto private inholding just downstream on Horton Creek.

Hydrologic Modeling

Pre and Post-fire hydrologic modeling was performed on two watersheds above the 26 road/culvert crossing at Horton Creek and at Willow Creek (Exhibit A). Wildcat was determined to be the most appropriate method to use for the model. The 1 hour, 25 year event was used as the storm frequency, magnatude and duraton parameters for the modeling as derived from the NOAA 14 table generated at the upper reaches of the drainage modeled (https://hdsc.nws.noaa.gov/hdsc/pfds/index.html). Curve Numbers (CN) used in the modeling were generated from GIS information including vegetation type and hydrologic soils group. The USGS StreamsStats program (https://streamstats.usgs.gov/ss/) was used to obtain basin characterics parameters as well as watershed delineation. Pre-fire peak discharge was also calculated using both StreamStats regresion equations and Wildcat CN based model for comparison purposes. Both were found to be within the same order of magnitude for the design storm (1hr 25year storm of 2.4 in/hr). Wildcat results are are presented below.

VAR Pour Point	Total Acres Modeled	Soil Burn Severity	SBS Acres	Pre-Fire (CFS)	Post Fire (CFS)	% Change/ Increase
Horton Ck. at FR26	2865	Unburned/Very Low	364	**412**	**850**	**106**
		Low	1,249			
		Moderate	1,213			
		High	18			
Total Acres in Burn Horton Ck. →			**2,844**			
Willow Ck. At FR26	3207	Unburned/Very Low	337	**352**	**532**	**51**
		Low	922			
		Moderate	502			
		High	23			
Total Acres in Burn Willow Ck. →			**1,784**			

It is important to note that the pre and post values (cubic feet per second) are not precise predictions and are only an "order of magnitude" estimate, rather it is the percent change from pre-fire conditions that is significant.

