

Date of Report: 7/22/2022**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:** Haywire**B. Fire Number:** AZ-COF-000536**C. State:** Arizona**D. County:** Coconino**E. Region:** R3 Southwestern**F. Forest:** Coconino NF**G. District:** Flagstaff RD**H. Fire Incident Job Code:** P3PP70 (0304)**I. Date Fire Started:** 06/13/2022**J. Date Fire Contained:** 95% on 7/3/22**K. Suppression Cost:** Approx. 2,000,000 on 7/3/22**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repair is ongoing (miles): 11.6 miles of dozer line; 0.51 miles of hand line

M. Watershed Numbers:*Table 1: Acres Burned by Subwatershed - unburned acres not included in table*

Subwatershed Number	Subwatershed Name	Total Acres in Subwatershed	Total % Burned
150200160104	Upper Kana-a Wash	38801	14.1
150200160101	Cinder Basin	39864	11.3

N. Total Acres Burned:*Table 2: Total Acres within BAER Analysis Perimeter by Ownership - includes unburned acres*

OWNERSHIP	ACRES
NFS	5,600
NPS	0
STATE	0
PRIVATE	0
TOTAL	5,600

O. Vegetation Types:

Ponderosa Pine Forest – This forest type makes up approximately 60% of the burned area. Characteristic species include *Pinus ponderosa* (Ponderosa Pine), *Bouteloua gracilis* (Blue grama), and *Festuca arizonica* (Arizona fescue). Within the Haywire fire burned area low to moderate soil burn severity is common in this vegetation type with small patches of high soil burn severity.

Pinyon Juniper Woodland – This woodland type makes up approximately 40% of the burned area. Characteristic species include *Juniperus monosperma* (Oneseed juniper), *Pinus edulis* (Colorado pinyon), *Fallugia paradoxa* (Apache plume), and *Bouteloua gracilis* (Blue grama). Within the Haywire fire burned area, low to moderate soil burn severity is common in this vegetation type

P. Dominant Soils

The burned area is dominated by geologically young soils in early stages of development. This region of the San Francisco Volcanic Field was active approximately 1000 years ago, and the soils are heavily influenced by that volcanic activity. The dominant parent material basaltic cinders and the dominant soil subgroup classification is Typic Ustorthents with a very cindery, coarse sand surface texture. The dominant parent material is extrusive igneous rocks that include rhyolite, andesite, and basalt. There are also soils formed on alluvial fans comprised of mixed igneous rock types. The alluvium on these fan shaped landforms comes from the San Francisco Peaks. See the soils report for a complete table of soil types in the burned area.

O. Geologic Types:

The landscape within and surrounding the Haywire fire is comprised of relict cinder cones and lava flows. The only geologic type found within the Haywire fire is Qtb – Holocene to middle Pliocene Basaltic rocks.

Q. 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 & EPHEMERAL	0

R. Transportation System:

Trails: National Forest (miles): 0 Other (miles): not reported
Roads: National Forest (miles): 16.28 Other (miles): 2.07

PART III - WATERSHED CONDITION**A. Soil Burn Severity (acres):**

Table 4. Burn Severity Acres by Ownership

Soil Burn Severity	NFS	NPS	State	Private	Total	% within the Fire Perimeter
Unburned	474	0	0	0	474	8%

Soil Burn Severity	NFS	NPS	State	Private	Total	% within the Fire Perimeter
Low	4,512	0	0	0	4,512	81%
Moderate	561	0	0	0	561	10%
High	53	0	0	0	53	1%
Total	5,600	0	0	0	5,600	100%

B. Water-Repellent Soil (acres):

Strong, natural (background) hydrophobicity was encountered in the unburned areas of the Haywire fire at a depth of 0-2cm. Soil moisture throughout the burned area was variable at the time of investigation due to recent precipitation. Hydrophobicity was not encountered in areas with increased soil moisture. Background hydrophobicity is likely not persistent. Determination of total hydrophobic acres not possible due to recent precipitation.

C. Soil Erosion Hazard Rating:

Soil erosion hazard ratings come from the Terrestrial Ecosystems Survey of the Coconino National Forest.

Table 5. Erosion hazard rating for USFS lands.

Erosion Hazard Rating USFS lands only	Acres	Percent of burned area
Slight	3,110	56%
Moderate	2,490	44%
Severe	0	0

D. Erosion Potential:

Not modeled. Soil Burn Severity for the Haywire fire was generally low over most of the burned area. The size and density of vegetation is one of several factors that influenced this soil burn severity pattern within the Ponderosa Pine and Pinyon Juniper vegetation types. Anticipated risk to soil productivity through increased post-fire erosion is low. The risk that post fire runoff, erosion and sedimentation could impact public safety and NFS roads is high at some locations within the burned area.

E. Sediment Potential:

Not modeled. Soil Burn Severity for the Haywire fire was generally low over most of the burned area. The size and density of vegetation is one of several factors that influenced this soil burn severity pattern within the Ponderosa Pine and Pinyon Juniper vegetation types. Anticipated risk to soil productivity through increased post-fire erosion is low. The risk that post fire runoff, erosion and sedimentation could impact public safety and NFS roads is high at some locations within the burned area.

F. Estimated Vegetative Recovery Period (years):

Vegetation recovery is estimated 3-5 years for shrubs, forbs, and graminoids, and 20+ years for some smaller areas of burned forest overstory. Recovery of native vegetation varies by ecosystem and recovery of past fires in the area may inform predictions for future recovery. This timeframe for vegetative recovery also corresponds well with reduced rates of erosion and runoff.

