**Date of Report: 07/30/2021**

# 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: Tiger**

**B. Fire Number: AZ-PNF-001008**

**C. State: AZ**

**D. County: Yavapai**

**E. Region: 03**

**F. Forest: Prescott National Forest**

**G. District: Bradshaw Ranger District**

**H. Fire Incident Job Code: P3N4E9 (0309)**

**I. Date Fire Started: 06/30/2021**

**J. Date Fire Contained: 07/29/2021**

**K. Suppression Cost: $5,644,000**

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

1. **Fireline repaired (miles):** 1.2 miles handline; .3 miles dozer line
2. **Other (identify):**

**M. Watershed Numbers:**

*Table 1: Acres Burned by Watershed*

| HUC # | Watershed Name | Total Acres | Acres Burned | % of Watershed Burned |
|---|---|---|---|---|
| **150701020305** | Poland Creek | 28,041 | 160 | .6% |
| **150701020308** | Black Canyon Creek (Local Drainage) | 41,373 | 16,177 | 39% |
| | | | | |
| | | | | |

**N. Total Acres Burned:**

*Table 2: Total Acres Burned by Ownership*

| OWNERSHIP | ACRES |
|---|---|
| **NFS** | 11,761 |
| **OTHER FEDERAL (BLM)** | 4,575 |
| **STATE** | |
| **PRIVATE** | |
| **TOTAL** | 16,336 |

**O. Vegetation Types:** Interior Chaparral 54%, Semi-Desert Grassland 20%, Desert Communities 4%, Ponderosa Pine-Evergreen Oak 23% (Minor subject to burn)

**P. Dominant Soils:** TEU 475 & 360 Lithic Haplustalfs

**Q. Geologic Types:** Granite

**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 |
| **INTERMITTENT** | 29 |
| **EPHEMERAL** | 74 |
| **OTHER (DEFINE)** | |

S. **Transportation System:**
**Trails:** *National Forest (miles):* 11.35 *BLM (miles):* .65
**Roads:** *National Forest (miles):* 1.5 *BLM (miles):* .23

## PART III - WATERSHED CONDITION

**A. Burn Severity (acres):**

*Table 4: Burn Severity Acres by Ownership*

| Soil Burn Severity | NFS | Other Federal (BLM) | State | Private | Total | % within the Fire Perimeter |
|---|---|---|---|---|---|---|
| **Unburned** | 1479 | 1309 | -- | -- | 2788 | 17% |
| **Low** | 8062 | 3158 | -- | -- | 11220 | 69% |
| **Moderate** | 1848 | 108 | -- | -- | 1956 | 12% |
| **High** | 373 | 1 | -- | -- | 373 | 2% |
| **Total** | 11,761 | 4,575 | -- | -- | 16,336 | 16,336 acres |

**B. Water-Repellent Soil (acres):** 800

**C. Soil Erosion Hazard Rating:** Severe

**D. Erosion Potential:**
- Average Post Fire rate: 4.7 tons/acre
- Average Pre-Fire rate: .02 tons/acre
- Tolerable rate: 2.0 tons/acre
- Erosion Rate Probability ~50% or “Likely” for 1 year post-fire
- Erosion rate tons/acre by Soil Burn Severity Class

| PNVT - TEUI | Slope Range | Unburnt | Low | Moderate | High | Weighted Post Fire Average |
|---|---|---|---|---|---|---|
| Chaparral/ Rock Outcrop - 475 | 40-120% | 0 | 4.38 | 6.25 | 8.65 | 4.34 |
| Semi-Desert Grassland - 360 | 15-60% | 0.08 | 6.63 | 8.13 | 11.4 | 5.95 |

**E. Sediment Potential:** Pre-fire 213 tons/acre; Post-fire 55,228 tons/acre

**F. Estimated Vegetative Recovery Period (years):** 3-7

**G. Estimated Hydrologic Response (brief description):** Watershed conditions following a fire, such as loss of stabilizing vegetation, decreased soil porosity, and increased hydrophobicity in soils, are all factors that can increase the magnitude, timing, and volume of stormwater runoff. Additionally, the volume of sediment and ash that these flows can transport can cause aggradation, down cutting, and/or widening of stream channels that can significantly reduce the functioning condition of these channels. The increased peak flows pose a threat to life, property, and resources within and below the burned area.

