Date of Report: 08/19/2021

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: Elkhorn

B. Fire Number: NDDPF-210176

C. State: ND

D. County: Billings

E. Region: 01

F. Forest: Dakota Prairie Grasslands

G. District: Medora RD

H. Fire Incident Job Code: P1 N4PV

I. Date Fire Started: 07/03/2021

J. Date Fire Contained: 07/09/2021

K. Suppression Cost: $120,000

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

1. **Fireline repaired (miles):**
2. **Other (identify):** 4.2 miles dozer line on FS

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
101102031202	Blacktail Creek	25,069	257	1.0%
101102031310	Mikes Creek-Little Missouri River	29,443	1,697	5.8%
101102031311	Morgan Draw-Little Missouri River	12,571	768	6.1%

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	1,593
OTHER FEDERAL (LIST AGENCY AND ACRES)	

OWNERSHIP	ACRES
STATE	
PRIVATE	1,130
TOTAL	**2,723**

O. Vegetation Types (Ecological Site Descriptions):

The Badlands (27%) ecological site is characterized by exposed soft, sedimentary siltstone and shale bedrock that is actively eroding. These sites have greater than 80 percent bare ground. Slopes are typically steeper than 50 percent but range from strongly sloping to very steep. The Badlands ecological site is constantly undergoing geological erosion, and surface runoff is very rapid. This site is located on steep-sided buttes, escarpments, knobs, and ridges, and is characterized by sparse vegetation, deeply entrenched drainageways, and depositional fans below the landforms.

The Loamy (17%) ecological site soils are greater than 20 inches deep. Surface textures are loams and silty loams and form a ribbon less than 2 inches long. Subsoils range from silt loams to clay loams and form a ribbon less than 2 inches long. The slopes range from0to 25percent. This site occurs on well drained uplands that are upslope from Loamy Terrace or Loamy Overflow ecological sites are downslope from Limy Residual or Shallow Loamy sites. Dominant species are western wheatgrass, some green needlegrass, and blue grama with fringed sagewort and western snowberry.

The Badlands Fan (17%) ecological site is on depositional fans at the base of steep badland escarpments. Rapid, unimpeded overland flow of water during rainfall events causes active erosion of the steep, sparsely vegetated or non-vegetated badland escarpments and deposition of sediments onto the alluvial fans below them. When the sedimentary parent material of the escarpment is sodic, this site often occurs in conjunction with the Thin Claypan site. Slopes range from 2-25%.

The Limy Residual (12%) ecological site is found on alluvial fans and hillslopes. When associated with fans, these areas are on relatively stable landforms below steep barren ridges that are higher on the landscape (e.g. badlands). When associated with hillslopes, this ecological site occurs on backslopes and footslopes. Soils are moderately deep to very deep, loamy throughout, with calcium carbonates occurring within 8 inches of soil surface. Slopes range from 0 to 25%. Vegetation in reference consists primarily of mid-statured rhizomatous cool-season grasses (e.g., western wheatgrass), short-statured warm-season bunchgrass (e.g., blue grama), and sedges.

P. Dominant Soils: See Section O. Vegetation above.

Q. Geologic Types:

A majority of the area within both fire boundaries is dominated by the Tongue River Member of the Fort Union Formation. Four basic lithologic types are present in the Tongue River Member. These are arranged in a basic cyclic unit consisting, from bottom to top, of (1) gray clay and silt, (2) lignite, (3) yellow silt and sand that may be clayey, and (4) sand. This cyclic unit probably originated during the formation and filling of flood basins on an alluvial plain.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	0.3 (Little Missouri River)
INTERMITTENT	7.8
EPHEMERAL	

S. Transportation System:

Trails: *National Forest (miles):* 1.42 *Other (miles):* N/A
Roads: *National Forest (miles):* 6.95 *Other (miles):* 2.32

PART III - WATERSHED CONDITION

C. Burn Severity (acres):

The few acres of high burn severity soils and majority low burn severity was observed during a 7/29/2021 field visits to the fire area. Areas mapped as high and moderate severity through BARC were most likely moderate and low severity. Due to time constraints and accessibility issues, soils were not tested in the field to confirm. However, recent experience this season with similar fires in the area only had low and some moderate burn severity.

