Date of Report: 10/9/2018

**BURNED-AREA REPORT**
(Reference FSH 2509.13)

## PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

[ ] 2. Interim Report #____
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

## PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Marten Creek

B. Fire Number: WY-BTF-001825

C. State: Wyoming

D. County: Lincoln and Sublette

E. Region: Intermountain (4)

F. Forest: Bridger-Teton

G. District: Greys River and Big Piney

H. Fire Incident Job Code: P4L44D 0403

I. Date Fire Started: 9/16/2018

J. Date Fire Contained: estimated to be 10/10/2019

K. Suppression Cost: $6,5000,000 (as of 10/06/2019)

L. Fire Suppression Damages Repaired with Suppression Funds (NFS lands only)
1. Other (identify): 3 helispots/bases, 5 drop points, 1 camp

M. Watershed Numbers:
170401030503, 140401010601, 170401030502, 140401010802

N. Total Acres Burned: 6,491 NFS Acres (100%)

O. Vegetation Types:
Sage/grass range lands; Mountain Big Sagebrush, Salix/Carex riparian areas; Aspen; Lodgepole pine; Douglas-fir; Spruce-fir; Whitebark pine

P. Dominant Soils:
Soils in the Marten Fire area are dominantly Typic Cryochrepts, loamy-skeletal,mixed; Mollic Cryoboralfs, loamy-skeletal, mixed; Lithic Cryorthents, loamy-skeletal, mixed; Typic Cryoborolls, loamy-skeletal, mixed (Bridger West Soil Survey).

Q. Geologic Types:

Major geologic formations include the Jurassic Stump and Prueus Red Beds Formation composed of interbedded sandstone, siltstone and claystone; the Nugget Sandstone, Permian, Pennsylvanian and Mississippian Wells, Amsden, and Madison Limestone formations. Quaternary alluvium composed of gravels and cobbles is found on the floodplains and low terraces. Avalanche chutes and scree slopes are common.

R. Miles of Stream Channels by Order or Class: (6) Perennial (17) Intermittent

S. Transportation System: Trails: 7.4 miles Roads: 5.9 miles

## PART III - WATERSHED CONDITION

A. Burn Severity: 7 acres (no data) 1,729 acres (unburned) 2,131 acres (low) 2,734 acres (moderate) 123 acres (high)

B. Water-Repellent Soil (NFS acres only): 2,858 acres (moderate + high burn severity)

C. Soil Erosion Hazard Rating ( Burned NFS acres only):
0% (low) 3% (moderate) 97% (high)

D. Erosion Potential: tons/acre: 1.0 tons/acre

E. Sediment Potential: cubic yards/square mile: 700 $yds^3/mi^2$

## PART IV - HYDROLOGIC DESIGN FACTORS

C. Equivalent Design Recurrence Interval, (years): 25 year

D. Design Storm Duration, (hours): 1 hour

E. Design Storm Magnitude, (inches): 1.0 inches

F. Design Flow (cubic feet / second/ square mile): 11

G. Estimated Reduction in Infiltration, (percent): 64%

H. Adjusted Design Flow, (cfs per square mile): +7

Please note that the 100-year flow event should be used for designing any in-channel structures that may be necessary in interium requests, not necessarily the rainfall/runoff modeling reported here. (see: USGS StreamStats at: https://streamstats.usgs.gov/ss/ to model any particular watershed).

Pre- & post-fire modeling results for selected watersheds for the 25-yr, 1-hr storm (1.0 inch/hour).

Modeling of the 25-year; 1 hour storm = 1.0 inches

| | | Pre-Fire | | | | Post-Fire | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sub-Watershed | Area ($mi^2$) | Total Runoff (acre-ft) | Peak Time (hours) | Pre-Fire Peak Flow (cfs) | Pre-Fire Peak Flow (csm) | Total Runoff (acre-ft) | Peak Time (hours) | Post-Fire Peak Flow (cfs) | Post-Fire Peak Flow (csm) | Increase in CSM | Fold Increase in CSM | Fold Increase in cfs | Reduction in Infiltration |
| Marten Creek | 3.5 | 0.9 | 1.1 | 16 | 4.7 | 3 | 0.6 | 39 | 11.1 | 6.4 | 2.4 | 2.4 | 64% |

## PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Potential Values and the associated criticality of their threat is listed in Table 1 below.