Post-fire hydrologic response for 5, 10, 25, and 100 year 1-hour precipitation events were modeled using Wildcat 5 for 6 small drainages within and flowing just outside the Tiger Burn Scar area. Wildcat 5 was chosen as the modeling method due to the size of the drainage basins of interest being relatively small.

Runoff from the 5-year one-hour convective event (~1.37”) was modeled to result in approximately 2.5 times greater flow than unburned conditions as a function of burn severity distribution throughout the 6 drainages. Runoff from the 10-year convective storm (~1.65”) was modeled to result in just over 2 times greater flow from unburned conditions. The 25-year one-hour storm (~2.05”) resulted in approximately 1.8 times increase from unburned conditions. And lastly, the 100-year one-hour storm (~2.72”) resulted in slightly more than 1.5 times increase from unburned conditions. The decrease in percent change as recurrence intervals lower in probability is due to increased precipitation depths resulting in higher peak flows instead of curve numbers dictating the model outputs.

All delineated drainages were created to show increased risk to FS values and one non-FS road. Castle Creek and Trial watershed has a pour point at the Castle Creek Trail. N. Fork Rock Creek watershed has a pour point at FSR 9268W. Sycamore_9268W watershed has a pour point at FSR9268W. Thunderbolt Mine Rd watershed has a pour point near the terminus of Thunderbolt Mine Road (non-FS value). TwinPeaks1 and TwinPeaks4 have pourpoints at the FS Twin Peak Trail.

Wildcat 5 Results (Percent Change: Prefire to Postfire)

| Percent Increase Pre to Post Fire by Precipitation Event | | | | | |
|---|---|---|---|---|---|
| **Watershed** | **Acres** | **5-yr** | **10-yr** | **25-yr** | **100-yr** |
| Castle Creek and Trail | 1661.2 | 100.28 | 69.45 | 48.56 | 36.75 |
| N. Fork Rock Creek | 738 | 90.33 | 73.68 | 62.73 | 50.93 |
| Sycamore_9268W | 2991.1 | 112.02 | 78.17 | 56.57 | 47.61 |
| ThunderboltMineRd | 1161.5 | 172.29 | 117.40 | 90.13 | 72.33 |
| TwinPeaks1 | 464.9 | 353.55 | 244.16 | 179.84 | 134.55 |
| TwinPeaks4 | 449.7 | 121.53 | 80.56 | 56.36 | 45.27 |
| **Average Percent Change** | | 158.34 | 110.57 | 82.36 | 64.57 |

## PART V - SUMMARY OF ANALYSIS

**Background**
Within the last 2 decades this area within the Castle Creek Wilderness has been subjected to 3 lighting caused wildfires which include Tiger 2006, Rattlesnake 2015, and Tiger 2021. The fire is predominantly within the Prescott NF (72%) with the remainder within BLM (28%). The BLM is not anticipating conducting a post-fire risk assessment because of the limitied values at risk associated with desert communities and lack of infrastructure.

The vast majority of the fire is located within the Black Canyon Watershed (local drainage) and the footprint impacted 49% of the watershed. The fire consists of 14% moderate and high burn severity and 69% low severity.

High and moderate burn severity is concentrated on the Twin Peaks and Horsethief Basin divide on very steep slopes and escarpments that are bouldery and have rock escarpments. Vegetation type within these areas are interior chaparral with high levels of shrub biomass that were fully consumed and shrub skeletons remain. The distinction between high and moderate severity is the moderate burn severity was associated with high levels of boulder cover. Impacts to soil alteration and biomass consumption is similar. The granitic soils are prone to hydrophobicity and is expected to be affiliated with high burn severity and portions of moderate burn severity not associated with boulder cover.

