

Date of Report: October 25, 2022**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:** Bovee**B. Fire Number:** NE-NBF-220792**C. State:** Nebraska**D. County:** Thomas**E. Region:** 2**F. Forest:** NNFG**G. District:** Bessey**H. Fire Incident Job Code:** P2 P24S (0207)**I. Date Fire Started:** October 2, 2022**J. Date Fire Contained:** October 17, 2022**K. Suppression Cost:** \$1.79M (10/09/2022)**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):****1. Fireline repaired (miles):** 0**M. Watershed Numbers:***Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% Of Watershed Burned
102100011001	102100011001	24679	4224	17
102100011003	Town of Halsey-Middle Loup River	31228	7033	23
102100011004	Town of Dunning-Middle Loup River	38395	2675	7
102100020504	102100020504	25362	1077	4
102100060409	Calf Creek School-Calf Creek	49615	267	1
102100060601	Keys Ranch-North Loup River	25231	2740	11
102100060602	Martin Ranch-North Loup River	30353	914	3

N. Total Acres Burned:*Table 2: Total Acres Burned by Ownership*

Ownership	Acres
NFS	5,130
State	583
Private	13,217
Total	18,930

O. Vegetation Types: Hand-planted forests are diverse in species including, ponderosa pine, jack pine, and eastern red cedar. Areas of pine tend to be moderately open with grass understories. The planted blocks of eastern red cedar were very dense with little herbaceous understory vegetation present. Grasslands of native prairie grasses are abundant between planted areas.

P. Dominant Soils:*Table 3: Total Acres Burned by Ownership*

Name	Acres	Hydro Group	Drainage Class	Erosion Hazard on Roads and Trails
Valentine fine sand, rolling and hilly, 9 to 60 percent slopes	2970	A	Excessively drained	Moderate
Valentine fine sand, hilly, 24 to 60 percent slopes	2112	A	Excessively drained	Severe

Q. Geologic Types: Ogallala group

R. Miles of Stream Channels by Order or Class:*Table 4: Miles of Stream Channels by Order or Class*

Stream Type	Miles of Stream
Perennial	0
Intermittent	0
Ephemeral	0

S. Transportation System:

Trails: NF Motorized (miles): 6.15
 NF Non-motorized (miles): 2.68
Roads: National Forest (miles): 10.50
 State (miles): 3.44
 Private (miles): 0.42

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 5: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	State	Private	Total	% Within the Fire Perimeter
Unburned	698	172	3987	4857	26
Low	2526	410	9155	12091	64
Moderate	1319	2	51	1372	7
High	609		2	610	3
Total	5151	584	13195	18930	



Figure 1: High soil burn severity in densely planted cedar.



Figure 2: Moderate soil burn severity



Figure 3: Low soil burn severity in timber.



Figure 4: Low soil burn severity in grassland.

B. Water-Repellent Soil (acres): Hydrophobicity was detected on high severity soils, and in some of the moderate severity areas. Moderate plus high severity areas total of 1928 acres.

C. Soil Erosion Hazard Rating: Wildfire induced changes to soil properties have potential to alter erosion rates from the natural, unburned state. Areas with moderate or high burn severity have little to no canopy

or ground cover to intercept rainfall and may have altered infiltration, both of which may lead to increased wind and water erosion. This erosion hazard generally persists through the first few years post-fire until hillslopes stabilize as vegetation recolonizes, infiltration capacity increases, and ground cover is recruited. Unburned areas and those with low severity have little to no erosion hazard in comparison.

The fire area consists of soils rated as moderate to severe for soil erosion on roads and trails, indicating that some erosion is likely. Roads or trails may require occasional maintenance, and that simple erosion-control measures are needed. Erosion Hazard Ratings for this assessment were obtained from accessing <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey> for Hazard of Erosion on Roads and Trails. In recent past assessments on the Pine Ridge Ranger District of the NNFG, the "Hazard of Off-Road or Off-Trail Erosion" was used, however, in observing erosion occurring before incidents are controlled or soon thereafter within the first year, (fire removing overstory canopy, shrubs and herbaceous material), seemed to better reflect a higher erosion hazard during precipitation events. Using the information rating provided under "Hazard of Erosion on Roads and Trails" for the first season following fire is likely more realistic on what we expect during that first year "emergency". When trees begin to drop needles, snags and the vegetation cover increases, the landscape behaves similarly to the ratings identified in the "Hazard of Off-Road or Off-Trail Erosion" in years 2-4 following the fire. No rating was given for "Hazard of Off-Road or Off-Trail Erosion" for the 201 East Fire area was available at this time.