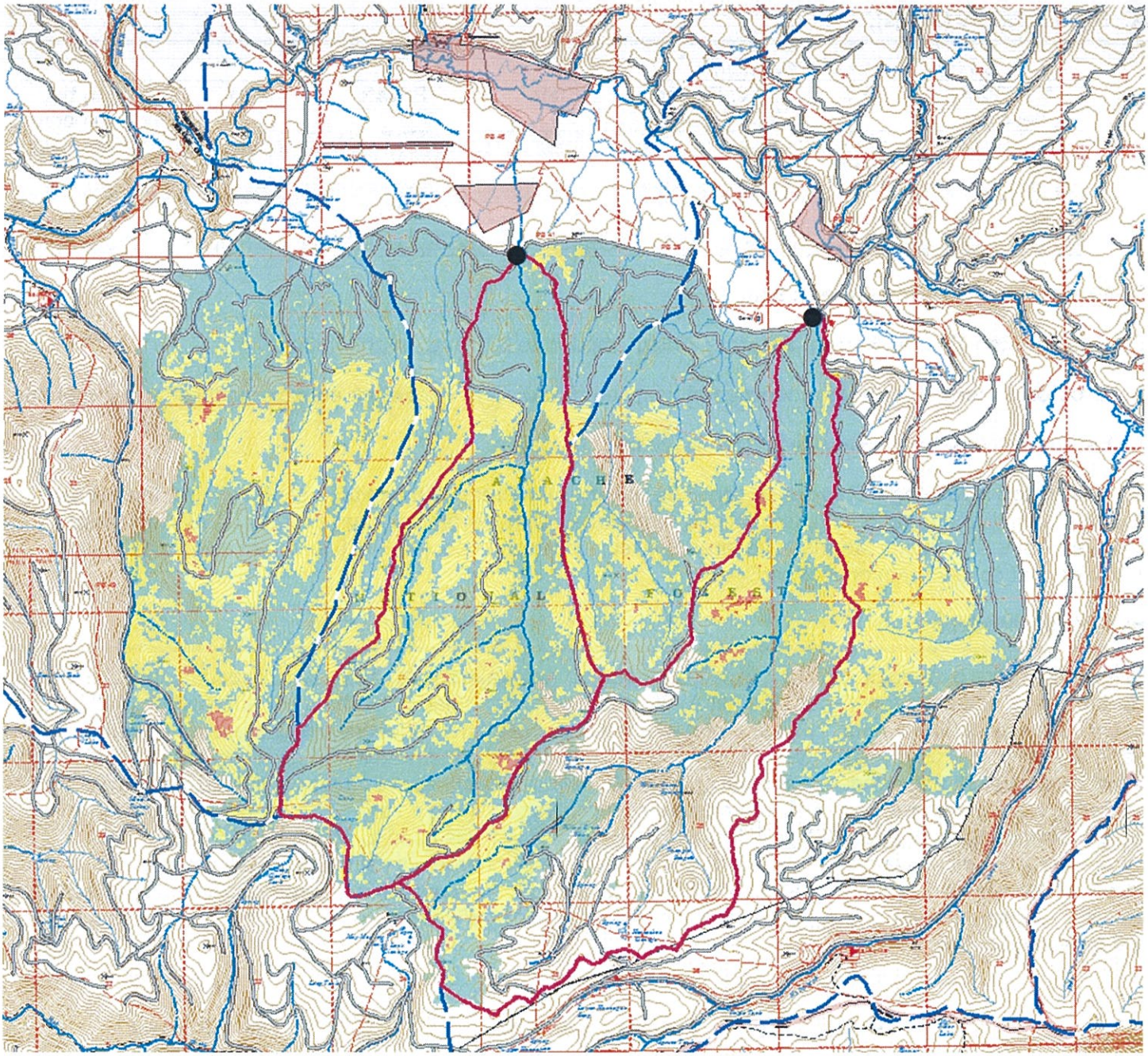


Exhibit A. Burn Severity in the Modeled drainages Horton Ck. (left magenta outline) and Willow Ck. (right magenta outline) above FR 26 crossing. Red = high severity, yellow = Moderate, lt. green = low, dark green = unburned, other is outside the fire perimeter and modeled as unburned. Modeled Pour Points are represented by black dots. North is up and sections are standard for scale.

It is important to note that the Horton Fire was a re-burn within the 2011 Wallow Fire that burned with much high soil burn severity (SBS). As a note, the northern boundary between moderate (yellow) SBS and low (teal) SBS coincides with the post Wallow Fire treatment areas (mostly mulch and some seeding) and High SBS. In fact, most of the moderate coincides with the Wallow Fire High SBS/post fire treatments.

Minor road damage has already occurred from a monsoonal storm that is much like the design storm used in this model. That flood event was filmed by property owners due North of the Horton Ck./FR 26 crossing and caused no reported damage. Larger events are possible before watershed recovery and private owners are being advised to seek consultation and help through a NRCS program.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Horton Fire was a reburn of the 2011 Wallow Fire, much of which was treated with seeding and some mulched. A proportionally large portion (35%) of the fire was characterized as being having moderate soil burn severity. Whereas, a very small percentage, approximately one-percent, was identified as high soil burn severity. Overall, reported peakflow increases were moderate (~ 50 and 100%) on the two modeled catchements.

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

Table 5: Critical Value Matrix

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

1. **Human Life and Safety (HLS):**
   a. Forest Service roads (FR) 26, 8762, 8759, 574 were all rated at 'high' to 'very high' risk based on 'major' magnitude of risk for potential flooding and washout incidents at road crossings. There are also private inholdings along affected streams including Horton and Beaver Creeks where the magnitude of consequence is 'major' and the probability of damage or loss unlikely for a 'intermediate' risk. Some flooding has occurred along Horton Creek.
2. **Property (P):**Forest Service roads 26, 8762, 8759, 574 are all at 'high' risk based on the major magnitude of risk of damage to the road prisms from potential flooding and washout incidents. An aquatic organism passage (AOP) is located just downstream of the burned scar on Beaver Creek, however given the design and freeboard no negative impacts are expected therefore ranked out as 'low' risk. As noted previously private inholdings are located along flood prone streams. Some of the recent heavy precipitation events have flushed a considerable amount of post-Wallow Fire woody debris therefore it is suspected reductions in the bulking effect to stream flows.
3. **Natural Resources (NR):** Roundtail Chub occupied habitat is located along an affected portion of Beaver Creek. This year a federal judge ordered the U.S. Fish and Wildlife Service (FWS) move forward with evaluating the status of a rare river fish in New Mexico and Arizona and potentially list it for federal protections under the Endangered Species Act. Potential post-fire effects and resulting impacts to the candidate species and associated habitat are: short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows, modifications to water quality due to sediment and ash, modification of streamside vegetation and stream bank conditions, loss of population due to ash flow. The magnitude of consequence for the occupied habitat is rated 'minor' with a probability of damage or loss 'likely' giving an overall risk of 'low'. There are no other wildlife, aquatics or other natural resource BAER VARs at unacceptable risk.
4. **Cultural and Heritage Resources:**See Wallow Fire Heritage BAER Report (2011). There are no cultural and heritage resources BAER VARs threatened within/by the burned area.

