Date of Report: 5/27/2021

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: 744 and Roosevelt Creek

B. Fire Number:
744: NDDPF-210057
Roosevelt Creek NDDPF-210082

C. State: ND

D. County: Billings County

E. Region: 1

F. Forest: Dakota Prairie

G. District: Medora RD

H. Fire Incident Job Code:
744 P1NW2W
Roosevelt Creek P1NZ0M

I. Date Fire Started:
744 04/01/2021
Roosevelt Creek 04/28/2021

J. Date Fire Contained:
744 04/05/2021
Roosevelt Creek 05/08/2021

K. Suppression Cost:
744 $80,654
Roosevelt Creek $400, 395

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

1. **Fireline repaired (miles):**
   744: No GIS information
   Roosevelt Creek: No GIS information
2. **Other (identify):**

M. Watershed Numbers:

Table 1: 744 Fire - Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
101102030808	Custers Wash-Little Missouri River	18,899	17	< 1%
101102030903	Lower Andrews Creek	19,484	1,369	< 8%
101102031302	Railroad Creek-Little Missouri River	12,542	784	< 1%

Table 2: Roosevelt Creek Fire - Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
101102031308	Crooked Creek-Little Missouri River	23,924	2,730	11%
101102031309	Roosevelt Creek	16,207	1,850	11%
101102031310	Mikes Creek-Little Missouri River	29,443	1	< 1%

N. Total Acres Burned:

Table 3: 744 Fire - Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	1,898
NPS	
STATE	27
PRIVATE	246
TOTAL	**2,171**

Table 4: Roosevelt Creek Fire - Acres Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	1,829
NPS	
STATE	199
PRIVATE	2,552
TOTAL	**4,581**

O. Vegetation Types: (Ecologic Site Descriptions)

744 Fire:

The Badlands Fan (51%) 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 Badlands (21%) ecological site is characterized by exposed soft, sedimentary siltstone and shale bedrock that is actively eroding. These sites have greater than 80% bare ground. Slopes are typically steeper than 50% 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 Shallow Loamy (10%) ecological site is located on convex shoulders of hillslopes and ridges in the badlands. The soils of this site are shallow with soft, sedimentary siltstone and mudstone bedrock parent material between 10-20 inches below the soil surface. The soils have a thin surface layer that is typically <4 inches thick. Surface textures range from silt loam to clay loam and form a ribbon less than 2 inches long. Soils on this site are well drained and typically have carbonates near the surface and are generally calcareous throughout. Slopes range from 3-70%. This site is above the Loamy and Limy Residual sites, and usually adjacent to Shallow Sandy and Very Shallow sites on the landscape. Due to the limited acreage; in some places the surface and subsurface layers may have considerable higher clay contents or textures that range from Silty Clay Loams to Clays, and sedimentary bedrock consisting of shale that is within 20 inches of the soil surface.

Roosevelt Creek Fire:

Badlands Fan (58%) ecological site (See 744 Fire Badlands Fan ESD)

The Limy Residual (23%) ecological site is located 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.

Badlands (11%) ecological site (See 744 Fire Badlands ESD)

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 5: 744 Fire - Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	2.6 (Andrew's Creek)
INTERMITTENT	5.1
EPHEMERAL	
OTHER (DEFINE)	

Table 6: Roosevelt Creek Fire - Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERENNIAL	0.6 (Little Missouri River)
INTERMITTENT	19.4 (Crooked Creek and Andrews Creek)
EPHEMERAL	
OTHER (DEFINE)	

S. **Transportation System:**

744 Fire

Trails: *National Forest (miles):* 3.78[1] *Other (miles):* 0.04
Roads: *National Forest (miles):* 4.41 *Other (miles):* 0.02

Rosevelt Creek Fire

[1] Buffalo Gap and Maah Daah Hey trails

Trails: *National Forest (miles):* 0 *Other (miles):* 0
Roads: *National Forest (miles):* 2.70 *Other (miles):* 6.74

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 7: 744 Fire - Burn Severity Acres by Ownership

Soil Burn Severity	NFS	NPS	State	Private	Total	% within the Fire Perimeter
Unburned	113		1	5	119	5%
Low	1606		26	239	1872	86%
Moderate	178			2	180	8%
High						
Total	**1898**		**27**	**246**	**2171**	

Soil burn severity for the 744 fire was ground truthed on 25-May. Most soils exhibited low severity. Soils with low and moderate burn severity will not become hydrophobic. Vegetation that had been lost due to the fire was returning.