- D. Erosion Potential:** Erosion potential for areas mapped as low/unburned within the fire area are not expected to differ from the inherent erosion potential prior to the fire.

Wind-caused erosion is expected in areas of moderate and high soil burn severity due to inherent characteristics associated with the dominant soil type and removal of effective ground cover (litter, vegetation, etc.). This will continue until ground cover can be established - either naturally and/or through approved BAER treatments (5 years or more depending upon weather conditions and erosion producing storm events).

Water driven erosion is not expected to cause substantial soil movement due to the high hydraulic conductivity of the soils and shallow hydrophobicity layer (1" and less). Erosion in localized areas around and on roads may be amplified from previous rates due to compaction and recessed roadbeds channeling flow.

- E. Sediment Potential:** The Middle Loupe River bisects the fire. However, there are no streams within the fire area to connect sediment sources to the river. Soil burn severity along the Middle Loupe's edge was rated as low in flat grasslands and open hardwood stands. There is a very low potential of sediment from the fire entering the river and effecting water quality.
- F. Estimated Vegetative Recovery Period (years):** Herbaceous vegetation is expected to recover in one to three growing seasons in the low to moderate burn severity areas and 3 plus years in the high severity areas. Some portions of planted areas where the overstory was completely consumed may revert back to native grasslands. There is a potential for cedar to move into opened areas where snags will remain. Observations in the 201 East fire that burned in May of 2022 show good vegetation recovery after one growing season in the low to moderate/high burned areas. Dense stands of pine that burned the hottest have many annuals, forbs, and sedges with an estimated 40% groundcover established. In the Bovee fire there are approximately 128 acres of densely planted red cedar that burned hot and intense leaving highly burned soils. These dense stands had minimal herbaceous vegetation pre-fire and will likely take up to 3-5 years for recovery without intervention.
- G. Estimated Hydrologic Response (brief description):** There are no hydrological features within the burn area. The sand dunes create a topography that is broken and not connected. Flows paths are short and are quickly dissipated in this terrain. The fire area consists of hydrologic soil group A soils. These soils have a high infiltration rate (low runoff potential) when thoroughly wet. They consist mainly of deep, well drained to excessively drained sands or gravelly sands. Hydraulic conductivity ranges from 1.4 to 14 in/hr.

NOAA Atlas precipitation frequency estimates for the fire area for a 2-year return interval 60 (50% chance of occurrence) is 1.23 in/hr (https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html). A storm with a five-year return interval (20% chance of occurrence) is 1.56 in/hr. Infiltration rates within high and moderate soil burn severity may be reduced due to the presence of hydrophobic soils. Because of the lack of connected hydrology there is not expected to be a hydrologic response due to the fire. Some roads (where hydraulic conductivity is lower) near moderate and high soil burn severity areas may catch and carry more water than usual during large rain events causing erosion and damage to roads at low points.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Bovee Fire was reported at 1:38 p.m. on October 2, and quickly spread up to 15 miles north, pushed through dry fuels by gusty south winds. Aggressive structure protection efforts by Forest Service and local firefighters successfully defended the historic Bessey Nursery and CCC Campground. Unfortunately, the lodge and camper cabins of the Nebraska 4H Camp were destroyed, along with the Scott Lookout Tower. The fire's cause is under investigation. The fire was contained on October 9th.

A. Describe Critical Values/Resources and Threats (narrative): The Nebraska National Forest is host to two unique critical values, highly intact natural prairie, and the largest hand planted forest in the United States. Other critical values are human life and safety of Forest Service employees and visitors to the forest, nursery infrastructure, district infrastructure, employee housing, campgrounds, Forest Service roads, and ATV trails. The hand-planted forest is unique in the Western hemisphere and well-loved by Nebraskans; however, it is also a seed source of invasive, native Eastern red cedar. No plans to re-plant exist. Some Jack pine might benefit from the fire and some of the ponderosa pines may survive. Dead trees along the ATV trails and roads could eventually pose a hazard to visitor, but fire crews limbed and removed the worst offenders. Herbaceous plants are already recovering in open areas and low soil burn severity.

