



Hermits Peak-Calf Canyon Burned Area Emergency Response (BAER) Phase 2 Assessment Report

Executive Summary



Figure. 1 Aerial View of Unburned, Low, Moderate, and High Soil Burn Severity in the Phase 2 HPCC Assessment Area

Fire Background

The Hermits Peak fire started on April 6, 2022, from the Las Dispensas prescribed burn on the Pecos/Las Vegas Ranger District (PLVRD) of the Santa Fe National Forest (SNF). Southwest Area Incident Management Team 1 (Type 1) assumed command of the fire on April 15. The Calf Canyon fire started on April 19, 2022, from a winter PLVRD pile burn project, and SWIMT 1 assumed command of this fire as well. The two fires merged on April 22 during high wind events and are managed as a single incident called the Hermits Peak-Calf Canyon (HPCC) Fire, eventually burning onto the Carson National Forest (CAF). The HPCC Fire initially divided into three zones, each under management of a Type 1 team. On May 15, and on May 27, the fire transitioned back to two zones and was managed by two Type 1 incident management teams (IMTs). As of June 30, 2022, the fire has burned 341,735 acres and is 93% contained and is managed by two Type 2 IMTs.

BAER Assessment

The Forest Service assembled a Burned Area Emergency Response (BAER) team on April 20, 2022, as HPCC fire managers increased its containment. The extreme wind events in late April resulted in rapid fire growth and the team was forced to delay its analysis. By mid-May, some areas of the fire were safe for BAER team's field analysis. The team was reestablished on May 17, 2022, to begin assessment on the HPCC fires. Due to the fire's size and continuing active fire behavior, the BAER team divided the burned area into separate

phases for analysis. The initial phase (Phase 1) examined the southern half of the burned area and included the headwaters of the Gallinas River Watershed and the Tecolote Creek Watershed. The burned area assessed in Phase 1 covers 115,542 acres and includes 48,581 acres (42%) of National Forest System (NFS) lands, 66,216 acres (57%) of private property, and 745 acres (1%) of New Mexico (NM) state lands. Approximately 13,558 acres of the Phase 1 assessment area is in the Pecos Wilderness.

The second phase (Phase 2) examined the northern half of the burned area and included Sapello River Watershed, Upper Mora Watershed, and portions of Embudo Creek and Coyote Creek Watersheds. The burned area assessed in Phase 2 covers 190,026 acres, including 57,093 acres of NFS lands (14,333 acres in the Pecos Wilderness) and 132,933 acres of private property. The total Phase 2 assessed burned area includes 81,830 acres (43%) of unburned/very low or low soil burn severity, 62,804 acres (33%) of moderate burn severity and 45,392 acres (24%) of high burn severity.

BAER team assessments consist of rapid evaluations of post-fire conditions of the burned landscape to determine the level of risk from potential flooding and debris-flows to values on NFS lands. The team identifies 'BAER critical values' such as human life and safety, infrastructure, property, and critical natural and cultural resources. BAER teams also share information with local and federal agencies to identify risks to off-Forest resources (such as private property). Risks to BAER critical values are identified with the BAER risk assessment (Table 1), and the BAER team evaluates emergency stabilization treatments to reduce the risk to NFS values. Treatment actions must be evaluated based on: (1) the ability to be implemented in a timely manner, (2) effectiveness in reducing risk, (3) practical and technical feasibility, and (4) cost. BAER assessments are conducted quickly because treatments (including all phases of bidding, contracting, and implementation) must be completed before the first damaging storm. In New Mexico (NM) these storms typically will start in early to mid-July and run through mid-September with the monsoon rainstorm cycle. Due to scattered distribution of convective events not all burned areas may experience a damaging storm in the first year. The final soil burn severity (SBS) map was used to model changes in precipitation runoff and debris flow potential and identify risks to critical NFS values via the BAER risk assessment process (Table 1). This document summarizes the formal assessment in the FS-2500-8, Burned Area Report.