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	164			138	302	11%
Low	866			537	1,403	52%
Moderate	400			254	654	24%
High	19			21	40	1%
Couds	142			178	321	12%
Total	**1,592**			**1,129**	**2,721**	

A. Water-Repellent Soil (acres):

Water repellency ratings were based on BARC data burn severity[1] and are shown on Table 5.

Table 5: Acres of Water Repellency by Ownership

NFS	Other	Total
19	178	197

D. Soil Erosion Hazard Rating:

Original soil erosion hazard ratings were based on BARC data burn severity and are shown on Table 6.

Table 6: - Acres of Soil Erosion Hazard Rating (SEHR) by Ownership

SEHR	NFS	Other
Low	1,030	675
Moderate	400	254
High	19	21

E. Erosion Potential:

Due to small areas of high soil burn severity areas and lack of threats, erosion potential was not modeled or estimated using other means.

F. Sediment Potential:

Due to small areas of high soil burn severity areas and lack of threats, sediment potential was not modeled or estimated using other means.

G. Estimated Vegetative Recovery Period (years):

1 – 3 years

H. Estimated Hydrologic Response (brief description):

The Elkhorn fire, fueled by grasses, was reported on 7/3/2021 on the Little Missouri National Grassland, Medora Ranger District. The fire, currently mapped at 2,723 acres, was declared contained 7/9/2021 and controlled on 8/5/2021. Soil burn severity was unburned or low on 63% and moderate on 24% of the burn area according to BARC data. Hydrologic response is expected to be insignificant.

For the fire, these high plains areas as defined in the NOAA Atlas 14 Vol 8 (2013) have heaviest rainfall for runoff during the late spring and summer months. Using the Medora station, on any year the average

[1] Moderate and high burn severity soils

heavy rainfall can be as much as 0.7 inches for 30-minute storm (2-year storm). Runoff generally can occur with greater than 0.5 inches in 30 minutes. Runoff on badlands is already flashy during these seasonal events with efficient transport and likely storm flow. Generation may be pronounced on the 20% of the 744 fire and 10% on the Roosevelt fire based on the mapping of badlands that drain to intermittent and perennial drainages. The burned condition may slightly increase runoff with reduction of grassland cover. However, the low severity and spring greening that has occurred would decrease the amplified hydrologic response from summer storms.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

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

Table 7: 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):

2. Property (P):

3. Natural Resources (NR):

A review of vegetation plot data (plots nearby the fire perimeter as none were taken within the perimeter) collected in 2010-2013 indicate a mix of cool season dominated mixed grass prairie with introduced species such as Kentucky bluegrass, crested wheatgrass, smooth brome and annual bromes interspersed or dominating in some areas.

Noxious weeds already present in the burned area, or inadvertently introduced during fire suppression activities, have the potential with the available seed bed to establish and/or spread within burned areas. Historically, common burdock, Canada thistle, leafy spurge and hound's tongue have been inventoried and/or treated within the fire perimeter. There are no records of treatment or inventory within the fire perimeter since 2016. Our weed control partner recognizes the need to inventory and control whatever weeds pop up due to the wildfire. Additionally, this allotment was acquired via the Eberts Purchase in 2007. We had to restore various crop and hay fields, and would like to keep ahead of the noxious weeds. Historical areas susceptible to immediate weed expansion plus dozer lines are estimated at approximately 50 acres.

Risk Assessment – threats to native plant communities.

Probability of Damage or Loss: Likely - Based on burn severity and disturbance associated with fire line construction and rehabilitation during suppression operations.

Magnitude of Consequence: Moderate – Loss of native plant communities and spread of noxious weeds.

Risk Level: High – Invasive species treatment is needed for areas disturbed by fire suppression activities such as fire lines. Additional invasive species monitoring next year will determine if weeds spread is occurring in the burned area.