Table 6: 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):

There is high risk to any members of the public or USFS employees accessing the burn area via roads, trails, and backcountry hiking due to falling tree snags. Multiple FS houses, work buildings, and campgrounds are immediately adjacent to the fire perimeter and are within tree fall distance. The probability of damage or loss is *possible* and the magnitude of consequences *major*, resulting in *high risk*. **The recommended treatment is hazard signage placed at the entrances into the fire area on all roads, ATV trails, and hiking trails. 10 signs are requested. The second recommended treatment is hazard tree removal at developed sites and in proximity to Forest Service administrative infrastructure.**

2. Property (P):

Improved roads FSR 203, 212, and 223 within the fire perimeter are now surrounded by areas of hydrophobic soils in moderate and high burn severity. Increased runoff onto roads can cause worsening road erosion and potential failure. The probability of damage or loss is *possible* and the

magnitude of consequences is *moderate*, resulting in *intermediate risk*. **Recommended treatment is storm inspection and response for these roads.**

Multiple FS houses, work buildings, and campgrounds are immediately adjacent to the fire perimeter and are within tree fall distance. The probability of damage or loss is *possible* and the magnitude of consequences *major*, resulting in *high risk*. **The recommended treatment is hazard tree removal at developed sites.**

3. Natural Resources (NR):

- a. This area is home to one of the largest intact native grassland ecosystems in nation. There is a high risk to native plant communities from noxious weeds and invasive plant species, particularly along road and trail corridors and near suppression disturbances. Small areas of known noxious weed and invasive plant populations exist within and immediately adjacent to the burn area. It is also very likely that invasives were transported during suppression activities and spread throughout the fire area. The probability of damage or loss is *Very Likely* and the magnitude of consequences is *Major* (typically moderate but due to the sensitive nature and high native biodiversity of this area we are recommending Major), resulting in *Very High Risk*. **The recommended treatment is weed detection monitoring and herbicide application.**
- b. Soils within the fire perimeter have the potential to experience short-term loss of soil productivity and reduced hydrologic function in areas where increased runoff and erosion occurs. The vast majority of areas within the burn will recover relatively quickly and will be a low risk for any long-term damage. However, in the areas of densely planted cedar, high soil burn severity was observed and little herbaceous understory existed pre-fire due to the closed canopy and allelopathic properties of *Juniperus* species. The lack of herbaceous plant and seed base within these burned stands will result in a very long vegetation recovery time (5+ years). The magnitude of consequence is *Moderate* given that severely burned soils will not vegetatively recover quickly and will be susceptible to noxious weeds/invasive species and severe wind erosion for many years. Considering these factors, the probability of damage or loss is *Very Likely*, the magnitude of consequences are *Moderate*, and the risk to soil productivity and hydrologic function is *Very High*. **The recommended treatment is native vegetation seeding in 25% of the area within severely burned cedar stands to speed up recover to minimize erosion and noxious weed expansion.** Following the BAER assessment, the District Ranger and Regional BAER Coordinator agreed to request funding for this treatment under the BAR program.

4. Cultural and Heritage Resources: No known cultural or heritage resources are at risk. **No treatments are recommended.** Emergency Treatment Objectives:

- a. Reduce the post-fire risks to life and safety by raising public awareness with warning signs, hazard tree removal and monitoring.
- b. Reduce the post-fire risks to USFS property with hazard tree removal.
- c. Patrol improved roads during and immediately after rain events to clear debris from drainage structures to reduce risk of road failure.
- d. Promote revegetation of native plant communities and soil stabilization through early detection/rapid response surveys and treatment to minimize the spread of State-listed noxious weeds. Seed native grasses in highly burned densely planted cedar stands.

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

Land: 90%

Channel: N/A

Roads/Trails: 90%

Protection/Safety: 90%

D. Probability of Treatment Success*Table 7: Probability of Treatment Success*

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

E. Cost of No-Action (Including Loss): It is difficult to quantify the cost of no action to human life and safety, native plant communities, although the value of each is certainly far in excess of the funds requested.