Establishment or spread of invasives species can impede recovery of native vegetation in burned areas.

G. Estimated Hydrologic Response (brief description):

The Haywire Burn Scar includes two 12-digit HUCs (subwatersheds), Cinder Basin (11.3% watershed area burned) and Upper Kana-a Wash (14.1% watershed area burned). No mapped streams, including

intermittent and ephemeral channels, were in the burned area. Due to the low burn severity within the majority of the fire perimeter (81% of the total burn was in the low SBS category) and the extensive cinder soils in the area, significant changes between pre- and post-fire hydrologic responses are not expected. Monsoonal rain events have already occurred within the burn perimeter, and storm water runoff surface flow patterns were observed at some locations. One of these events was reported to produce half an inch of hail on the eastern portion of the fire perimeter. So far, observed flow patterns are associated with vehicle travel corridors, which are known to concentrate overland flow. Travel corridors are expected to be a continued area of flow concentration. Vehicular traffic through this area mobilizes the sediment and maintains the travel surface. Localized sheet erosion and/or rilling on slopes is expected. There is also low potential gully erosion limited to steeper areas. Generally, hill-slope erosion is expected to decrease over time as post-fire recovery occurs. While fire induced overall watershed response is predicted to be low over most of the burned area, the risk that post fire runoff, erosion and sedimentation could impact public safety and NFS roads is high at some locations within the burned area.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Haywire and Double Fires started 7.5 miles northeast of Doney Park from presumed smoldering lightning strikes on June 13th and quickly merged to be managed as the Haywire Fire. The California Incident Management Team 15 (Type 2) assumed command of the Haywire and nearby Pipeline fires on June 13th and transitioned to the Great Basin Incident Management Team 2 (Type 1) on June 16 to manage both fires. This assessment covers the Haywire Fire, which has burned 5,575 acres and is 95% contained as of July 4, 2022.

The USFS BAER team was tasked with assessing post-fire effects of the Pipeline and Haywire fires. The team began its assessment of the Pipeline burn scar on June 24th and resource groups began transitioning to Haywire beginning July 1st. Soil Burn Severity mapping was accomplished by ground truthing and adjusting an initial Burned Area Reflectance Classification (BARC) map using the methods outlined in RMRS-GTR-24, resulting in a final field validated soil burn severity map (Figure 1 - Appendix). Additional field review and identification of watershed response threats, hazards to human life and safety, threats to the NFS transportation system, threats to soils and water quality, threats native vegetation communities, and threats to cultural resources was by the BAER survey team.

Because soil burn severity and hydrologic assessments indicate little threat of significant increases in post-fire runoff, the BAER team did not request a USGS post-fire debris flow hazard assessment. The remainder of this report will focus on threats to Critical BAER values identified in FSM 2523 – Emergency Stabilization – Burned Area Emergency Response.

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

Table 6. Critical Value Matrix used in the assessment of threats to Critical BAER Values

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):

- a. Human life and safety of Forest visitors and employees traveling on NFS roads and trails and other areas within the burn scar is threatened by the potential for injury or loss of life from hazard tree strikes, falling rocks, stump holes, floods, debris flows, and other burned area hazards. The probability of damage or loss is **possible** as the NFS transportation

system contains motorized and non-motorized routes adjacent to and through the burned area. The magnitude of consequence is **major** since an overhead hazard strike, or motorized vehicle collision with downed trees or fallen rocks, or entrapment could result in serious injury or loss of life. The risk level is **high**. The BAER Team did not conduct an extensive inventory of hazardous trees within the burned. Removal of hazardous trees under BAER is limited to work needed to protect the safety of BAER implementation workers. General hazard awareness through social media messaging when the current closure order is lifted, and again at the start of monsoon season is also recommended. See treatments S1a and S3.

2. **Property (P):** Potential increases in postfire runoff following high intensity precipitation events threaten sections of NFSRs 244 and 777. The probability of damage or loss is **likely** for sections of the roads within the burn area. Increased post-fire runoff is likely to impact some sections of road if storm proofing measures are not implemented. The magnitude of consequence is **moderate** because damage to FS infrastructure would be limited. The risk level is **high**. Recommended BAER treatments are: R1. Storm Proofing, R3. Storm Inspection and Response, S1a. Road Hazard Signs.

b. The remaining components of the NFS road network are threatened by increased runoff during high intensity precipitation events that could result in loss of control of water within the existing drainage structures. The probability of damage or loss is **unlikely** as these routes are located on or below lower angle slopes that are mostly unburned or burned at low SBS. The magnitude of consequence is **minor** because any damage that would occur is expected to be limited in economic value and to a small number of NFS transportation system investments. The risk rating is **very low**. BAER treatments are not recommended.