Table 1: BAER Risk Assessment:¹

Probability of Damage or Loss	Magnitude of Consequence		
	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

Soil Burn Severity Mapping

The BAER assessment focuses on NFS critical values to determine where post-fire precipitation events could increase water runoff, flooding, erosion, and sediment delivery, where post-fire effects could impact critical threatened and endangered wildlife habitat, and where high-risk areas exist for the spread of invasive weeds. Post-fire water runoff changes with the severity of the fire – more severe fire conditions (i.e., hotter fire conditions) will alter the landscape in ways that enable more water runoff (increased flooding) and sediment mobilization (to include potential debris flows). The BAER team analyzed satellite reflectance images and collected field data from June 5-7, 2022, to produce a Phase 2 SBS map (Figure 2), which categorizes the

¹ Threats to resources are based on the likelihood and consequence of an event. Threats that result in low or intermediate (white and yellow) risks are typically not considered for potential treatments. Treatments may be considered where threats that result in high or very high risks (red) are identified.

burned area as High, Moderate, Low, or Very Low SBS (Table 2). Field validation of SBS was completed on June 7, 2022. Within the HPCC Phase 2 burned area, 45,392 acres (24%) were high SBS, 62,804 acres (33%) were moderate, 74,322 acres (39%) were low, and 7,508 acres (4%) were very low/unburned.