F. Cost of Selected Alternative (Including Loss):**G. Skills Represented on Burned-Area Survey Team:**

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

Team Leaders: Matt Scott

&

Anne Dunckel

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&

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Phone(s) 307-399-3425

210-887-6882

Forest BAER Coordinator: Matt Lucas**Email:** matt.lucas@usda.gov**Phone(s):** 308-520-2164**Team Members:** *Table 8: BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Matthew Scott, Anne Dunckel
Soils	Matthew Scott, Anne Dunckel
Hydrology	Anne Dunckel
Engineering	Tom Emerson
GIS	Anne Dunckel
Archaeology	Heather Horobik
Weeds/Range	Matthew Scott, Natalie GSchwind
Recreation	Amber Pearson
Other	Julie Bain, District Ranger

H. Treatment Narrative**Land Treatments**

P1a-b. Early detection/rapid response (EDRR): EDRR surveys will focus on areas of unimpaired native plant communities that burned at high or moderate soil burn severity and are adjacent to known state-listed noxious weeds, as well as areas disturbed by suppression activities. EDRR will be used to minimize the potential for new noxious weed infestations and ensure the natural recovery of native perennial grasses and forbs. Heavy equipment used for suppression activities travelled through areas of known weed populations to unaffected

areas, which has substantially increased the risk of noxious weed spread in these disturbed areas. If new weed populations are found they would be promptly treated to minimize the potential to spread and resulting degradation of native plant communities. Chemical treatment of new and existing noxious weed infestations will reduce the likelihood of spread to disturbed areas and help re-establish high-quality wildlife and habitat within the burn.

Preventative Seeding for Invasive Species: Seeding focused on areas of densely planted cedar that burned at high or moderate soil burn severity. These areas did not have any native grass seed base prior to the fire. Seeding will allow for native grasses to take over these areas and out compete invasive species while stabilizing bare soils will be requested under the BAR program

Land Treatment Item	Estimated Acres	Unit Price	Cost
P1a. Invasive Weeds EDRR vectors	80	\$165	\$13,200
P1a. Invasive Weeds EDRR expansion areas	160	\$165	\$26,400
P1B. Invasive weeds – fire suppression repair Dozer containment lines (6.5 miles)	12	\$165	\$1,980
P1B. Invasive WEEDS – Fire Suppression repair Road as line (0.4 miles)	2	\$165	\$330
P2. Preventative Seeding for Erosion Control & Invasive Species	32	\$250	\$8,000 - BAR
Total Cost			\$41,910

Channel Treatments: N/A

Roads and Trail Treatments:

R3: Storm Inspection and Response: Storm Inspection and Response will keep road surfaces intact and drainage features functional by clearing sediment and debris between storms and filling lost road base to retain the effectiveness of these features and safety of roads.

Treatment	Units	Unit Cost	# of Units	Total Cost
Storm Inspection and Response (Light equipment)	mile	\$500	7	\$3,500

Protection/Safety Treatments:

S1a. Road Hazard Signs: This treatment will install burned area warning signs at key road entry points to caution forest users of burned area hazards and/or closures.

Treatment	Units	Unit Cost	# of Units	Total Cost
Burned Area Hazard signs, posts, hardware and installation	sign	\$600	5	\$3,000