3. **Natural Resources (NR):**

a. Generally, soil productivity and hydrologic function can be threatened by increased post-fire soil loss and loss of hydrologic function. The probability of damage or loss is only **possible** because soil burn severity and associated rates of post fire erosion are generally expected to be low over most of the burned area. The magnitude of consequence is **minor** because the soil loss is recoverable within the context of natural disturbance and recovery. If and where they occur, long-term effects to soil productivity would be localized and of limited extent. This is expected within the natural variability of a fire-adapted ecosystem. The risk rating is **low**. Treatments are not recommended.

b. There is an increased risk to native or naturalized plant communities on NFS lands from invasive species and other weeds. Specialists have identified Yellow Bluestem and Whitetop as invasive species that would have a significant impact if establishment occurs in burned areas. Currently, these species are not readily found within the Haywire burn scar. The probability of damage or loss is **possible** because of the invasiveness of each of these species and due to the origin of mobilization of the Type 1 and Type 2 team. Yellow Bluestem is an aggressively spreading perennial bunchgrass that is a prolific seed producer in burned areas. It can easily outcompete native grasses and forbes. Yellow Bluestem is allelopathic and can suppress native plant recovery. Whitetop forms dense monocultures with extensive root systems that are difficult to control once established. The magnitude of consequence is **major** due to natural resource damage and large-scale changes to plant community composition. Eradication is only possible for these species if the plants are documented and treated early and before they are allowed to get established. The risk rating is **high**. Treatments are recommended. See treatment P1a.

c. There is an increased risk to native or naturalized plant communities on NFS lands from invasive species and other weeds. Specialists have identified Scotch Thistle, Diffuse Knapweed, Dalmatian Toadflax and Camelthorn as possible weed species that will likely take root in suppression activity disturbed areas within or adjacent the burned area due to their distribution on other areas of the forest. Camelthorn was recorded near and inside the fire scar in the past, but was not recently observed or found during field observations on 7/1/22 or 7/4/22. Yellow Bluestem and Whitetop are species that are not found or found in limited distribution on the Coconino National

Forest. These species are highly invasive and have the potential to cause natural resource damage if establishment occurs. To prevent spread due to lack of a weed washing station during the first week of the fire and the abundance of these species in the areas where the Type 1 team mobilized from, it is recommended to diligently monitor for and chemically or mechanically treat any individual populations that establish after containment. The probability of damage to native or naturalized plant communities is **likely** because suppression activities caused soil disturbances in areas where invasion of noxious plants is expected to occur. Multiple years of growth of invasives, if unchecked, can lead to more robust seedbanks for these species, which make future control much more time consuming and difficult. The magnitude of consequence from this damage is **moderate** because there will be long-term effects of weed invasion to existing intact native plant communities. The risk is **high**. Treatments are recommended. See treatments P1b.

4. **Cultural and Heritage Resources:** a. Three cultural resource sites eligible for the National Register of Historic Places (NRHP) are threatened by post-fire erosion, flooding, falling hazard trees, and tree uprooting. These threats may adversely impact site integrity, buried cultural deposits, and human remains. The probability of damage or loss is very **likely** as the sites are located on slope positions that are vulnerable to accelerated erosion or have dead and standing/fire-killed trees within archaeological features that could expose buried, intact deposits. The magnitude of consequence is **major** because the loss would result in an irreversible loss of intact subsurface cultural deposits including deposits of great concern to consulting tribal nations. The risk rating is **very high**. Treatments are recommended. See treatments L6.

b. The six remaining archaeological sites and the San Francisco Peaks Traditional Cultural Property are threatened by the loss of intact subsurface cultural deposits from erosion, flooding, and hazard trees falling and ripping out deposits. The probability of damage or loss is **unlikely** because they are in unburned or low severity locations. The magnitude of consequence is **major** because the loss would result in an irreversible loss of intact subsurface cultural deposits including deposits of concern to consulting tribal nations. The risk rating is **intermediate**. BAER treatments are not recommended, however ongoing monitoring of site conditions is advised.

B. Emergency Treatment Objectives:

- a. Minimize the risk for post fire impacts on human life and safety through area closures and raising awareness of postfire hazards throughout the burned area
- b. Minimize postfire damage to NFS roads
- c. Minimize the establishment of invasive plants and noxious weeds
- d. Protect cultural and heritage resources from the loss of irreplaceable artifacts, deposits, and scientific information.

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

Land: N/A

Channel: N/A

Roads/Trails: 90%

Protection/Safety: 95%

Monsoonal rain events, which began (with regularity) approximately 1-2 weeks ago, coincided with the fire cooling off, transitioning to management by a Type 4 team and the beginning of the BAER assessment. Rainfall events of equal or greater magnitude are expected to continue.

EDRR treatments will be implemented at logical times within the first year following the fire. Following that, ongoing treatments will likely be needed using non-BAER funds such as BAR.

The fire area closure is in place at the time of this report. BAER closure treatments and information sharing are will be implemented as the highest priority BAER treatments with the goal of having them place before the fire closure order is lifted. Sign placement will be expedited as signs are already available.

D. Probability of Treatment Success:

Table 7. Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	N/A	N/A	N/A
Channel	N/A	N/A	N/A
Roads/Trails	80%	90%	90%
Protection/Safety	90%	80%	70%

E. Cost of Selected Alternative (Including Loss):

NFS Roads:

- \$400,000 value of roads with high and very high BAER risk ratings
- \$9,640 treatment cost
- \$240,000 expected benefit of treatment

Invasives Treatments: The benefits of proactive or preventative measures to limit establishment and/or spread of invasive plants are generally self-evident yet it is challenging to model using simple cost/benefit analysis tools.

- \$29,974. Minimum assumed value of weeds treatments if BAER treatments are not applied in high risk areas
- \$14,987. Treatment cost
- \$17,984. Minimum expected benefit of treatment

F. Cost of Selected Alternative (Including Loss): See expected benefit of treatments (above)

The cost of taking no action to protect cultural sites cannot be accurately calculated as the loss of irreplaceable artifacts, deposits, and historical information does not have a monetary value. Similarly, injury or loss of human life that may result from taking no action to minimize risk to Forest visitors in the form of the protection and safety treatments does not have a monetary value.