Table 8: Roosevelt Creek Fire – Burn Severity Acres by Ownership

Soil Burn Severity	NFS	NPS	State	Private	Total	% within the Fire Perimeter
Unburned	90		18	175	283	6%
Low	1,634		177	2,300	4,111	90%
Moderate	106		3	78	187	4%
High						
Total	**1,829**		**199**	**2,552**	**4,581**	

Soil burn severities are assumed to be similar to the 744 fire.

B. Water-Repellent Soil (acres):

Water repellency ratings were based on BARC data burn severity[2] and are shown on Table 9.

Table 9: Acres of Water Repellency by Ownership

Fire	NFS	Other	Total
774	1,784	267	2,052
Roosevelt Creek	1,793	2,559	4,298

C. Soil Erosion Hazard Rating:

Original soil erosion hazard ratings were based on BARC data burn severity and are shown on Table 10 and Table 11.

Table 10: 774 Fire - Acres of Soil Erosion Hazard Rating (SEHR) by Ownership

SEHR	NFS	Other
Low	1,719	267
Moderate	178	2
High		

Table 11: Roosevelt Creek Fire - Acres of Soil Erosion Hazard Rating (SEHR) by Ownership

SEHR	NFS	Other
Low	1,724	2,667
Moderate	106	82
High		

[2] Moderate and high burn severity soils

D. Erosion Potential:
Due to the lack of high soil burn severity areas, erosion potential was not modeled or estimated using other means. The lack of high burn severity soils and majority low burn severity was observed during 25-May field visits to the 744 fire area.

E. Sediment Potential:
Due to the lack of high soil burn severity areas, sediment potential was not modeled or estimated using other means. The lack of high burn severity soils and majority low burn severity was observed during 25-May field visits to the 744 fire area.

F. Estimated Vegetative Recovery Period (years):
1-3 years

G. Estimated Hydrologic Response (brief description):
The 744 fire was reported on 04/01/2021 on the Little Missouri National Grassland, Medora Ranger District. The fire, currently mapped at 2,171 acres, was declared contained 04/05/2021 and controlled on 04/07/2021. Soil burn severity was “unburned” or low on 91% and moderate on 8% of the fire area. Hydrologic response is expected to be insignificant.

The Roosevelt Fire was reported on 04/28/2021 on the Little Missouri National Grassland, Medora Ranger District. The fire, currently mapped at 4,581 acres, was declared contained and controlled on 05/08/2021. Soil burn severity was “unburned” or low on 96% and moderate on 4% of the fire area. Hydrologic response is expected to be insignificant

For both fires, 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 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 12: 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): NA**
2. **Property (P): NANatural Resources (NR):**
   744 Fire - Native Plant Communities
   Vegetation plot data (3 plots within fire perimeter) collected in 2014 indicate similarity indices of 78, 79 and 47 percent similarity to the reference plant community for that ecological site. Plant community phase determinations were 1.1 – western wheatgrass-needlegrasses-blue grama-little bluestem; 1.2 – blue grama, western wheatgrass/sedges/forbs and 1.2 – shortgrass cool-season

community on two limy residual and one loamy ecological site. These determinations indicate a native, cool-season grass dominated plant community within the fire perimeter. There will be areas of Kentucky bluegrass and other introduced species, but not enough to cross a threshold. Essentially, the native grassland remains intact.