4. **Cultural and Heritage Resources:**

B. Emergency Treatment Objectives:
Minimize the establishment and spread of noxious weed infestations that have the potential to occur in the next 12 months.

C. Probability of Completing Treatment Prior to Damaging Storm or Event: 50%

D. Probability of Treatment Success

Table 8: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land*(Noxious weed treatment)*	80	85	85
Channel			
Roads/Trails			
Protection/Safety			

E. Cost of No-Action (Including Loss):
The value of protecting the ecological integrity of native plant communities and soil productivity of the burned area from noxious weed infestation easily exceeds the cost of treatment and monitoring. Noxious weed establishment and spread would impact treatment costs in the future. Fire suppression activities have rendered 50 acres within the burned areas susceptible to weed establishment and spread. If pre-emptive detection and suppression of weeds on these 50 acres are not carried out, and weeds become established in these areas during the first year after the fire, the footprint of the weed infestation would likely spread over subsequent years. As a coarse estimate the weeds, once established in areas made susceptible by the fires, may spread into adjacent areas at the rate of 14% per year. Using the base estimate treatment area, this infestation area could grow to 97 acres in the five years after initial establishment and cost $500/ac to treat. Thus, not addressing the risks equates to at an estimated cost of $48,500 in the long run.

F. Cost of Selected Alternative (Including Loss):
There remains a 20 percent chance that the proposed treatments for this work may not be complete prior to damaging storm fail. As a gross estimate, the cost is the treatment estimate ($25,000) plus the loss (0.2 × $48,500) which equals $34,700.

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Nick Semenza
Email: nicholas.semenza@usda.gov **Phone(s):** (701)989–7311

Forest BAER Coordinator: Nick Semenza
Email: nicholas.semenza@usda. **Phone(s):** (701)989–7311

Team Members: *Table 9: BAER Team Members by Skill*

Skill	**Team Member Name**
Team Lead(s)	Nick Semenza
Soils	Jennie Jennings
Hydrology	Jennie Jennings
Engineering	
GIS	Phil Sjursen
Archaeology	Troy Price
Weeds	Niki Dahl

Skill	Team Member Name
Recreation	Rob Schilling
Other	

H. Treatment Narrative:

Land Treatments:

Objective:

The objective is to detect and suppress new weed infestations in the burned area. The unintentional introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish persistent weed populations. Left unchecked, it is likely that such weed infestations will increase post-fire in these grasslands. Though classified as low severity, the spring conditions and available nearby vectors increase chance for accelerated growth and reproduction. It is expected that most native vegetation will recover if weed invasions are minimized.

Method:

Use EDRR. As monitoring indicates, treat:

1. Areas disturbed during suppression including dozer lines and routes travelled for suppression.[2]
2. Routes travelled and desired plant communities near vector corridors.

The cost for treatment is high due to inflation from oil and gas proximity. Costs where oil and gas production are much higher than other areas on the Dakota Prairie Grassland. Average treatment cost for UTV and trucks average $500 per acre which is 10 orders magnitude higher than on other districts.

Channel Treatments:

Roads and Trail Treatments:

Protection/Safety Treatments:

I. Monitoring Narrative: NA

[2] Staging area was located on private and therefore not included.

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										
EDRR supression-disturbed areas	Acres	500	8	$4,000	$0		$0		$0	$4,000
Travel routes & desired plant cor	Acres	500	42	$21,000	$0		$0		$0	$21,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$25,000	$0		$0		$0	$25,000
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										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road and Trails				$0	$0		$0		$0	$0
D. Protection/Safety										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Protection/Safety				$0	$0		$0		$0	$0
E. BAER Evaluation										
Initial Assessment	Report			---	$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				$25,000	$0		**$0**		**$0**	**$25,000**
Previously approved										
Total for this request				**$25,000**						

PART VII - APPROVALS

1. BENNIE SOUTH Digitally signed by BENNIE SOUTH Date: 2021.08.30 12:47:49 -06'00'

Forest Supervisor Date

Appendix: Soil burn severity map of Elkhorn fire