G. Skills Represented on Burned-Area Survey Team:

- | | | | | |
|---|--|---|--|---|
| <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Hydrology | <input checked="" type="checkbox"/> Engineering | <input checked="" type="checkbox"/> GIS | <input checked="" type="checkbox"/> Archaeology |
| <input checked="" type="checkbox"/> Weeds | <input checked="" type="checkbox"/> Recreation | <input type="checkbox"/> Fisheries | <input checked="" type="checkbox"/> Wildlife | |
| <input checked="" type="checkbox"/> PIO | | | | |

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Team Members:

Table 8. BAER Team Members by Skill

Skill	Team Member Name
Team Lead(s)	Eric Schroder; Matt O'Neill (t)
Soils	Rob Ballard
Hydrology	Kelly Mott Lacroix, Kyle Paffett, Reba McCracken (t)
Engineering	Sean Untalan; Kaitlyn Tighe; Taylor Connolly

Skill	Team Member Name
<i>GIS</i>	Mark Christiano
<i>Archaeology</i>	Michael Terlep; Rochelle Rhone
<i>Weeds</i>	Katie Landry; Andy Pigg
<i>Recreation</i>	Paul Dawson; Scott Saville
<i>Wildlife</i>	Justin Schofer
<i>PIO</i>	Dick Fleishman

H. Treatment Narrative:

The following narratives summarize the response actions recommended to decrease risks to BAER Critical Values. It is important to note that these treatments are not designed to eliminate risk. They are designed to reduce risk to an acceptable level, per FSM 2523.1 - Exhibit 02. Detailed specifications, cost estimates, and maps identifying the spatial location for the treatments are in the BAER Assessment project record. The documents can be obtained by contacting the Forest BAER Coordinator.

All treatment costs were estimated based on the assumption that off-forest Agency personnel or contract crews would be implementing the authorized treatments without the use of local unit NFSE salary funding. If personnel from the local unit are identified for implementation, current BAER salary and expense guidance regarding the use of H-funds would be adhered to. Project budgets represent the best estimate of the BAER assessment team and may be adjusted with interim funding authorization requests to reflect current market values at the time of contracting and implementation.

Land Treatments:

P1a. EDRR BAER: Surveys and eradication treatments for new or expanding invasive plant/noxious weed infestations associated with the Haywire Fire will be conducted over a total of 2 entries during 2022 and spring/summer 2023 in areas of native plant communities with little to no noxious or invasive plant species present prior to the fire. A 4-person contract crew will be necessary to conduct surveys and treatments in a timely manner. Survey efforts may be coordinated with other federal, state, or local agencies/partners. BAER funded surveys will be completed within one year of fire containment. Survey, monitoring or treatment activities that extend beyond the first year will be accomplished through non-BAER funding sources such as BAR.

Detection surveys and eradication treatments will be conducted on NFS lands that have moderate to severe fire effects and are susceptible to infestation by invasive plant species. These areas were identified from the Soil Burn Severity map, site visits, and the proximity to other weed populations and vector sources such roads and trails. The Cinder Hills area is identified as having highly valuable native plant habitat which adds to the diversity of landscapes that make up the San Francisco Volcanic Field. Burned areas with a moderate or high SBS on NFS lands that are adjacent to known weed populations or are along motorized travel corridors have been prioritized for EDRR treatment. There is a potential for weed infestation to occur in other areas of moderate and high SBS throughout the burn scar; however, the overall risk decreases with the increase in distance from known threats or vectors such as existing infestations and designated motorized travel corridors.

EDRR BAER activities will be conducted at identified locations at an intensity/frequency necessary to identify the occurrence/spread of weed infestations, with a focus on Yellow Bluestem, Whitetop and Camelthorn. Surveys will be conducted on foot or from vehicles (UTV/truck). Specific information (e.g., species, location, size, photos) regarding identified infestations will be collected and added to the appropriate database of record.

Timely surveys will allow for new or expanding weed infestations to be identified, and proper measures implemented for eradication/control to protect native plant communities where invasive plants are currently absent or present in minor amounts.

Implementation personnel will survey and treat any newly detected invasive plants or noxious weeds immediately upon detection. The estimated cost per acre is based on the assumption that much of the targeted acreage will only require a brief survey and not an extensive eradication treatment.

Treatment maps are included for Treatment P1a. EDRR-BAER Traditional at the end of the document.

Table 9. P1a EDRR BAER Costs

Item	UOM	Unit Cost	# of Units Treated per Entry	Entries Needed	Total Treatment Cost
P1a EDRR – BAER	Acre	\$5,000 per trip \$2.88/ acre/ treatment	1,734.07 acres	2	\$9988.24

P1b. Early Detection Rapid Response (EDRR) Suppression: Surveys and treatment for new or expanding invasive plant and noxious weed infestations associated with fire suppression activities will be conducted by over a total of 2 entries during 2022 and Spring or Summer 2023. EDRR activities that extend beyond the first year will be accomplished through non-BAER funding sources such as BAR. EDRR Suppression efforts will only occur along areas that were disturbed by unmitigated suppression activities and suppression rehab, including areas of hand line and dozer line construction as well fire camp, staging and safety areas. These areas were delineated by the BAER Weeds Specialist using suppression disturbance lines and points provided by the IMT GISS. In an effort to accurately capture the actual size of the on the ground disturbance, the points and lines were buffered into polygons that most accurately represent the actual disturbed area. The buffer assigned to the GIS line and point features varied by feature type. The rehabilitated dozer lines are assumed to have a 25' total disturbance width and handlines are assumed to have a 4' total disturbance width. Fire camp was established along FR 556 for roughly 1.25 miles, and a 100' buffer has been established to either side of the road to capture disturbance for EDRR. Treatment is not proposed beyond the extent of the soil disturbance associated within the control features.