Noxious weeds already present in the burned areas, or inadvertently introduced during fire suppression activities, have the potential with the available seed bed to establish and/or spread within burned areas. Historically, leafy spurge has been treated in this area primarily along Andrews Creek; however, in the last five years spot spraying of noxious weeds has occurred here and there. Our weed partner, Billings County Weed Control Board, has contacted us to pretreat dozer lines before they're rehabilitated to stay on top of current control efforts. Historical areas susceptible to immediate weed expansion plus dozer lines are estimated at 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.

Roosevelt Creek Fire

Vegetation plot date (5 plots within fire perimeter) collected in 2013 indicate similarity indices of 72, 71, 77, 64 and 52 percent similarity to the reference plant community for that ecological site. Plant community phase determinations were 1.1 – reference plant community; 1.1 – western wheatgrass-needlegrasses-blue grama (2 plots); 1.2 – western wheatgrass-blue grama; and 2.1 – western wheatgrass-needlegrasses-blue grama. These determinations indicate a native, cool-season grass dominated plant community within the fire perimeter. There will be areas of Kentucky bluegrass and other introduced species, but not enough to cross a threshold outside of the one plot determined to be in the 2.1 plant community phase.

Noxious weeds already present in the burned areas, or inadvertently introduced during fire suppression activities, have the potential with the available seed bed to establish and/or spread within burned areas. Historically, leafy spurge has been treated in this area primarily west of along Roosevelt Creek; however, in the last five years spot spraying of noxious weeds has occurred here and there. Our weed partner, Billings County Weed Control Board, has contacted us to pretreat dozer lines before they're rehabilitated to stay on top of current control efforts. Historical areas susceptible to immediate weed expansion plus dozer lines are estimated at 150 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: NAEmergency 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 13: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
***Land** (Noxious weed treatment)*	80	85	85

E. Cost of No-Action (Including Loss):
744 Fire
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 96 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 $48,000 in the long run.

Roosevelt Creek Fire
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 150 acres within the burned areas susceptible to weed establishment and spread. If pre-emptive detection and suppression of weeds on these 150 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 289 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 $144,500 in the long run.

F. Cost of Selected Alternative (Including Loss):
744 Fire
There remains a 20 percent chance that the proposed treatments for this work either 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 × $48,000) which equals $34,600.

Roosevelt Creek Fire
There remains a 20 percent chance that the proposed treatments for this work either may not be complete prior to damaging storm fail. As a gross estimate, the cost is the treatment estimate ($75,000) plus the loss (0.2 × $144,500) which equals $103,900.

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.gov **Phone(s):** (701)989-7311

Team Members: *Table 14: 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
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, hand lines, routes travelled for suppression, etc.
2. Native 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.

Table 15. Treatment costs.

Fire	Treatment Type	Acres	Cost
744	Fire suppression Response	3.5	$1,750
Roosevelt	Fire Suppression Response	4	$2,000
744	Risk to Native Grassland	46.5	$23,250
Roosevelt	Risk to Native Grassland	146	$73,000