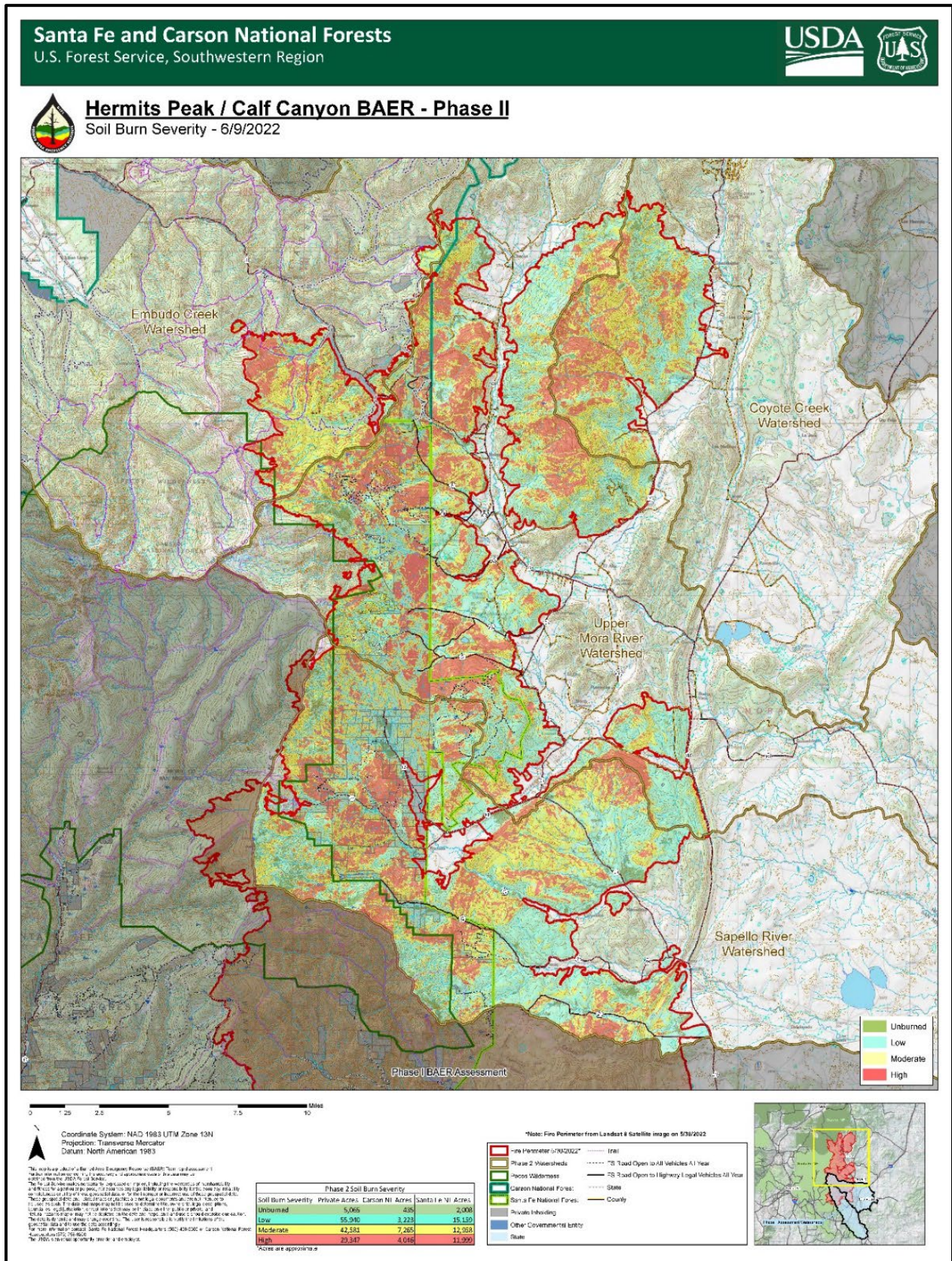


Figure 2: Soil Burn Severity Map for the northern area (BAER Phase 2) of the Hermits Peak-Calf Canyon Fire.

Table 2: Soil burn severity by land ownership

Soil Burn Severity	NFS	Other Federal	State	Private	Total	% of HPCC Phase 2 Perimeter
Unburned	2,443		0	5,065	7,508	4
Low	18,382		0	55,940	74,322	39
Moderate	20,223		0	42,581	62,804	33
High	16,045		0	29,347	45,392	24
Total	57,093		0	132,933	190,026	100



Figure 3: Examples of low (top left), moderate (top right), and high (lower left) soil burn severity in the burned area. These burn conditions, including remaining ground cover, soil integrity, hydrophobicity, remaining root structure, and surviving vegetation, assist to estimate the likelihood and intensity of future flooding, erosion, and debris- flows.

Watershed Response

Soils

Soil productivity, or how well soil supports plant growth, is a non-renewable resource due to the exceptionally slow soil formation rate in the southwest. Post-fire soil erosion poses a significant threat to soil productivity. Moderate and high soil burn severities increase the potential for erosion and debris flows due to fire induced hydrophobicity (Figure 3), the loss of protective soil cover, the loss of soil porosity, the weakening or loss of soil structure, and the loss of soil stability due to root consumption. More than half (108,196 acres) of the burned area within the BAER Phase 2 assessment had high or moderate SBS. Approximately 21,642 acres of fire induced water repellent soils occur on lands administered by the United States Forest Service (USFS) in the Phase 2 assessed burned area.



Figure 4: Strong hydrophobic soil conditions caused by moderate soil burn severity in mixed conifer forest. Note 2 cm diameter water drop that persists on soil surface.

Accelerated runoff and erosion are to be expected throughout much of the Phase 2 analysis area, depending on burn severity, slope, post-fire soil characteristics, and the intensity and duration of precipitation that occurs within a given watershed. Debris-flows and flooding are strong possibilities. Baseline (pre-fire) erosion rates for soil types in the analysis area average less than one ton per acre per year. Modeling indicates the Phase 2 burned area will now average 23 tons per acre on NFS lands. Average sediment potential across moderate and high SBS on NFS lands is approximately 16,000 cubic yards per square mile.

Hydrology

Post-fire watershed conditions such as loss of groundcover and stabilizing vegetation, decreased soil porosity, and fire induced water repellency in soils are all factors that can increase the magnitude, frequency, and volume of stormwater runoff and produce debris-flows. Post-fire water flows have greater energy with which to damage resources within and downstream of the burn area and threaten life and property than do regular rainfall runoff events that occur over unburned areas. Additionally, high flows with increased concentrations of sediment and ash (bulking effect) can produce geomorphic changes such as aggradation, downcutting, and/or widening of stream channels that can significantly alter hydrologic function.

The large contiguous areas of moderate and high SBS are contributing to the elevated watershed response. Phase 2 assessment areas includes 18 sub-watersheds (12-digit Hydrologic Unit Codes). 10 of the 18 sub-watersheds have more than 20% of the watershed area burned, and six have more than 50% of the total watershed area that burned at high and moderate soil burn severity. Four of these six sub-watersheds contain

significant portions of NFS lands: The headwaters of Manuelitas Creek, Rio la Casa-Moro River, Rito San Jose, and Santiago Creek. In addition, these sub-watersheds: Deer Creek-Sapello River and Rito Angostura-Rio Pueblo also contain NFS lands and areas of high and moderate soil burn severity.