EDRR Suppression activities will be accomplished by a crew of 2 individuals to complete the treatments in a timely manner. The invasive species of concern in these suppression areas are Dalmatian Toadflax, Diffuse Knapweed, and Scotch Thistle due to their presence within the burned area. Yellow Bluestem, Whitetop and Camelthorn are species of concern that are highly invasive and should be surveyed for in these suppression sites. The estimated cost per acre is significantly higher than P1a EDRR BAER because the areas will require survey by foot and more frequent eradication work is expected due to disturbance and origin of mobilization for the Type 1 team. The EDRR suppression surveys will be focused on suppression disturbance and repair in features such as hand lines, dozer lines, fire camp and staging areas.

Treatment maps are included for Treatment P1a. EDRR-BAER Traditional at the end of the document.

Table 10. P1b. EDRR Suppression Costs

Item	UOM	Unit Cost	# of Units Treated per Entry	Entries Needed	Total Treatment Cost
P1b EDRR – Suppression	Acre	\$2,500 per trip \$19.86/ acre/ treatment	125.85 acres	2	\$4,999

H1.

Other Cultural Site Protection: Three sites within the Haywire Fire have been identified for

emergency treatments to mitigate potential adverse effects to significant cultural resources. The sites are located within moderate or low burn severity. Each site is potentially eligible to be listed on the NRHP and site types are large, complex habitation and agricultural features used by the Sinagua. The Sinagua Cultural group, unique to northern Arizona, are ancestors to the modern Hopi Tribe, Pueblo of Zuni, and Pueblo of Acoma. The sites consist of prehistoric habitation sites and agricultural fields with multiple rock alignment and terraces.

Recommended treatments include directional felling of dead and standing/fire-killed trees at all three sites. The directional felling will be done to provide a stabilization structure to prevent downhill erosion at the sites and also to prevent root balling and disruptive excavation within features at the site. Root balling could potentially result in the loss of sub-surface intact cultural deposits or potentially unearth human remains at the sites. Directional felling also has the added benefit of concealing archaeological resources that are more exposed in a post-burn environment and may attract visitors resulting in vandalism, artifact collecting, and looting. This work is needed to protect subsurface deposits from erosion and/or exposure following storm events that have the potential to uproot trees adjacent to the sites or generate accelerated erosion that could expose deposits. Use the felled trees and slash to obscure visibility of sites from members of the public who might stumble upon the site and vandalize it. The cultural site protection lump sum cost includes the estimated equipment and personnel costs to mitigate emergency risks to cultural sites; such as sawyers/laborers, cultural specialist monitoring during work, materials, post-implementation effectiveness monitoring, data management, and SHPO consultation.

Table 11. Cultural Site Protections Costs

Item	UOM	Unit Cost	# of Units	Total Cost
H1. Heritage and Cultural Resource Protection	Cost/Site	\$1,176	3	\$3,528

Channel

Treatments: None recommended.

Roads and Trail Treatments:

Roads:

R3. Storm Inspection and Response: Storm inspection and response on FSR 244, 9137E, 9140K, 9129N, 9140R, and 777 keeps drainage features under R3 functional by removing accumulated sediment and debris between or during storm events. Following heavy monsoon rains and significant spring snowmelt the inspection will involve identification of roadway and drainage hazards such as washouts, channeling, and accumulated debris and sediment that limit functionality of road drainage features. The response will use equipment to remove obstructions in catch basins, drainage dips, lead-off ditches, and other drainage features, as well as maintain or repair any damage to road surfaces that cause the road to be impassable. Problems will be corrected before they worsen or jeopardize the road drainage features. This treatment is used in lieu of more costly structural upgrades, such as culvert upsizing.

Table 12. R3 Road Storm Inspection and Response and R1 Storm Proofing Costs

Item	UOM	Unit Cost	# of Units	Total Cost
R3. Road Storm Inspection and Response	mile	\$1,253.57	7.69	\$9,640
Total Cost				\$9,640

Trails: None recommended.

Protection/Safety Treatments:

An administrative closure is currently in place for the fire area. This closure is recommended to remain in place through at least the first monsoon season to protect human life and safety. Following the first monsoon season the forests should reassess post fire threats and risk to inform reopening. Install 2 closure/warning signs on FR244 and FR777.

S1a. Burned Area Warning Signs: The purpose of the Burned Area Warning signs is to reduce risks to human life and safety by informing forest visitors of potential dangers and/or hazards when entering burned areas on NFS lands. Entering burned areas presents a high risk to human and life and safety, with increased threats from post-fire effects such as falling trees, rolling rocks, flash floods, and debris flows. It is necessary to inform the public of burned-area hazards that are a direct result of wildfire; hazards which are substantially different compared to unburned forest setting and with which many forest visitors may be unfamiliar. Burned area warning signs will be installed to inform the public of the possible dangers associated with the burned area on major entry points into the burned area. Lump sum costs include signs, posts, hardware, and installation.