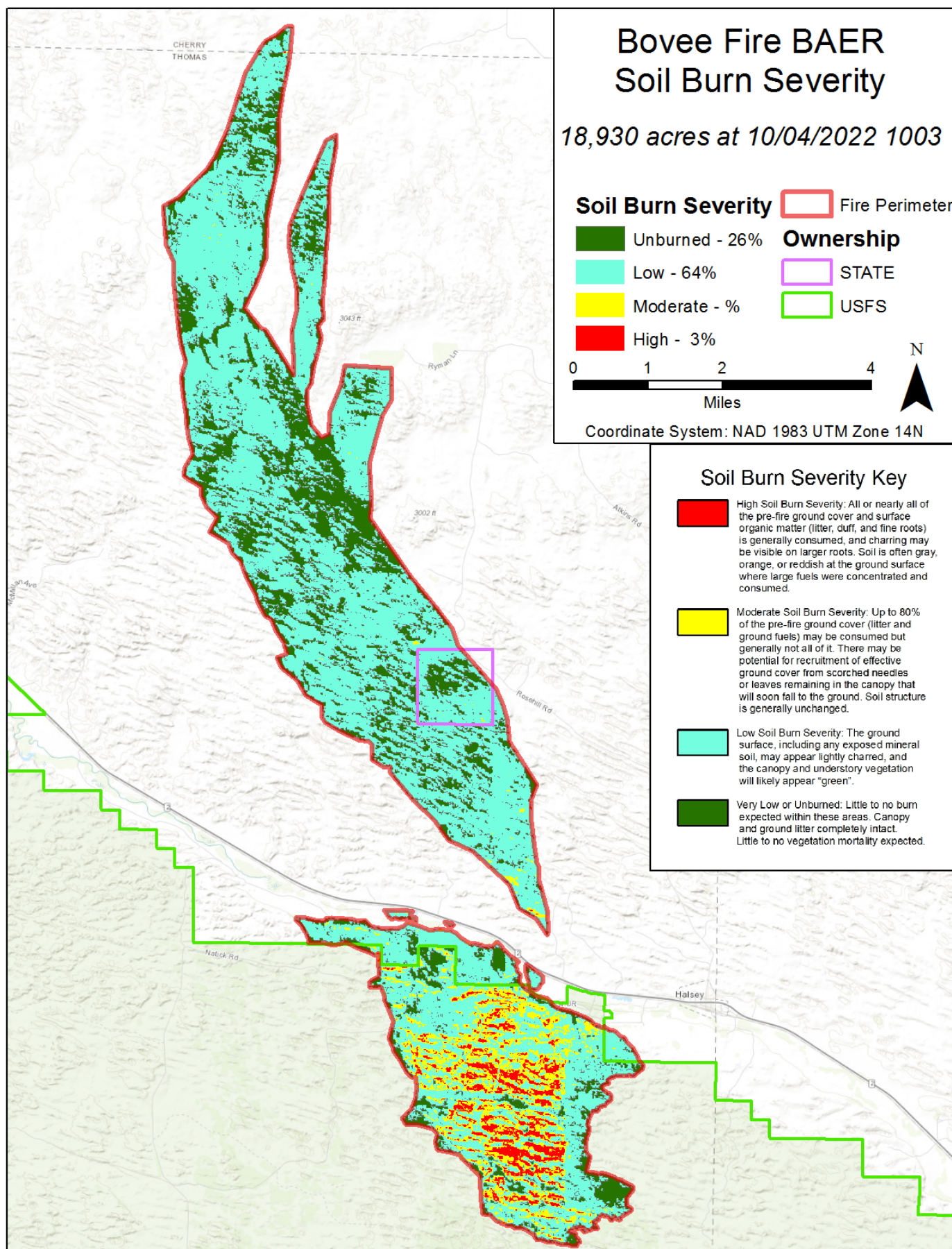
S1b: Trail/Recreation Hazard Signs: This treatment will install burned-area warning signs at trailheads and on trails intersecting the fire perimeter.