B. Emergency Treatment Objectives:

Provide public users of the Forest Service roads with warning opportunities to avoid dangerous driving situations with the modification of Wallow Fire previously installed signs along FR 26. Prevent further deterioration and maintain safe ingress and egress of Forest Service roads, especially FR26, through storm patrol and response actions to stabilize problem areas.

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

Land NA **Channel** NA

Roads/Trails Damaging storms have occurred in the area, however given the strength of the mosoon season further risks to forest service road prisms.

Protection/Safety Damaging storms have occurred in the area, however given the strength of the mosoon season further risks to the public from motorized travel is certain.

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land			
Channel			
Roads/Trails	90%	95%	100%
Protection/Safety	100%	100%	100%

E. Cost of No-Action (Including Loss): $150,000- The replacement cost for a mile of a maintenance level 2 road.

F. Cost of Selected Alternative (Including Loss): $23,000 for road inspection and response and sign modification.

H. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Paul Brown
Email:paul.a.brown@usda.gov **Phone(s)(928) 333-6308**

Forest BAER Coordinator: Paul Brown
Email:paul.a.brown@usda.gov **Phone(s):(928)-333-6308**

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

Skill	**Team Member Name**
Team Lead(s)	Paul Brown
Soils	Kristi Meier, Dan Bone
Hydrology	John Rihs
Engineering	Chris Miller
GIS	
Archaeology	
Weeds	
Recreation	
Other	

H. Treatment Narrative:Land Treatments: No seeding or mulching treatments were recommended on the upper slopes of the Horton Fire because the resulting soil burn severity was mostly moderate soil burn with no high soil burn severities reported. Although, the runoff response has and will continue to be exacerbated by the loss of live vegetation, there was ample residual groundcover present to dissipate runoff as effectively as a land treatment would provide. FR26 is a popular route for NF visitors and used by grazing permitees to access an active allotment. Therefore, inspection of these roads following significant precipitation events and maintaining them to be passable if impacted is warranted.

Roads and Trail Treatments: (see Figure 2) $1,500 for each storm inspection and response x 15 responses = $22,500

Protection/Safety Treatments: (see Figure 2) Road sign modification (use of stickers on existing signs): $500

I. Monitoring Narrative:

Not requested

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

			NFS Lands				Other Lands				All
		Unit	# of		Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$		units	$	Units	$	$
A. Land Treatments											
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Land Treatments				$0	$0			$0		$0	$0
B. Channel Treatments											
				$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											
Storm Patrol and Response	event	1,500	15	$22,500	$0			$0		$0	$22,500
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Road and Trails				$22,500	$0			$0		$0	$22,500
D. Protection/Safety											
Modification of Existing Sign	each	500	1	$500	$0			$0		$0	$500
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Protection/Safety				$500	$0			$0		$0	$500
E. BAER Evaluation											
Initial Assessment	Report	$4,684	1	---	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				---	$0			$0		$0	$0
Subtotal Evaluation				$0	$0			$0		$0	$0
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				$23,000	$0			**$0**		**$0**	**$23,000**
Previously approved											
Total for this request				**$23,000**							

PART VII - APPROVALS

1. Forest Supervisor _____ Date: 7/28/2021

Figure 1.

