**Date of Report:** 07/10/2018

# 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:** Sardinas Canyon

**B. Fire Number:** NM-CAF-000457

**C. State:** NM

**D. County:** Taos

**E. Region:** Southwest R3

**F. Forest:** Carson

**G. District:** Camino Real

**H. Fire Incident Job Code:** P3LW1K

**I. Date Fire Started:** 06/24/2018

**J. Date Fire Contained:** 40% as of 7/9/18

**K. Suppression Cost:** $ 2,500,000

**L. Fire Suppression Damages Repaired with Suppression Funds**
1. **Fireline waterbarred (miles):** ongoing
2. **Fireline seeded (miles):** ongoing
3. **Other (identify):** Base Camp/ Helispot/ Heli Base

**M. Watershed Number:**

| Watershed Number | Watershed Name | Acres Burned | Total Acres | Percent of Watershed Burned |
|---|---|---|---|---|
| 130201010901 | La Junta Creek | 2,103 | 19,273 | 11 |
| 130201010502 | Headwaters Rio Grande de Rancho | 192 | 25,824 | 1 |

**N. Total Acres Burned:**
**[ 2,337] NFS Acres [ ] Other Federal [ ] State [ ] Private**

**O. Vegetation Types:** Spruce/Fir, Mixed Conifer

**P. Dominant Soils:** Typic Cryoboralfs

**Q. Geologic Types:** Sandstone, Shale, Limestone

**R. Miles of Stream Channels by Order or Class:** 1st – 3, 2nd – .5

**S. Transportation System**

**Trails:** 1 **miles** **Roads:** 32 **miles**

## PART III - WATERSHED CONDITION

**A. Burn Severity (acres):** 1563 **(low)** XXX **(moderate)** 744 **(high)**

**B. Water-Repellent Soil (acres):** 370

**C. Soil Erosion Hazard Rating (acres):** 26 **(low)** 212 **(moderate)** 2069 **(high)**

**D. Erosion Potential:** 8 **tons/acre**

**E. Sediment Potential:** 571 **cubic yards / square mile**

## PART IV - HYDROLOGIC DESIGN FACTORS

**A. Estimated Vegetative Recovery Period, (years):** 5

**B. Design Chance of Success, (percent):** 80

**C. Equivalent Design Recurrence Interval, (years):** 10

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

**E. Design Storm Magnitude, (inches):** 1.65

**F. Design Flow, (cubic feet / second/ square mile):** 41

**G. Estimated Reduction in Infiltration, (percent):** 32

**H. Adjusted Design Flow, (cfs per square mile):** 199-238

## PART V - SUMMARY OF ANALYSIS

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

**Critical Values Identified**
Critical Values identified (FSM 2523.1 Exhibit 01) during the BAER assessment are: Human life and safety, property, natural resources and cultural/heritage resources. The BAER team evaluated the risk to those critical values using the BAER Risk Assessment (FSM 23235.1 Exhibit 02).

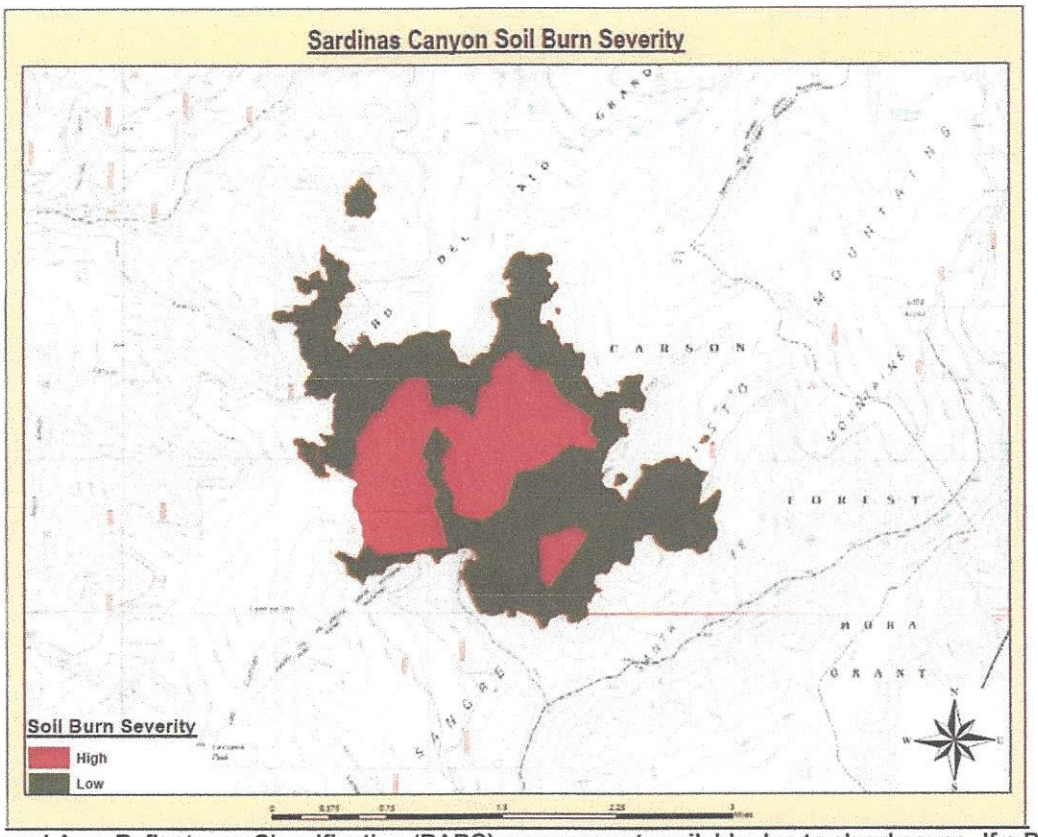
See project record for list of all critical values identified through the BAER assessment.