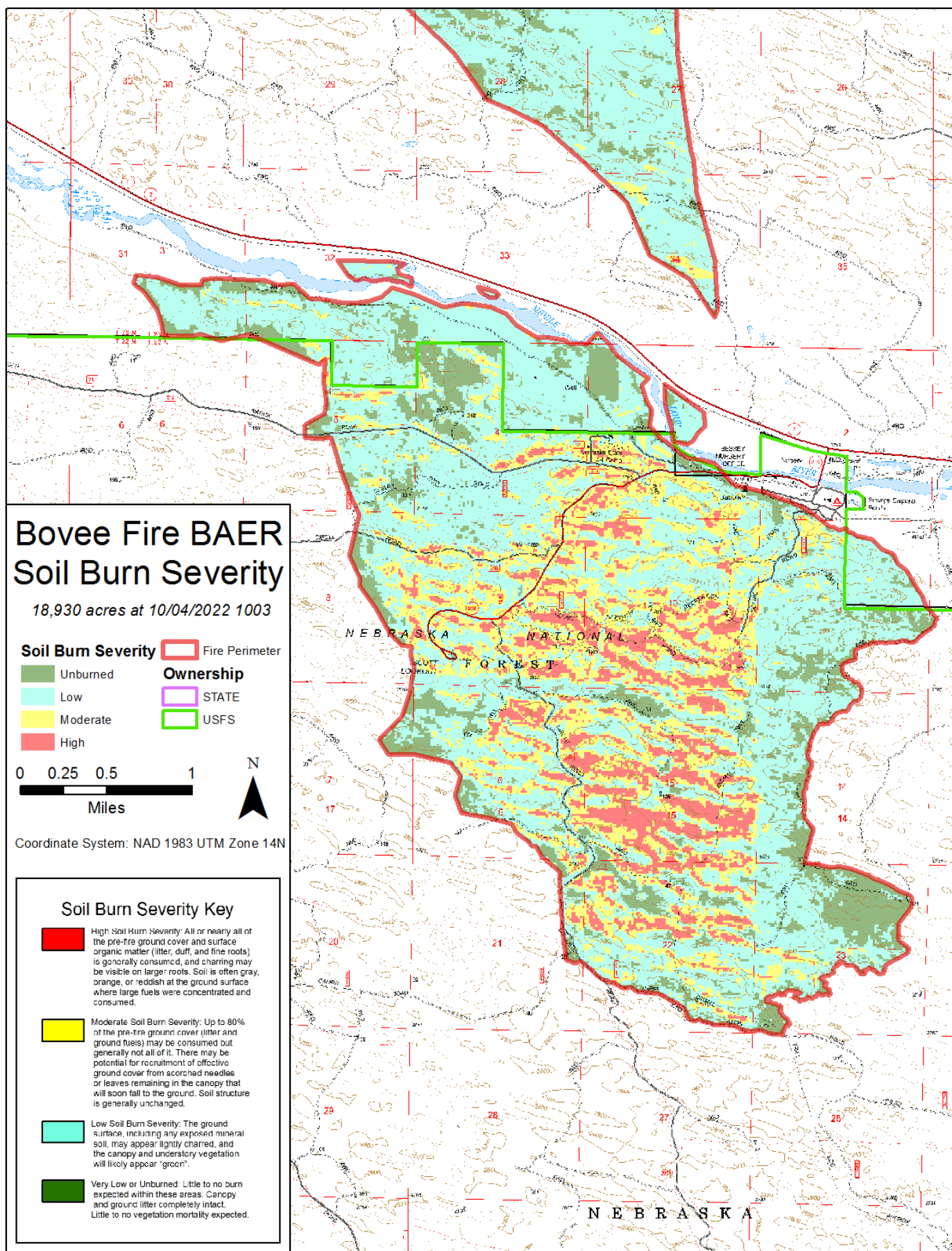
Treatment	Units	Unit Cost	# of Units	Total Cost
Signs for trails and trailheads	sign	\$600	5	\$3,000

S3. Hazard Tree Falling: This treatment will cover the removal of fire-killed trees at risk of falling and damaging campground, FS housing, and building infrastructure.

Treatment	Units	Unit Cost	# of Units	Total Cost
Hazard tree falling at campgrounds, houses, work buildings (Fire Suppression Module)	Day	\$3,500	5	\$17,500

I. Monitoring Narrative: Treatment monitoring will occur as part of the treatments for weeds, roads, and trails. No additional funding is requested for monitoring.





PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

Line Items	Units	Unit Cost	NFS Lands		Other \$
			# of Units	BAER \$	
A. Land Treatments					
P1a. Invaives EDRR - Vectors	ac	165	80	\$13,200	
P1a. Invasives EDRR - Expansion Areas	ac	165	160	\$26,400	
P1b. Invasives EDRR - Supression Repair	ac	165	14	\$2,310	
<i>Subtotal Land Treatments</i>				<i>\$41,910</i>	
B. Channel Treatments					
<i>Subtotal Channel Treatments</i>				<i>\$0</i>	
C. Road and Trails					
R3. Storm Inspection/Response	miles	500	7	\$3,500	
<i>Subtotal Road and Trails</i>				<i>\$3,500</i>	
D. Protection/Safety					
S1a. Road Hazard Signs	each	600	5	\$3,000	
S1b. Trail/Recreation Hazard Signs	each	600	5	\$3,000	
S3. Hazard Tree Falling (Hand Crew)	day	3,500	5	\$17,500	
<i>Subtotal Protection/Safety</i>				<i>\$23,500</i>	
E. BAER Evaluation					
Initial Assessment	Report			---	\$4,500
<i>Insert new items above this line!</i>				---	
<i>Subtotal Evaluation</i>				<i>\$0</i>	
F. Monitoring					
<i>Subtotal Monitoring</i>				<i>\$0</i>	
G. Totals				\$68,910	
Previously approved					
Total for this request				\$68,910	

PART VII - APPROVALS

1. _____
 Forest Supervisor Date