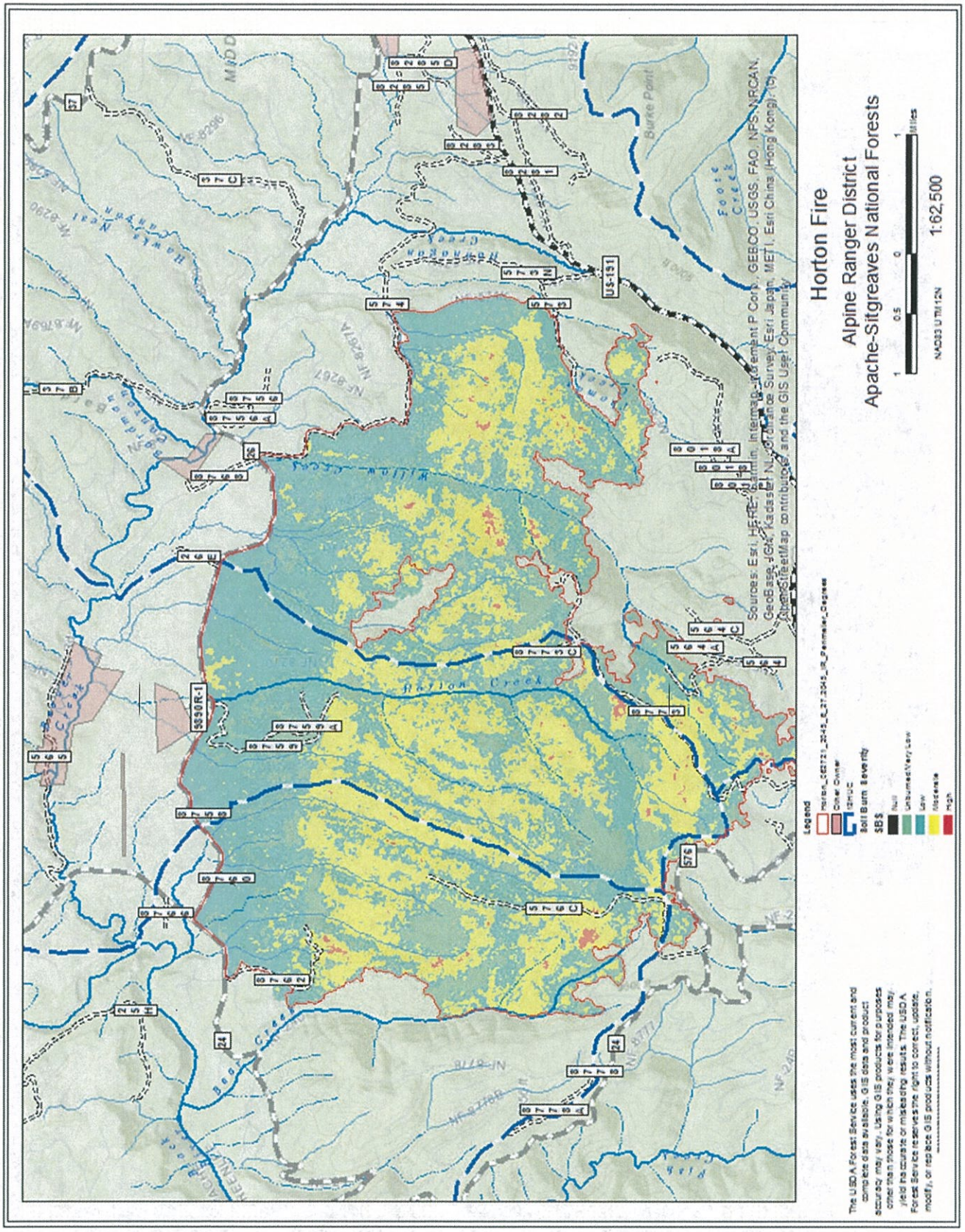
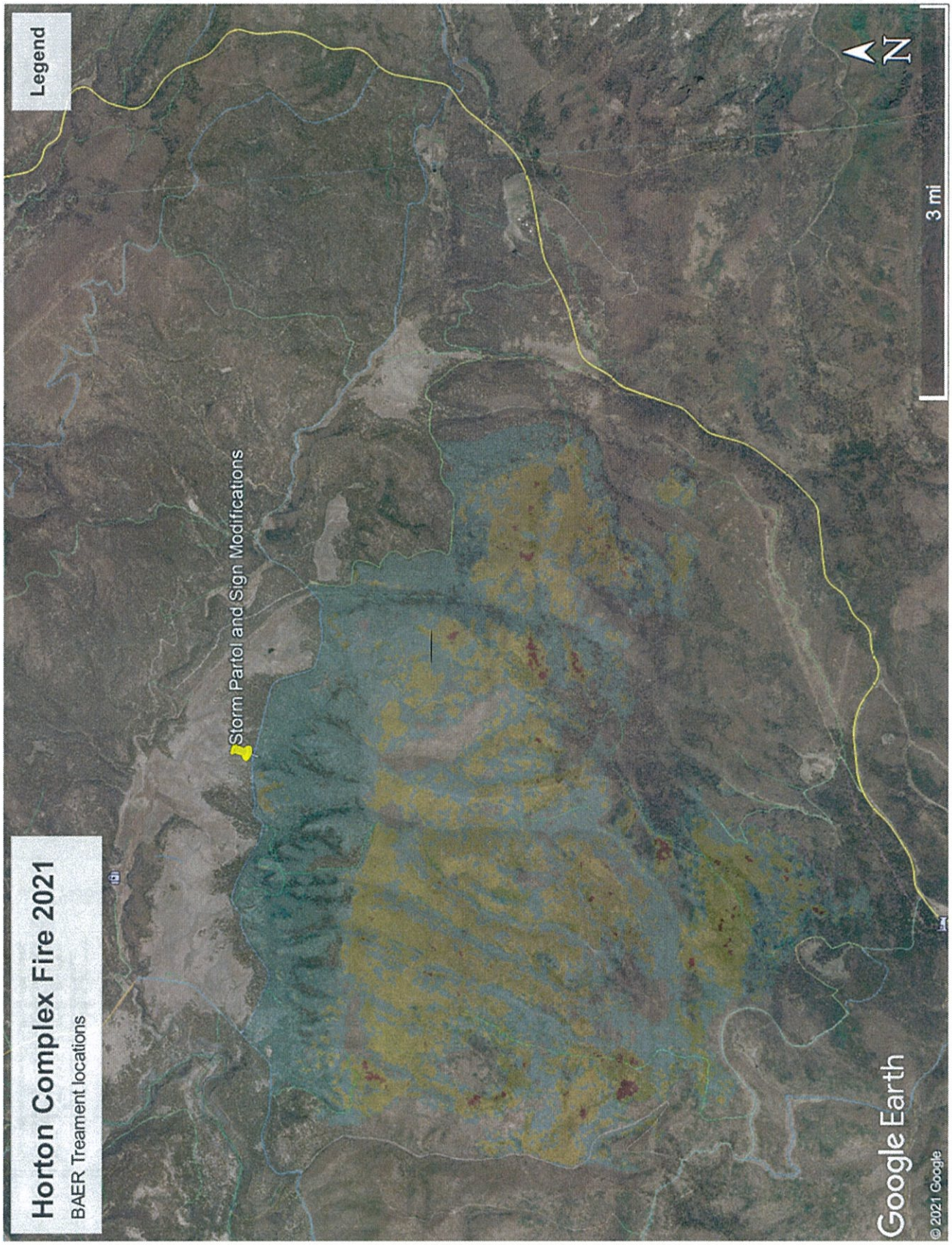

Horton Fire
Alpine Ranger District
Apache-Sitgreaves National Forests
1:62,500
NAD83 UTM 12N
Legend
Dozer Dollar
Soil Burn Severity
Unburned/Very Low
Low
Moderate
High
Horton Creek
Willow Creek
Burke Point
Foote Creek
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap contributors, and the GIS User Community

Figure 2.


Legend
Storm Partol and Sign Modifications
Horton Complex Fire 2021
BAER Treament locations
N
3 mi
Google Earth
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