Table 13. S1a Road and Trail Warning Sign Costs

Sign Type	UOM	Unit Cost	# of Units	Total Cost
FW8-14f 48"x24"	Lump Sum	\$643.67	1	\$ 643.67
FW8-18c 30"x30"	Lump Sum	\$443.67	1	\$ 443.67
P1a Road and Trail Warning Sign Total Cost				\$ 1,087

I. Monitoring Narrative:

Closure: Forest personnel will periodically review safety signs to ensure they are not being vandalized along with other field observations to determine effectiveness of closure treatments

Road drainage stabilization treatments will be monitored through implementation of the storm inspection and response plan.

Archaeologists will monitor the effectiveness of the heritage site treatments following storm activity to ensure ongoing protection of subsurface deposits is achieved.

Table 14. Closure Monitoring

Item	UOM	Unit Cost	# of Units	Entries Needed	Total Treatment Cost
M1. Monitoring Closure	Days	\$360	2	2	\$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										
P1a. EDRR BAER (2 entries)	Acres	\$2.88	3,468	\$9,988	\$0		\$0		\$0	\$9,988
P1b. EDRR – Suppression (2 entries)	Acres	\$19.86	251.7	\$4,999	\$0		\$0		\$0	\$4,999
H1. Cultural Site Protection	Site	\$1,176.00	3	\$3,528	\$0		\$0		\$0	\$3,528
<i>Subtotal Land Treatments</i>				<i>\$18,515</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$18,515</i>
B. Channel Treatments										
None				\$0	\$0		\$0		\$0	\$0
<i>Subtotal Channel Treatments</i>				<i>\$0</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$0</i>
C. Road and Trails										
R3. SIR	mile	\$1,253.57	7.69	\$9,640	\$0		\$0		\$0	\$9,640
<i>Subtotal Road and Trails</i>				<i>\$9,640</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$9,640</i>
D. Protection/Safety										
S1a Road Warning Signs	each	\$543.67	2	\$1,087	\$0		\$0		\$0	\$1,087
<i>Subtotal Protection/Safety</i>				<i>\$1,087</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$1,087</i>
E. BAER Evaluation										
Initial Assessment	Report	\$8,672.00		---	\$0		\$0		\$0	\$8,672
<i>Subtotal Evaluation</i>				<i>\$0</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$8,672</i>
F. Monitoring										
M1. Closure	Days	\$360.00	2	\$720	\$0		\$0		\$0	\$720
<i>Subtotal Monitoring</i>				<i>\$720</i>	<i>\$0</i>		<i>\$0</i>		<i>\$0</i>	<i>\$720</i>
G. Totals				\$29,962	\$0		\$0		\$0	\$38,634
Previously approved										
Total for this request				\$29,962						

PART VII - APPROVALS

1. Forest Supervisor _____ Date _____

Soil Burn Severity Map
Haywire Fire BAER

Soil burn severity is classified by assessing the effects of a fire on ground surface characteristics and is based on fire-induced changes in physical and biological soil properties. The term "Soil Burn Severity" is used to differentiate post-fire soil properties from fire effects on vegetation (such as tree mortality).

Soil Burn Severity	Acres	Percentage
Unburned	474	8
Low	4,512	81
Moderate	561	10
High	53	1
Total acres assessed	5,600	

Legend

- Haywire Fire Perimeter
- Severity
 - Unburned
 - Low
 - Moderate
 - High

Map Details:
 Title: COCONINO NATIONAL FOREST, SOUTHWESTERN REGION - U.S. FOREST SERVICE
 Coordinate System: NAD 1983 UTM Zone 12N
 Projection: Transverse Mercator
 Datum: North American 1983
 Basemap: Coconino National Forest 2013 Visitor Map
 Date: 7/5/2022
 Scale: 0 to 6 Miles
 Source: USDA Forest Service, Coconino National Forest, Southwest Region, U.S. Forest Service

Treatments proposed to mitigate Haywire Fire effects to BAER critical values.