**Table 1. Potential values at risk and criticality**

| Potential Value | Critical | Non-Critical | Notes |
|---|---|---|---|
| Heritage Resources | | X | Details provided in Heritage Report |
| Naturalized Ecosystems (Noxious & Invasives) | X | | Throughout moderate & high soil burn severities |
| Soil Productivity & Hydrologic Function | X | | Throughout moderate & high soil burn severities |
| Water Quality & Fisheries | X | | Throughout moderate & high soil burn severities |
| FS Roads | X | | Drainage along FS Road 10138 |
| Non-Motorized Trail Prisms | X | | Drainages along FS Trails 3045 and 2048/3048 |
| Hazardous Condition Warning | X | | Districts will address with appropriate signage at identified public access points |

The removal of vegetation and increased soil hydrophobicity due to fire have the potential to decrease slope stability. This can result in numerous types of landslides. Based on review of the local geology and the types of historic landslides that have occurred in the fire perimeter, the most likely to occur would be slumps and debris flows or a combination of thereof. These may potentially impact a significant distance downslope from the point of initiation.

From a hydrologic standpoint, an emergency condition does exist. The amount and location of high and moderate burn severities create a likely potential for unacceptable loss USFS roads and trails, soil & site productivity, and water quality.

The burned area includes native plant habitat important to grizzly bears, wolves, sage-grouse, ungulates (elk, deer, moose, antelope) and other wildlife species. All documented invasive species within and adjacent to the burn area have high seed viability, are spread by vehicles and animals and are known to increase post-fire. The overall resiliency of existing native plant communities is considered high and recovery following natural successional pathways is expected, especially areas of low soil burn severity; however there is substantial and documented concern for expensive long-term post-fire treatments and negative impacts due to invasives if left unchecked in areas of moderate to high soil severity and areas disturbed by suppression activities.

### Potential Values and Values at Risk

Risks were evaluated and assigned based on Interim Directive No.: 2520-2018-1 guidance.

**Table 2. Risk assessment table displaying results of critical values risk evaluation**

| Critical Value | Critical Value Type | Probability of Damage | Magnitude of Consequence | Risk |
|---|---|---|---|---|
| Heritage Resources | Cultural & Heritage Resources | Unlikely | Minor | Very Low |
| Soil Productivity & Hydrologic Function | Natural Resources | Likely | Moderate | High |
| Water Quality & Fisheries | Natural Resources | Likely | Moderate | High |
| FS Roads & Motorized Trail Prisms | Property | Likely | Moderate | High |
| Nonmotorized Trail Prisms | Property | Likely | Moderate | High |
| Naturalized Ecosystems (Noxious & invasives) | Natural Resources | Likely | Major | Very High |
| Hazardous Condition Warning | Human Life & Safety | Very Likely | Major | Very High |

B. Emergency Treatment Objectives:

- Nonmotorized Trails – Decrease the potential for low to moderate intensity, short to moderate duration precipitation/snow melt events to result in damage or loss of high value infrastructure (FS Trails 3045 and 2048/3048).

- Invasives – Weeds and native vegetation recovery; Reduce the risk from expansion of existing weed seed beds into burned areas and to allow burned plant communities to recover more rapidly.

- Roads – Decrease the potential for low to moderate intensity, short to moderate duration precipitation/snow melt events to result in damage or loss of high value infrastructure (FS Road 10138)

- Signs – Inform the public of the dangers present within the burned area to reduce the risk of injury or death resulting from an increase in hazard trees throughout the area.

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

Invasives **90**% (prior to seed) Channel **N/A**% Roads & Motorized Trails **70**% Protection/Safety(signs and gates) **90** %

D. Probability of Treatment Success

Table 4. Probability of Treatment Success

| | Years after Treatment | | |
|---|---|---|---|
| | 1 | 3 | 5 |
| Invasives | 90 | 75 | N/A |
| | | | |
| Channel | N/A | N/A | N/A |
| | | | |
| Roads/Trails | 80 | 80 | 70 |
| | | | |
| Protection/Safety | 75 | 50 | N/A |
| | | | |

E. Cost of No-Action (Including Loss):
Cost of No–Action Alternative assumes that a low to moderate intensity, short to moderate duration precipitation/snow melt event occurring over the areas proposed for treatment would result in the loss of portions of FS Road 10138. It would also result in the loss of FS Trails 3045 and 2048/3048. There is currently a relatively low amount of noxious/invasive weeds in the area. Not acting quickly to maintain control of the existing infestations, would be a significant loss of future plant communties. The potential injury or loss of life from hazards within the burn perimeter resulting from inadequate signage notifying public users and would far exceed any request for sign funding.