The 50% (i.e., 2-year – 1.14 to 1.49 inches in a 1-hour storm) chance event has an 88% likelihood over the next three years and is a “*very likely*” probability event, while the 20% (i.e., 5-year – 1.52 to 1.97 inches in a one-hour storm) chance event has a 49% probability over the next three years and is considered to be the “*likely*” event. Risk is based on a scale of minimal, significant, very significant, and extreme based on the degree of change in peak flows pre to post fire. For most basins (88%), assuming average water runoff conditions, the *very likely* single storm event is modeled to have increases that are minimal to significant. The exceptions are four basins in the Deer Creek Sapello Basin and one basin in the Headwaters of Manuelitas Creek that are modelled to have extreme change in peak flows. An additional 19 basins across all modeled sub-watersheds have very significant increases in peak flows for the very likely single storm event.

Debris-Flow Hazard Assessment

The US Geological Survey (USGS) predicts the potential for debris-flows using the SBS map, basin morphometry, soil properties, and rainfall characteristics. The preliminary models estimate a high-level debris-flow hazard for most of the area assessed in the Phase II, Hermits Peak-Calf Canyon fire. Most stream reaches and small drainage basins have a greater than 60% likelihood of debris-flow occurrence at a modest 15-minute (I_{15}) rainfall intensity of 24 mm/hour [0.94 inch/hour]. Debris-flow likelihood exceeds 80% in a few drainage basins at this 24 mm/hour rainfall intensity. These high to very high hazard areas are widespread in the Phase II assessment area, including the following: above County Road A023 near the Rincon Mountains, Vigil Canyon, some sections of NM State Highway 276, County Road C001 near Fragozo Ridge, and County Roads A3a and A4a in the southern portion of the assessed area.

Critical Values

Critical Values identified during the BAER assessment that have potential to be at-risk as defined in Forest Service (FS) Manual 2523.1 include human life and safety of employees and public, FS property (roads, trails, administrative and recreation infrastructure), cultural resources, natural resources including Threatened and Endangered Species (TES) habitat, native plant communities, soil, and water resources. The BAER team evaluated the risk to these critical values in accordance with the critical value matrix table (Table 1) by using the BAER risk assessment. The HPCC fire critical value table is in the project record.

Human Life and Safety

There is a very high risk to human life and safety on NFS lands within and immediately downstream of the burn area. The post-fire environment poses increased hazards to the public and FS employees who travel, work, or recreate on NFS lands. Threats to human life and safety of forest visitors and employees traveling on NFS roads and trails include falling trees and limbs, falling rocks, flash floods, debris-flows, road/trail failure at multiple locations and other burned area hazards such as burned stump holes in the prism of the road/trail. Threats downstream of the burned area on NFS lands include flash floods and debris-flows.

Property--Roads and Bridges

The watersheds burned in the HPCC fire will experience increased water runoff, sediment/ash laden runoff, and debris-flows creating a future concern for roads, bridges, culverts, and the associated channels along the drainage paths of the burned watersheds. Increased water flows may cause the capacity of crossings and drainage features (culverts) to be exceeded, and the transported sediment and debris may cause culverts, bridges, and other drainage features to become overwhelmed and ultimately fail (Figure 5). These impacts may cause uncontrolled flow to overtop the road and damage the road prism with potential for structural failure of roads within the affected watersheds.



Figure 5. Burned area above culvert where increased erosion and sedimentation can plug culverts leading to a road being overtopped by flood waters.

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. Public safety hazards are significantly increased due to flash flooding, where road segments lie within the floodplain, fallen trees, destabilized rock slopes, damage to traffic safety structures and signs.

Common BAER emergency treatments could include signs warning travelers of the increased danger, closures of some Forest Service roads during monsoon season, storm inspection and response, creating armored dips, clean ditches to handle increased flows, and removing debris from stream channel.