| 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 |

*Risk Matrix Table for Values at Risk with High or Very High ratings*

| Risk Type | Value at Risk | Potential Threats | Owner ship | Probability of Damage | Magnitude of Consequence | Risk | Forest Service Treatment Method |
|---|---|---|---|---|---|---|---|
| Life/Safety | Human life and safety | Increase runoff, debris flows/loose rock/hazard trees | USFS | Possible | Major | High | Recommend area closure, sign and gate access points. Close campgrounds (3), restrict access to dispersed camping along stream course. |
| Infrastructure | Human health and safety | Breach of vault toilet from increased runoff, erosion, and sediment delivery | USFS | Likely | Moderate | High | Pump Vault Toilets (3) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Infrastructure | La Junta Road (FR 76) | Increased runoff, erosion, and debris flows | USFS | Very Likely | Moderate | Very High | |
| Infrastructure | Sardinas Canyon Motorized Trail (Trail 12) | Increased runoff, erosion, and debris flows | USFS | Very Likely | Moderate | Very High | |
| Natural Resource | Soil Productivity | Increased soil erosion | USFS | Likely | Moderate | High | No treatment recommended |




**A Burned Area Reflectance Classification (BARC) map was not available due to cloud cover. If a BARC image becomes available it will be used to refine the soil burn severity map.**

People who may find themselves within the burn area during or immediately after large precipitation events will be at a high risk from post fire flooding and debris flows. Other post fire hazards exist within the burn area including stump holes and hazard trees. The area is recommended to be closed through the first monsoon season and assessed thereafter for recommendations to reopen. Hazard warning signs and gates are recommended to be placed at access points to inform forest visitors of potential post fire hazards and restrict access to the burn area. A large number of administratively closed and user created roads occur within and around the burn area creating multiple entry points. The number of gates requested reflects the high amount of access points to the burn area.

Existing (open) forest service roads and trails (Sardinas Canyon Trail and La Junta Road) and associated culverts have a very high risk to failure from post fire effects. Increased flows may cause the capacity of drainage features to be exceeded and transported sediment and debris may cause culverts and other drainage features to fail. These impacts may cause uncontrolled flow to cross the road and damage the road prism with potential for structural failure of roads. The road prism may become impassible to vehicles and in extreme cases may be completely washed out due to fill slope failure. Road prisms may also be damaged due to falling rock and debris making the road impassible.

Vegetative cover is critical to reducing erosion rates, improving hydrologic function and maintaining site productivity. Natural re-establishment of cover is the preferred BAER recommendation. The burn area contains aspen that typically re-sprout after fire; therefore conditions in areas that were classified as high soil burn severity are expected to respond through natural re-establishment. Fire-induced soil hydrophobicity can negatively impact hydrologic function, however these soil conditions are likely to dissipate within the first year and were not widespread across the burn area. If wide-spread heavy rainfall events occur within the recovery period, erosion and sedimentation above pre-fire rates will occur. Accelerated erosion has the potential to delay vegetative cover re-establishment if it exceeds soil loss tolerance.

Based on historic precipitation patterns, it can be expected that high-intensity monsoon storms have a high probability of occurring in the weeks following the Sardinas Canyon Fire. These short duration, high intensity storms are associated with flash flooding and erosional events. These conditions will be exacerbated by the fire, creating hazardous conditions within and downstream of the burned area. Post-fire flows may create ash and debris flows and runoff several orders of magnitude greater than pre-fire flow conditions resulting in hydrologically responsive drainages.

Peak flows have been estimated for the small sub-watershed containing the burn area using the Wildcat 5 Rainfall-Runoff Hydrograph Model from the University of Arizona and supported by the USDA Forest Service. The Wildcat modeling is generally targeted at areas of high burn severity and areas with hydrophobic soils, as runoff from these areas are expected to be different from the unburned or low burn severity areas. Therefore, smaller basins that burned with a high severity are expected to display a larger magnitude response compared to a larger basin that contains a mosaic of unburned, low, moderate and high burn severities. Areas with hydrophobic soils further add to the predicted magnitude of runoff. Riparian areas adjacent to the fire perimeter are still intact and exhibit an adequate degree of roughness provided by vegetation which helps to attenuate effects of ash and sediment flows including floatable large woody debris.