In high and moderate burn severity areas, shrub consumption occuring within boulder outcrops may create post-fire rockfall hazards. These areas are affiliated with erosive granite parent material and are located on inherently unstable slopes. Lack of protective shrub cover and anchoring properties make these areas suceptable to rock/boulder movement and rockfall from summer monsoon runoff/erosion and winter freeze/thaw. Rockfall movement can create a cascading rock ravel that could also amplify soil movement. The potential rockfall runout would be expected to occur downhill into light burn severity areas and the runout distance could be amplified due to downhill continuation of very steep slopes. Movement of rock ravel onto Semi-Desert Grassland Soils on very steep slopes could also amplify soil instability on inherently unstable soils associated with granite parent material.

Only 4% of the Desert Communities are located within the fire footprint with the majority subjected to low burn severity and a minimal amount unburned.

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

*Table 5: 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):** Rockfall, boulder movement, and rock ravel have a *Possible* probability of occurance within the footprint of the fire and adjacent drainages. Magnitude of Risk is *Major*. A risk of **High** would predominantly be affiliated with summer moonsoon storm events and the winter freeze/thaw period.
   a. Routes: Routes immediately downstream of the fire located on the western edge are difficult to acess, generally affiliated with specialised rock crawler vehicles from BLM from access, and recreating activities concentrate during periods of cooler periods. The probability of impact to human live and safety from post fire elevated downstream flooding and very limited rockfall is *Possible*. The Magnitue of Consequence is *Major*. Anticipated risk is **High**.
   b. Trail users and canyoneers entering the canyons in and below the burned area typically occurs during the cooler winter periods. Probability of damage to human life and safety is *Possible* because post-fire monsoon period would have passed but freeze-thaw affiliated with rockfall maybe initiated. Magnitude of Consequence is **High**.
   c. Hunting. In discussions with Arizona Game and Fish Department, The Tiger Fire burn area in

Castle Creek Wilderness receives very little to zero hunters during the August "Over The Counter" deer season and they would not foresee safety concerns for hunters in this area. The Probability of damage to human life during hunting season that occurs after monsoons and before winter freeze/thaw is *Unlikely*. The Magnitude of the Consequences is *Major*. This presents an **Intermediate** risk.

d. Downstream Post-fire Flows: Flows and debris will increase within and shortly downstream of the burn area but will prominently be localized to the steep drainages within and shortly downstream of the burn scar. Personnel from the National Weather Service have observed downstream flows within Black Canyon similar to historic monsoon induced flows. Without a closure the probability of damage to human life during the monsoon and before winter freeze/thaw is *Likely*. The Magnitude of the Consequences is *Major*. This presents a **Very High** risk. With the closures, the probability of damage to human life during the monsoon and before winter freeze/thaw is *Unlikely*. The Magnitude of the Consequences is *Major*. This presents an **Intermediate** risk. Outside and downstream of the closure, probability of damage to human life during the monsoon and before winter freeze/thaw is *Unlikely*. The Magnitude of the Consequences is *Major*. This presents an **Intermediate** risk**.**