There are approximately 102 miles of Forest Service roads (FSR) within the Phase 2 HPCC assessment area. There is risk of road loss and damage, or loss of access to recreational sites that could occur to the following surveyed FSR roads:

- Santa Fe NF (SNF) FSRs 113D, 113E, and 632 roads
- Carson NF (CAF) FSR 723, 161, 89, and 708 roads

Not all FSR roads were surveyed. However, the BAER team determined that there is also risk of road loss or damage to the non-surveyed lower maintenance rated FSR roads

The FSR 518A Bridge over the Upper Rio Pueblo is a reinforced concrete bridge located on FSR 518A crossing Rio Pueblo. The End of Bridge (EOB) is exposed and undermined. Water has poor alignment under the bridge and is attacking the far (EOB) abutment. Hydrologic models determine there is a possibility of the Pueblo Rio seeing a substantial increase in flows upstream of the bridge. The bridge is almost certain to fail in higher flows and bridge components would pose a threat to anyone/anything downstream as well as cause significant injury or death of anyone on the bridge if it failed. The bridge failure would also result in increased sedimentation into the Rio Pueblo.

Property--Trails

Trail assessments on the SNF were completed using SBS maps, topographic maps, flight imagery, and in many instances first-hand knowledge of specific trails. The following 10 assessed SNF trails were considered at-risk: #220, #251, #380 (risk considered low), #222, #223 (risk considered intermediate), #233, #266, #269 (risk to be high), and #214, #250 (risk to be very high) trails.

Property—Fish Barrier

The Alamitos Creek Fish Barrier is a structure that protects aquatic habitat of the Rio Grande (RGCT) cutthroat trout by preventing non-native fish species from entering RGCT refugia. The barrier is threatened by post-fire flooding and debris flows and the risk is considered very high.

Natural Resources—Water Quality of Outstanding National Resource Waters

Outstanding National Resource Waters (ONRWs) are streams, lakes and wetlands that receive special protection against degradation under the State of New Mexico's Standards for Interstate and Intrastate Surface Waters (Water Quality Standards) and the federal Clean Water Act. ONRW water bodies are at risk of water quality loss due to post-fire effects. ONRWs themselves are not considered to be BAER critical values; however, the sections of ONRWs on Forest Service lands were evaluated for post-fire risks to their water quality which is a BAER critical value. Several miles of stream ONRWs are within the Phase 2 assessment area including segments of Rito de Gascon, Serpent Lake, Unnamed Lake South of Serpent Lake (Group 1), Rito San Jose, Sparks Creek, Daily Creek, Johns Canyon, and Sapello River (Group 2).

The probability of damage to Group 1 ONRWs is based on minimal changes in peak flows from pre- to post-fire and soil erosion modeling and expected sedimentation rates. The low influx of potential sediment into the stream system is predicted and therefore, a low potential to exceed the State's water quality standard.

The probability of damage to Group 2 ONRWs is based on the extreme changes in modeled peak flow values from pre- to post-fire and soil erosion modeling and expected sedimentation rates. This influx of sediment into the stream system could potentially exceed the State's water quality standard.

Natural Resources—Eligible Wild and Scenic Rivers

Eligible wild and scenic rivers (WSR) meet the basic criteria for inclusion in the National Wild and Scenic Rivers System. They are free-flowing and possess at least one value that is outstandingly remarkable, regionally, or nationally. Within the HPCC Phase 2 BAER assessment, there are two (2) eligible WSR segments within the fire perimeter, both of which occur on the Carson NF: 1) Alamitos Creek (from its headwaters to the fish barrier; and 2) North Fork Alamitos Creek (from the headwaters to Alamitos Creek).

The Phase 2 SBS map depicts burn severity as moderate in the watershed area along the length of both eligible reaches with minor amounts of high SBS in their uppermost reaches near the Pecos Wilderness boundary. Directly within and adjacent to the riparian corridor of the WSR reaches, patches of low burn severity exist intermittently. The probability of damage to water quality is likely based on changes in modeled peak flow values from pre- to post-fire and soil erosion modeling and expected sedimentation rates and considerable effects to water quality is expected.

Natural Resources—Agricultural Waters on NFS Lands

Alamitos Creek and Rito Angostura provide water for agricultural use to two acequias which deliver water to private lands off-forest in the Holman, NM area. Water used for agricultural supply on NFS lands is threatened by increased sedimentation from erosion, increased post-fire water flows, and degradation of water quality.