Treatments P1b. EDRR-Suppression

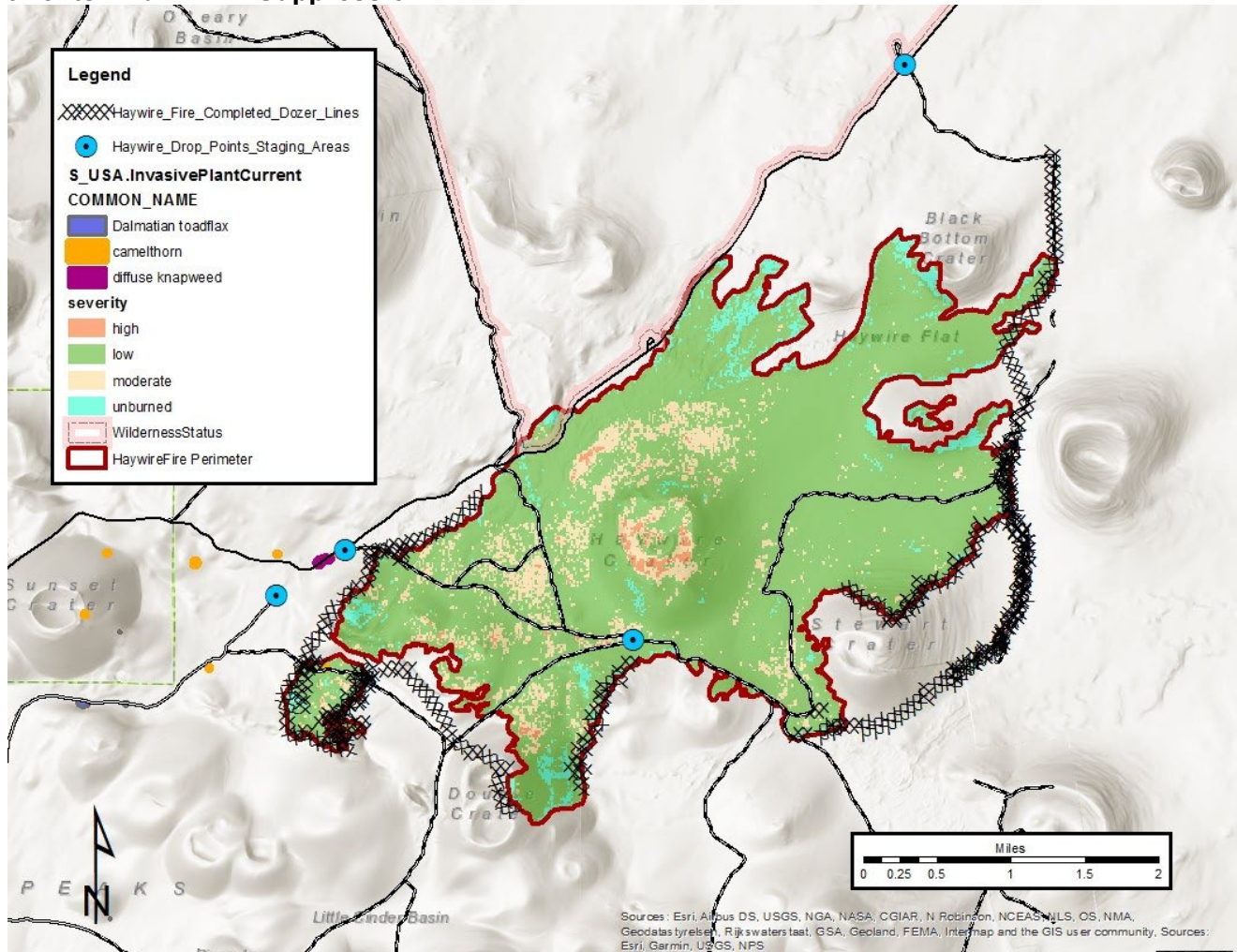


Figure 2: Location of documented invasive Dalmatian Toadflax, Diffuse Knapweed, and Camelthorn populations in relation to mapped soil burn severity and fire suppression activities – i.e. completed dozer lines and incident drop points/ fire resource staging areas.