3. **Property (P):** Trails. There is a **very high** risk to approximately 1.95 miles of trails out of 11.35 miles within the burned area. These trail sections occur within or below moderate and high SBS on steep terrain (>40%). The major threat to these trail sections include first year erosion rates ranging from 6 tons/acre to 11 tons/acre. Post-fire accelerated soil loss levels are expected to exceed tolerable levels.
4. **Natural Resources (NR):**Soil. Soil loss is expected to have a temporary negative impact to productivity, particularly on the limited high/moderate severity areas but average soil loss is above tolerable soil loss levels. Probability of elevated soil loss levels is *Likely* immediately post-fire but overtime with recovery the probability is *Possible*. Average Magnitude of Consequence (erosion rate) is *Moderate*. Soil productivity damage or loss Risk is **Intermediate**.
    b. Hydrology. The expected increased volume of flow, sediment, and ash is expected to cause localized aggradation, down cutting, and/or widening of stream channels that will temporarily reduce the functioning condition of these channels; predominantly occurring within and just downstream of high/moderate severity burn areas, particularly within the northern area of the burn boundary. Probability of elevated reduction in hydrologic function levels is *Likely* immediately post-fire but overtime with recovery the probability is *Possible*. Magnitude of Consequence is *Minor*. Hydrologic Function reduction Risk is **Low**.
    c. Terrestrial Wildlife. In the PNVTs where fire does naturally occur, the Tiger Fire will have beneficial effects to the habitat and wildlife. Negligible fire impacts may have occurred in a very small portion of the Desert PNVTs. Magnitude of Consequence: *Minor*. Probability of Damage or Loss: *Unlikely*. Risk: **Very Low**.
    d. Desert Communities -Annual Red Brome. Annual red brome was present in areas, par but the likelihood of expansion from the fire is minimal due to the low burn severity. Magnitude of Consequence = *Minor*. Probability of Damage or Loss = *Unlikely*. Risk = **Very Low**
4. **Cultural and Heritage Resources:**Since the 69% of the burn area was subject to low burn severity, the Risk to cultural resources was **Low**. Fire did encroach one NRHP-Eligible cultural resource (AR-03-09-02-002, East Fort), but imagery provided by Jason Williams on 7/26/21 shows minor impacts to the non-fire sensitive hilltop fort. One fire-sensitive, NRHP-Eligible cultural resource (AR-03-09-02-017, Cat Claw Site Petroglyphs) is plotted 100 meters outside the fire perimeter along Boulder Creek and will need to be re-located to confirm post-fire condition. There were two other non-fire sensitive sites that were within the fire perimeter (AR-03-09-03-167 and AR-03-09-03-1088) and any fire effects are expected to be very low. Magnitude of Consequence = *Minor to None*. Probability of Damage of Loss = *Unlikely*

**B. Emergency Treatment Objectives:**

a. Human Life and Safety
- Temporary Administrative Closure
- Post-Fire Hazard Caution Signage

b. Trail Infrastructure – Minimal storm proofing to save prioritized trail segments from total loss requiring full redesign and reconstruction.

**C. Probability of Completing Treatment Prior to Damaging Storm or Event:**
**Land**: NA
**Channel:** NA
**Roads/Trails:** 70%
**Protection/Safety:** 80%

**D. Probability of Treatment Success**

*Table 6: Probability of Treatment Success*

| | *1 year after treatment* | *3 years after treatment* | *5 years after treatment* |
|---|---|---|---|
| ***Land*** | | | |
| ***Channel*** | | | |
| ***Roads/Trails*** | 70 | 90 | 95 |
| ***Protection/Safety*** | 80 | 90 | 95 |

**E. Cost of No-Action (Including Loss):** *Not account for Administrative Closure, Caution Signage and Human Life and Safety. Based on FS Property: Trail Infrastructure.* $117,000

**F. Cost of Selected Alternative (Including Loss):** $95,900

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

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

**Team Leader:** David Moore
**Email:**david.moore@usda.gov **Phone(s)**928-713-9028

**Forest BAER Coordinator:** David Moore
**Email:**david.moore@usda.gov **Phone(s):**928-713-9028

**Team Members:***Table 7: BAER Team Members by Skill*

| **Skill** | **Team Member Name** |
|---|---|
| *Team Lead(s)* | David Moore |
| *Soils* | David Moore |
| *Hydrology* | Chad Yocum |
| *Trails/Roads* | Jason Williams |
| *GIS* | Tom Potter |
| *Archaeology* | Carlos Herrera |
| *Weeds* | Francisco Anaya |
| *Wildlife* | Noel Fletcher |
| *Public Affairs Officer* | Debbie Maneely |

**H. Treatment Narrative:** Public administrative closure of the fire footprint area would be implemented due to rockfall hazards associated with high/moderate burn severity on very steep slopes and subsequent downhill rockfall runout onto low burn severity areas. Localized post fire flooding risks predominantly affiliated within the fire scar also exists. Administrative closure monitoring effectiveness would occur during and/or after the winter season due to potential rockfall hazards associated with freeze/thaw activity. Caution signage would be installed to inform the public of post-fire hazards when temporary closure has been lifted.