The probability of damage or loss for SNF and CAF water used for agricultural supply is very likely in moderate and high SBS areas due to increased erosion, sediment delivery and from significant-to-very significant-to-extreme changes in modeled peak flow values from pre-to post-fire and soil erosion modeling outputs. There is potential damage and loss of agricultural use for a considerable time (over the next 2-4 years) which could include related water ditches and specific water diversion points.

Natural Resources—Hydrologic Function

Post-fire, increased water runoff is expected, resulting in increased magnitude of post-fire peak flows. Post-fire peak flows can affect stream channel geomorphology, thereby altering hydrologic function through excess scouring and deposition. There is a probability of damage to this critical value because of the likelihood of increased erosion, sediment delivery, channel incision, vertical and horizontal instabilities, changes to peak discharge, and reduction in flood attenuation. While there is a possibility its function will naturally adjust and

recover over time, the risk is considered very high.

Natural Resources—Soil Productivity

The probability of damage or loss for soil productivity with minor post-fire soil erosion potential (modeled soil loss < soil loss tolerance) is very likely because modeled erosion rates are associated with the 1.5-year return period of annual precipitation. Because soil loss on these hillslopes could result in minimal, recoverable, or localized damage to soil productivity, the risk is considered low.

The probability of damage or loss for soil productivity with moderate post-fire soil erosion potential (modeled soil loss 1-3 times soil loss tolerance) is very likely because modeled erosion rates are associated with the 1.5-year return period of annual precipitation. Because soil loss on these hillslopes could result in considerable long-term damage to soil productivity, the risk is considered very high.

The probability of damage/loss for soil productivity with major post-fire soil erosion potential (modeled soil loss >3 times soil loss tolerance) is very likely because modeled erosion rates are associated with the 1.5-year return period of annual precipitation. Because soil loss on these hillslopes could result in considerable long-term damage to soil productivity, the risk is considered very high.

Natural Resources—Native or Naturalized Communities

Fire suppression activities may result in the spread of noxious invasive plants. The unknown introduction and dispersal of invasive weeds into areas disturbed by fire suppression and repair has the potential to establish large and persistent weed populations. Aggressive invasive plants (i.e., scotch thistle, bull thistle, oxeye daisy) are present within the Phase 2 assessment area, primarily along travel routes and trails. These infestations are within or adjacent to the burned areas. Invasive plants are highly adapted to take advantage of early seral conditions created after fire and can out-compete native plants for resources. There is a risk to native plant populations due to plant species adjacent to previously un-infested areas that have been burned at a moderate to high intensity. These invasive plant infestations would have considerable long-term effects with eventual displacement of native plants. The risk is high for critical values such as native plant communities due to spread of invasive plants into previously un-infested areas.

The Arizona willow is a unique species found in wet high alpine meadows and riparian areas. This plant is vulnerable to habitat loss and is representative of key native plant communities from riparian and wetland areas within and adjacent to the fire area. Invasive plants take advantage of the early seral conditions created after fire and can out compete native plants for resources. Because invasive plants are close to un-infested, vulnerable habitat, the probability of spread is likely. The risk of damage of invasive plant infestation would have considerable long-term effects with eventual displacement of native plants such as the unique Arizona willow plant communities.

Natural Resources—Rio Grande Cutthroat trout

The Rio Grande Cutthroat trout (RGCT) is a USFS region 3 sensitive species managed under a Species Conservation Agreement. The probability of loss for remaining RGCT within burned drainages is very likely because the introduction of ash to streams, extreme flows and heavy sediment loads will degrade the habitat. The magnitude of consequences is anticipated to be moderate because the local loss of the population will occur. The risk to this native community is considered very high.

Natural Resources—Mexican spotted owl (MSO)

The HPCC fire burned within a portion of Mexican spotted owls (MSO) suitable recovery habitat. Within the burned area on the Carson NF (CAF), there were approximately 2,475 acres of MSO Recovery habitat (mixed conifer). Because there are no Protected Activity Centers (PACs) and there is no designated critical habitat on the Carson NF portion of the fire footprint, none of the MSO recovery habitat meets the threshold for BAER critical values for threatened and endangered species (TES).