*Wildcat 5 Results Summary*

Estimated pre- and post-fire peak flows for the Wildcat 5 models are summarized in the table below. A total of 3 Wildcat 5 runs each were completed simulating 2, 5, and 10 year/1-hour storm events. The modeled storms' precipitation ranged from 1.03 to 1.65 inches/hr. These recurrence interval storms were used because they are the most likely to happen within the next few years during the recovery period of this watershed. Due to the inability to acquire a BARC map or an aerial flight over the burn area, the BAER team was unable to produce a completely accurate soil burn severity map. Because of this, a range of values for post fire peak flows was modeled. The acreages of the modeled runs included two estimates of high severity burned soil. The first was 800 acres and the second was a more

conservative figure of 1000 acres. Because the data in the table below are derived from a numerical model, the runoff estimates should not be interpreted as absolute values. Small drainage basins with higher percentages of high burn severity showed the greatest increases in runoff potential. The results from the modeling runs indicate that it is likely that 2-5 year storm could exceed the capacity of the culvert at the intersection of FR 76 and Sardinas Creek.

***Storm Recurrence Interval and Generated Peak Flow Table***

| Storm recurrence interval | Pre-fire peak flow (cfs) | Post-fire peak flow (cfs) 800acres High severity | Post-fire peak flow (cfs) 1000acres High severity | Flow Capacity of culvert FR 76 / Sardinas Creek (cfs) |
|---|---|---|---|---|
| 2 yr | 6 | 628 | 784 | 840 |
| 5 yr | 128 | 1069 | 1304 | 840 |
| 10 yr | 308 | 1489 | 1784 | 840 |

**B. Emergency Treatment Objectives (narrative):**

1. Administratively close burn area to protect and restrict access to the burn area.
2. Install road closure gates and hazard warning signs at key access points of the burn area to inform the public and prevent exposure to hazard trees, flooding, debris flows, and entrapment within the burn area.
3. Install road closure gates and hazard warning signs to prevent access to camping and day use sites that exist in high risk areas.
4. Pump (3) vault toilets that have a high likliehood of being impacted by post fire flows, debris, and sediment to reduce the risk to human helath and safety.

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

**Land** XXX% **Channel** XXX% **Roads/Trails** XXX% **Protection/Safety** 80%

**D. Probability of Treatment Success**

| | Years after Treatment | | |
|---|---|---|---|
| | 1 | 3 | 5 |
| **Land** | XXX | XXX | XXX |

| | | | |
|---|---|---|---|
| **Channel** | XXX | XXX | XXX |
| | | | |
| **Roads/Trails** | XXX | XXX | XXX |
| | | | |
| **Protection/Safety** | 80 | 80 | 80 |

**E. Cost of No-Action (Including Loss):** XXX

**F. Cost of Selected Alternative (Including Loss):** XXX

**G. Skills Represented on Burned-Area Survey Team:**

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

**Team Leader**: Greg Miller

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**H. Treatment Narrative:**
**(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)**

**Land Treatments**: XXX

**Channel Treatments**: XXX

**Roads and Trail Treatments**: XXX

**Protection/Safety Treatments**:

Restrict access for protection of life and safety. Recommend administrativley closing the burn area to protect the public from entering the burn area.

Recommend installing 14 road closure gates and hazard warning signs at key access points due to safety concerns within the burn area and in downstream channels especially during the monsoon season. The gates would physically restrict access while the signs would inform forest users of potential risks including loss of life and injury by entering the burn area. The number of gates and signs recommended reflect the very high number of administrativley closed roads within and surrounding the burn area that provide access.

Recommend pumping three vault toilets due to health and safety concerns where toilets could be breached by increased flows, debris, and sediment.

I. **Monitoring Narrative:**
**(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)**

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

| | | | 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 |
| | | | | $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 |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Channel Treat.* | | | | $0 | $0 | | $0 | | $0 | $0 |
| C. Road and Trails | | | | | | | | | | |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Road & Trails* | | | | $0 | $0 | | $0 | | $0 | $0 |
| D. Protection/Safety | | | | | | | | | | |
| Gates | | 5000 | 14 | $70,000 | $0 | | $0 | | $0 | $70,000 |
| Warning Signs | | 400 | 14 | $5,600 | $0 | | $0 | | $0 | $5,600 |
| Vault Toilet Pump | | 500 | 3 | $1,500 | $0 | | $0 | | $0 | $1,500 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Structures* | | | | $77,100 | $0 | | $0 | | $0 | $77,100 |
| E. BAER Evaluation | | | | | | | | | | |
| | | 15,000 | 1 | — | $15,000 | | $0 | | $0 | $15,000 |
| *Insert new items above this line!* | | | | — | $0 | | $0 | | $0 | $0 |
| *Subtotal Evaluation* | | | | — | $15,000 | | $0 | | $0 | $15,000 |
| F. Monitoring | | | | | | | | | | |
| | | | | $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 | | | | $77,100 | $15,000 | | $0 | | $0 | $92,100 |
| Previously approved | | | | | | | | | | |
| Total for this request | | | | $77,100 | | | | | | |

## PART VII - APPROVALS

1. James P Dunn — Forest Supervisor (signature) — July 10/2018 — Date

2. Elaine Kohrman — Regional Forester (signature) — 7/11/2018 — Date