Treatments P1b. EDRR-Suppression

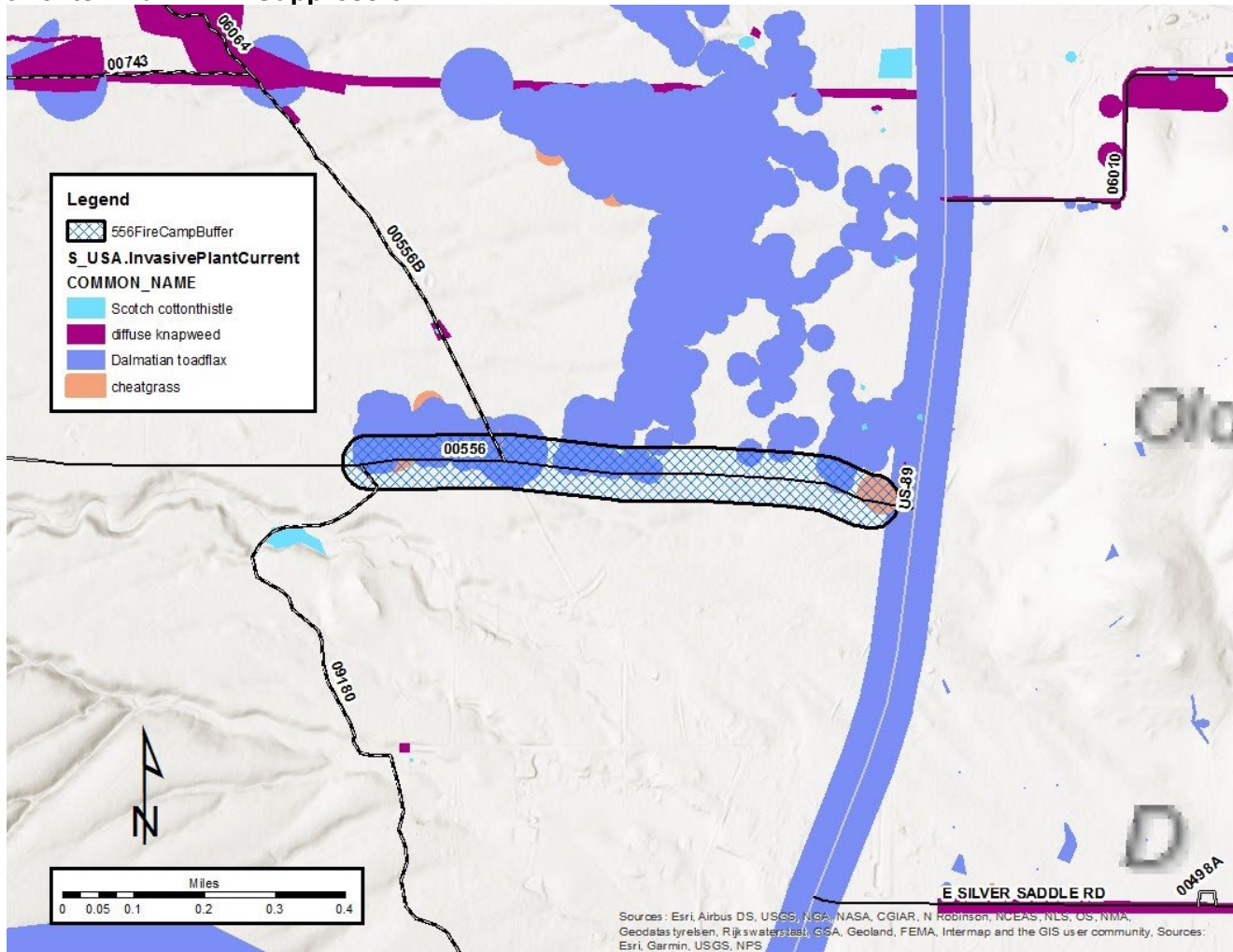


Figure 3: Location of documented invasive Dalmatian Toadflax, Diffuse Knapweed, Scotch Thistle, and Cheatgrass populations in relation to fire camp which was shared and utilized by both the Pipeline and Haywire Fires' suppression resources (i.e. crews, vehicles, equipment).

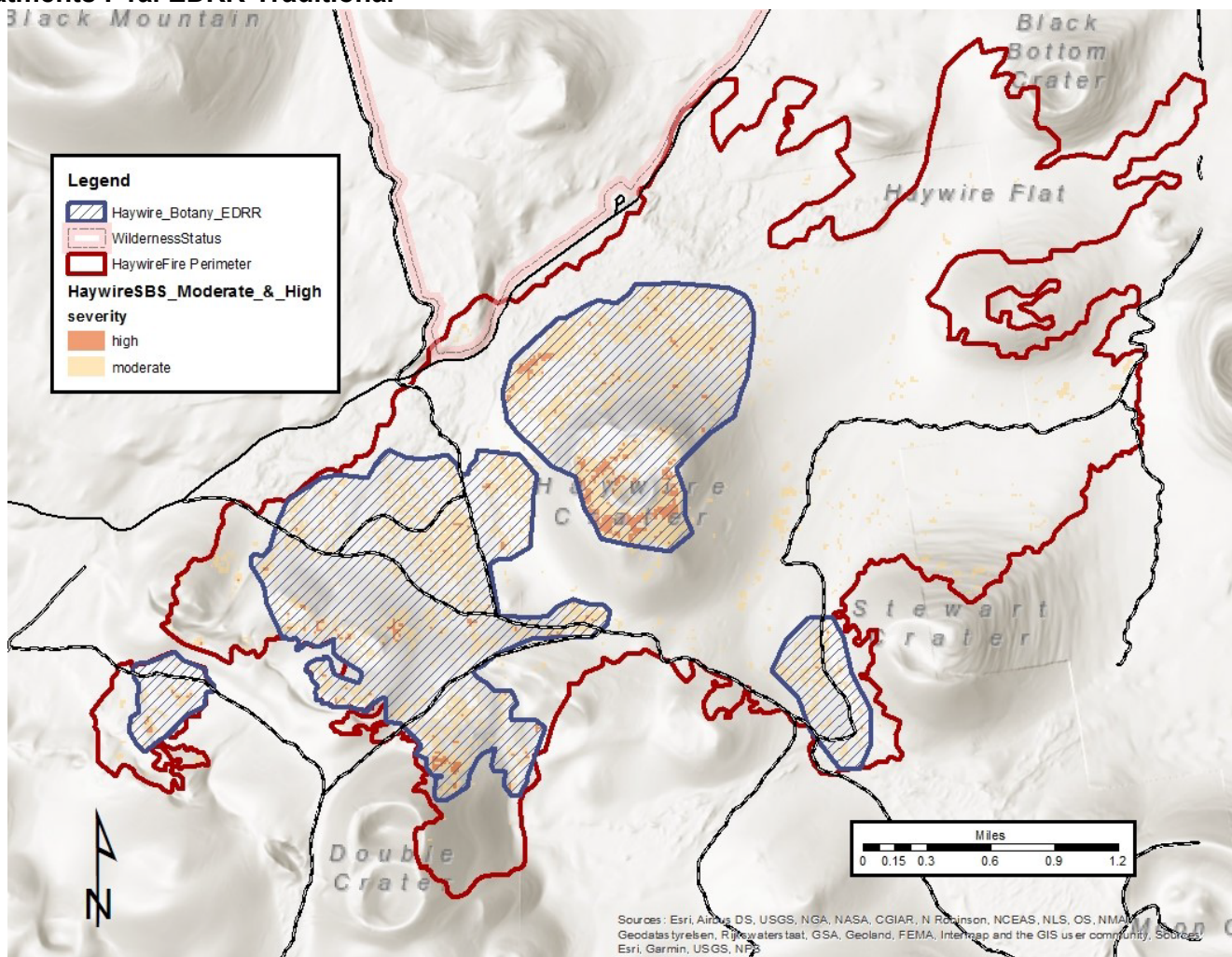
Treatments P1a. EDRR-Traditional

Figure 4: Recommended response action item P1a. Invasives EDRR surveys in relation to mapped moderate and high soil burn severities and likely areas of spread around the Cinder Hills OHV Area and the WAPA utility line.