The HPCC fire burned within a large portion of Mexican spotted owl (MSO) suitable and designated critical habitat on the Santa Fe NF (SNF). In the Phase 2 assessment area, there are approximately 20,326 acres of

MSO delineated habitats that were impacted by the fire, including 3 MSO Protected Activities Centers (PACs). Due to accelerated soil erosion potential and decreased site productivity, the probability of damage or loss is Very Likely for MSO Critical Habitat. High and Moderate soil burn severity are likely to have altered MSO habitat to an extent that would result in those areas being no longer suitable. The loss of these MSO PACs and MSO critical habitats it is likely to have long term impacts to the local population of the species on the eastside of the SNF; therefore, there is a risk to Mexican spotted owls protected activity center habitat and designated critical habitat. However, the entire population ranges well beyond the SNF, including multiple National Forests throughout Arizona and NM, thus, the species will slightly be negatively impacted from the effects of this fire over the long term. No BAER treatments are recommended.



Figure 6. Mexican Spotted Owl

Cultural Resources

Cultural resources or historic properties consist of archaeological sites, historic buildings, and traditional cultural properties (TCPs). Significant heritage sites are those listed, or are potentially eligible for listing, on the National Register of Historic Places (NRHP) and are considered nonrenewable and irreplaceable resources. Post-fire erosion threats to cultural resource sites in high to moderate severity burns have been well documented. Sites with surface vegetation removed by wildfire are vulnerable to erosion, slumping, trampling and, with increased ground visibility, artifact looting and theft. Storm runoff, particularly after severe summer monsoons, may wash away significant portions of heritage sites or bury them with mud and debris. Post fire erosion threats include: the development of gullying or rilling that can expose and remove subsurface cultural deposits or burials; increased levels of sheet-wash eroding archaeological features and/or removes artifacts from site locations and fire-killed trees that fall, and up-end root systems can result in the destruction of archaeological features/architecture, displace artifacts, and contribute to the exposure of subsurface archaeological deposits including human remains.

A total of 53 cultural resources were identified within the Phase 2 HPCC BAER assessment area. Of these, 44 were considered BAER critical values (i.e., sites eligible for listing in the NRHP or unevaluated sites with apparent significance based on consultation with local heritage staffs and Tribes). These include 4 artifact scatters, 1 mine/prospect pit, 22 rock shelters/rock alignments, 12 structural sites, and 2 culturally modified trees. Other cultural resources BAER critical values are 2 acequias and 1 potential Traditional Cultural Property (TCP) trail.

Partner Efforts

In addition to identifying and recommending treatments to reduce post-wildfire effects to critical values on NFS lands, BAER team members met and communicated with other federal agencies such as US Geological Survey (USGS), Natural Resources Conservation Service (NRCS), and National Weather Service (NWS). Team members also met with non-federal partners such as the State of New Mexico Forestry Department-EMNRD and New Mexico Acequia Association to understand additional post-fire needs that are outside of the scope of the Forest Service BAER program and shared their analysis and data.

Conclusion

The BAER team identified threats to critical values on NFS lands based on a rapid Phase 2 assessment of the area burned by the HPCC fires. The team's findings provide the information needed to recommend emergency treatments for managing unacceptable risk to critical values.

BAER treatment recommendations must undergo an internal review at the local Forest Service Supervisor's Office, Regional Office, and Washington Office, depending upon total treatment funding amounts. The BAER team's recommended emergency treatment objectives for its Phase 2 assessment include:

- Posting area closure and hazard warning signs to control public access and to inform the public of post-wildfire hazards that exist within the burned area.
- Implementing closure barriers for public safety from post-fire flooding and debris-flows at key roads, trails, campsites, and trailheads.
- Facilitating the implementation of early warning systems (precipitation gauges or similar). Although the Forest Service does not install or maintain early warning systems, the Santa Fe and Carson NFs should facilitate the expedited clearances and permits for partner agencies to install and maintain early warning systems for downstream entities and infrastructure prior to high-risk precipitation events.
- Protecting high value Forest Service roads through storm proofing, culvert cleaning, and strategic armoring to facilitate effective function of NFS investments during events with increased water flows, and sedimentation delivery.
- Placing targeted cultural resource treatments to mitigate the risk of loss. Treat archaeological sites by hazard tree felling, seeding and site stabilization.