**Land Treatments:** None

**Channel Treatments:** None

**Roads and Trail Treatments:**
Trail storm proofing is recommended to protect trail infrastructure within the burned area. Minimal work should be done to stabilize trail alignments preventing total loss. Total trail loss would not only require total reconstruction, but once the alignments are undetectable the entire trail would need a total redesign and layout. The work would include rapid trail benching, removing backslope sloughing to keep the trail alignment identifiable, focused on priority trail segments in or below high and moderate SBS on steep (>40%) slopes. Trail treatments will be completed by 1- 5 person crew. The Prescott NF will modify existing agreements to expedite the treatments being completed. See trail treatment map for specific locations.

**Trail Priorities for Treatment**

| Number | Trail Name | **Priority** | Miles | Justification |
|---|---|---|---|---|
| 240 | Twin Peaks | 1 | 1.44 | Critical access for Range infrastructure and high value canyoneering recreation activities |
| 239 | Castle Creek | 2 | .43 | Critical access for Range infrastructure and high value canyoneering recreation activities |
| ***Total Trail Infrastructure Storm Proofing: 1.95 miles*** | | | | |

**Trail Treatment Cost Breakdown per Mile**

| Item | Item/Mile | Days | Miles | Miles Per Day | Cost/Day | **Total Cost** | **Cost per Mile** |
|---|---|---|---|---|---|---|---|
| | | | | | | **$5,751** | **$2,949** |
| Conservation Corps Crew | 5 person crew | 2 | 1.95 | 1 | $1,667 | $3,251 | $1,667 |
| Conservation Corps Crew | Mobilization Cost | 2 | | | $1,250 | $2,500 | |

**RoadTreatments:** None are needed or being recommended as the 1.5 miles road within the fire area is managed as level 2 and have not received maintenance in 20+ years.

**Protection/Safety Treatments:**

1. Temporary Administrative closure of fire footprint within Black Canyon Watershed (Local).
    a. Press Release $0.
    b. Prescott NF website $0.
2. Temporary Administrative Closure and Caution Signage. 9 signs @ $200/each = $1,800.00

**I. Monitoring Narrative:**Monitor effectiveness of Temporary Administrative closure. Evaluate rockfall/ravel hazards, soil stabilization recovery, and flooding risks within the fire scar. Results will be utilized to determine effectiveness of administrative closure and adjust closure timeframes. Labor $430/day @ 4 days = $1,720.

## 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** | | | | | | | | | | |
| | | | | $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 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Channel Treatments* | | | | $0 | $0 | | $0 | | $0 | $0 |
| **C. Road and Trails** | | | | | | | | | | |
| Trail Storm Proofing | miles | 2,949 | 2 | $5,750 | $0 | | $0 | | $0 | $5,750 |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Road and Trails* | | | | $5,750 | $0 | | $0 | | $0 | $5,750 |
| **D. Protection/Safety** | | | | | | | | | | |
| Caution and Closure Signs | signs | 200 | 9 | $1,800 | $0 | | $0 | | $0 | $1,800 |
| | | | | | $0 | | $0 | | $0 | $0 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Protection/Safety* | | | | $1,800 | $0 | | $0 | | $0 | $1,800 |
| **E. BAER Evaluation** | | | | | | | | | | |
| Initial Assessment | Report | $6,300 | | --- | $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** | | | | | | | | | | |
| Admin Closure Effectiveness | days | $430 | 4 | $1,720 | $0 | | $0 | | $0 | $1,720 |
| | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Insert new items above this line!* | | | | $0 | $0 | | $0 | | $0 | $0 |
| *Subtotal Monitoring* | | | | $1,720 | $0 | | $0 | | $0 | $1,720 |
| | | | | | | | | | | |
| **G. Totals** | | | | $9,270 | $0 | | **$0** | | **$0** | **$9,270** |
| Previously approved | | | | | | | | | | |
| Total for this request | | | | **$9,270** | | | | | | |

## PART VII - APPROVALS

1._____

Forest Supervisor Date