Channel Treatments: NA

Roads and Trail Treatments: NA

Protection/Safety Treatments: NA

I. Monitoring Narrative: NA

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

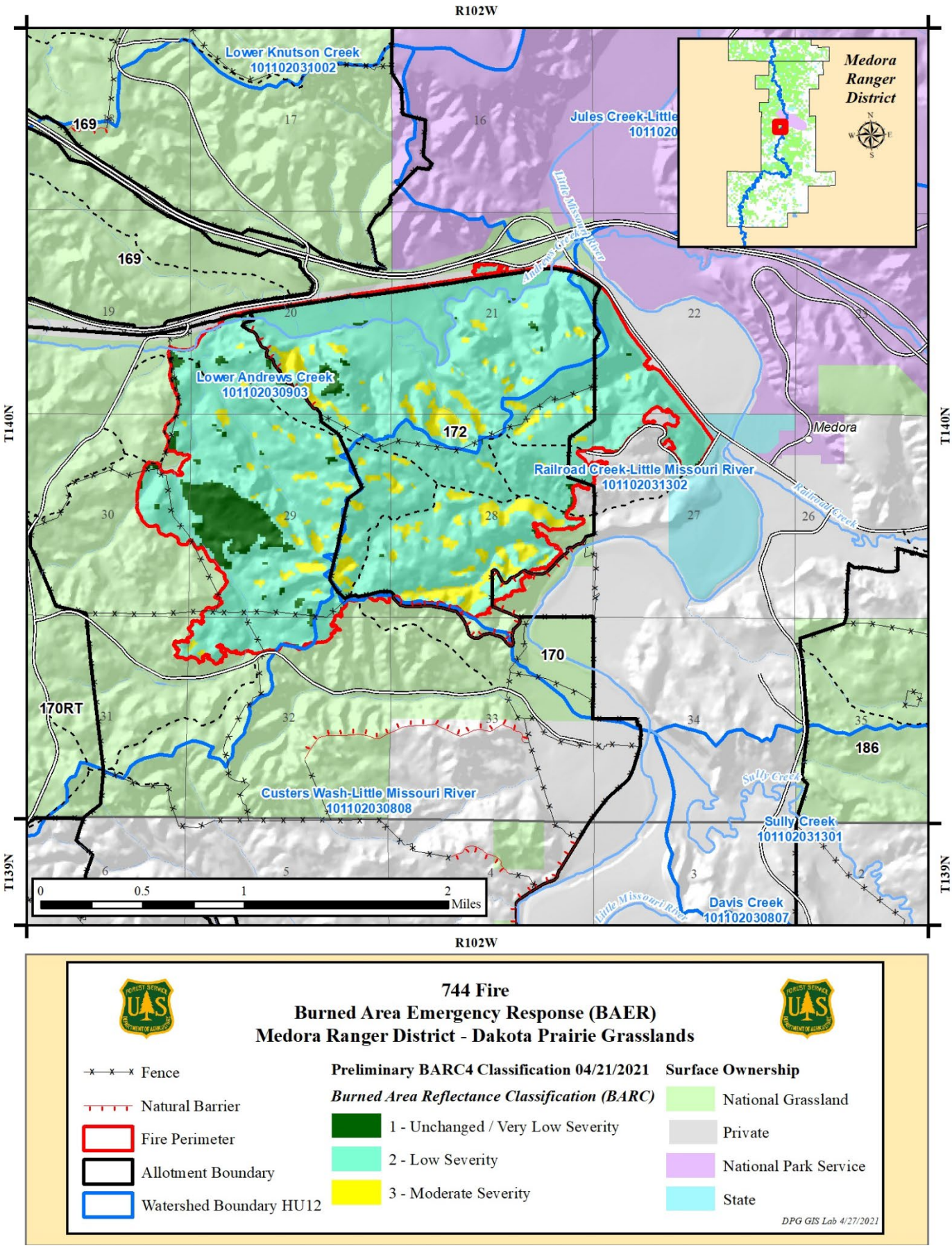
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
EDRR suppression-disturbed areas	Acres	500	7.5	$3,750	$0		$0		$0	$3,750
EDRR native grassland range	Acres	500	192.5	$96,250	$0		$0		$0	$96,250
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$100,000	$0		$0		$0	$100,000
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				$100,000	$0		**$0**		**$0**	**$100,000**
Previously approved										
Total for this request				**$100,000**						