F. Cost of Selected Alternative (Including Loss): Refer to Table 6 – Treatment Cost Summary

G. Skills Represented on Burned-Area Survey Team:

[**X**] Hydrology [**X**] Soils [] Geology [] Range [] Forestry [] Wildlife [] Fire Mgmt
[] Engineering [] Contracting [] Ecology [X] Botany [**X**] Archaeology [X] Fisheries
[] Research [] Landscape Arch [**X**] GIS

Team Leader:
Trevlyn Robertson, Hydrologist, Bridger-Teton NF trevlynrobertson@fs.fed.us Phone: 307-886-5317

Core Team Members:

- Brad Higginson – Hydrology
- Cindy Stein - Trails
- JP Schubert - Archeology
- Rose Lehman – Invasives
- Chris McCollister – GIS/Avalanche
- Eric Winthers - Soils

## Part VI – Emergency Stabilization Treatments and Source of Funds

H. **Treatment Narrative:**

Natural Resources and Property:

Invasives
Total treatment cost is unknown at this time due to waiting for treatment specifications from the local Weed and Pest. An interim report with be filed this winter with a more specific cost estimate along with a more finite estimate of treatments actions tied to fire suppression versus locations/areas determined to be a BAER critical value. This treatment plan with be included along with the proposed EDRR treatment once received from Lincoln County Weed and Pest.

Roads Treatments:
BAER funds are appropriate for treatment of anticipated fire erosion events on roads but not to improve roads to standards over pre-fire conditions. The objective of the proposed road treatments are to stormproof the road investments from accelerated erosion, sediment transport, and sediment deposition on travel routes and reduce the sediment transfer from the routes while maintaining access to the Forest for administrative, private lands access, and public use. Wildfire accelerated surface flows down roads are probable and if not treated will cause significant surface erosion and failure in localized areas.

FS Road 10138 (Greys River Road)
Implement storm proofing at approximately 20 culverts within the fire perimeter. Clear debris upstream and downstream of the Red Creek Culvert. Armor the intake and outtakes of the culverts if needed along with cleaning the catchment basins of the intakes. Storm patrol of this section of the road will be needed during the fall and spring/summer of 2019.

FS Trails 3045 and 2048/3048
BAER funds are appropriate for treatment of anticipated fire erosion events on trails but not to improve trails to standards over pre-fire conditions. The objective of the proposed trails treatments are designed to prevent the uncontrolled channeling and resultant damage of water across roads and trails. These treatments are also designed to reduce erosion and further watershed degradation by controlling run-off drainage within the trail prism. Wildfire accelerated surface flows down trails are probable and if not treated will cause significant surface erosion and failure in localized areas.
Cross-drains and water bars will protect the tread that currently exists and will help protect from runoff during fall storm activity. This treatment need was identified for 10 miles of FS Trails 2129, 2130-31, 2136, and 2049 within the moderately and highly burned areas. Hazard trees would need to be identified and cut down to provide for a safe work area for the trail crew to implement the treatments.

Protection/Safety Treatments:

National Weather Service
Coordinate with the local National Weather Service in Riverton to provide them the finalized BARC map to assist with an early warning system for flash flooding and debris flows within the Marten Creek Fire area.

Signs

Post warning signs at road and trail portals to notify public of increased hazards as a result of post wildfire conditions.

**Table 7. Treatment Cost Summary**

| Line Item | Units | Cost/day | # of Units | BAER $ | Total $ |
|---|---|---|---|---|---|
| **Natural Resources and Property** | | | | | |
| Invasives | An interim report will be filed this winter with exact treatment costs. | | | | |
| Greys River Road Storm Proofing | 1 | $1,000 | 1 | $1,000 | $1,000 |
| Storm Patrol | 1 | $1,000 | 2 | $2,000 | $2,000 |
| Trail Stabilization | 1 | $2,502 | 3 miles | $7,507 | $7,506 |
| | | | | | |
| **Protection and Safety** | | | | | |
| Hazard Signs | 1 | $170 | 10 | $1,700 | $1,700 |
| | | | | | |
| **BAER Evaluation** | | | | | |
| Team Salary | 4 | $464 | 6 | | $2,784 |
| | | | | | |
| Monitoring | Included within the cost of the treatments | | | | |
| | | | | | |
| **Totals** | | | | | |
| | | | | | |
| Total for this request | | | | | $12,206 |

I. **Monitoring Narrative:**

Implementation monitoring is proposed and will occur as the treatments are installed or put in place. Inspectors will monitor all contracted treatments to ensure proper implementation. The cost of the implementation monitoring is included in the treatment costs.

## PART VII - APPROVALS

_____ 10/09/2018_____

Forest Supervisor (signature) Date

__/s/Mary Farnsworth (for)_____ _10/16/2018_____

Regional Forester (signature) Date