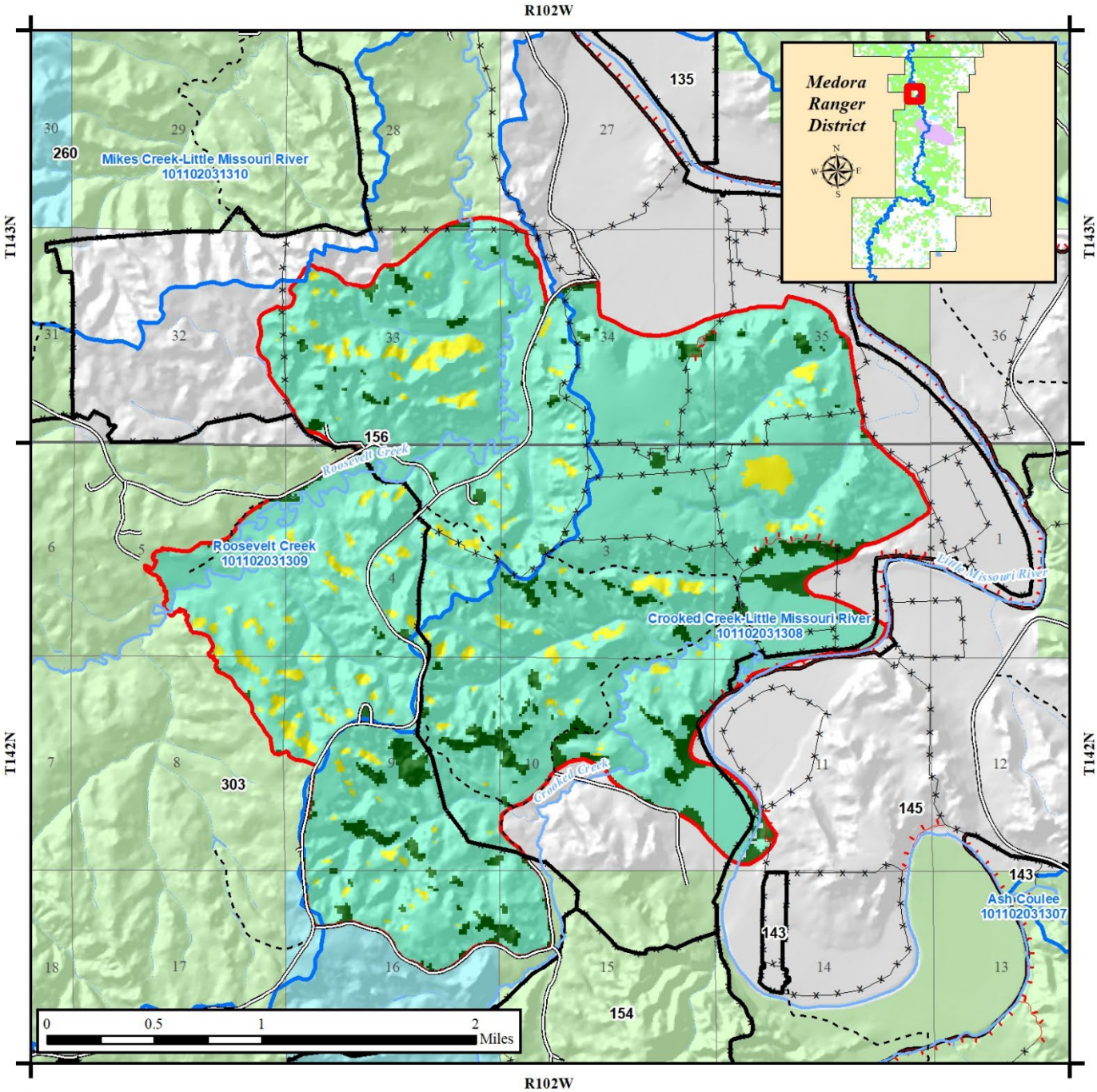
PART VII - APPROVALS

1. BENNIE SOUTH Digitally signed by BENNIE SOUTH Date: 2021.05.27 16:40:56 -05'00'

Forest Supervisor Date

APPENDIX: Soil Burn Severity Maps





Roosevelt Creek Fire
Burned Area Emergency Response (BAER)
Medora Ranger District - Dakota Prairie Grasslands

- Fence
- Natural Barrier
- Allotment Boundary
- Watershed Boundary HU12
- Fire Perimeter

Preliminary BARC4 Classification 04/28/2021

Burned Area Reflectance Classification (BARC)

- 1 - Unchanged / Very Low Severity
- 2 - Low Severity
- 3 - Moderate Severity

Surface Ownership

- National Grassland
- Private
- State

DPG GIS Lab 5/13/2021