



Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Post-Fire Recovery and Response

Forest Service

Shared Commitment

- Post-fire response and long-term recovery is a shared responsibility
 - Collaboration with Federal, State, and Local Agencies and Municipalities
 - All-lands approach to leverage resources with multiple agencies with intent to achieve well-organized and all-embracing recovery for lands and communities impacted by wildfires
 - Ongoing collaborative meetings since the beginning of fire season
 - Each agency, municipality, and partner has been engaged in proactive and innovative approaches toward fire and post-fire efforts. This work could not be achieved without the cooperation of all entities with a role in post-fire recovery and response
 - Burned Area Coordinated Response Team: weekly meetings include federal, state, and local agencies as well as Congressional staff, Land Grants, Acequias, and Tribes to troubleshoot and collaborate on solutions

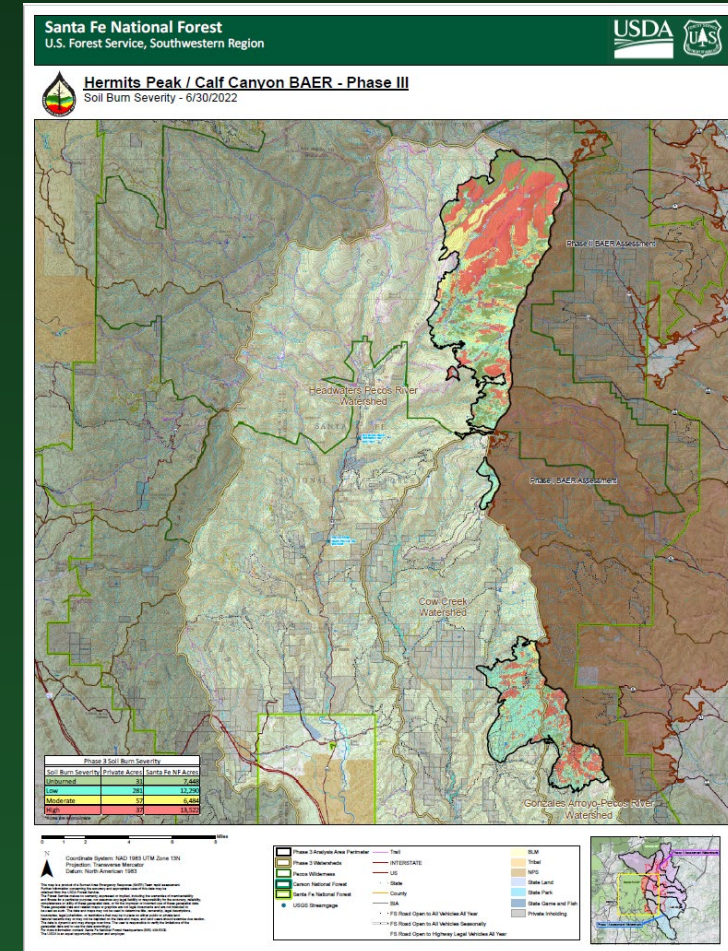
Burned Area Emergency Response

- Primary responsibility for recovery on National Forest System Lands lies with the USDA Forest Service
- Burned Area Emergency Response Program
 - Identifies imminent threats to critical values: human life and safety, property, and critical natural and cultural resources
 - Takes immediate action to manage unacceptable risk to critical values
 - Three program components:
 - Emergency Stabilization
 - Burned-Area Rehabilitation
 - Burned-Area Restoration

BAER Efforts to Date

Hermits Peak/Calf Canyon Fire – Santa Fe National Forest

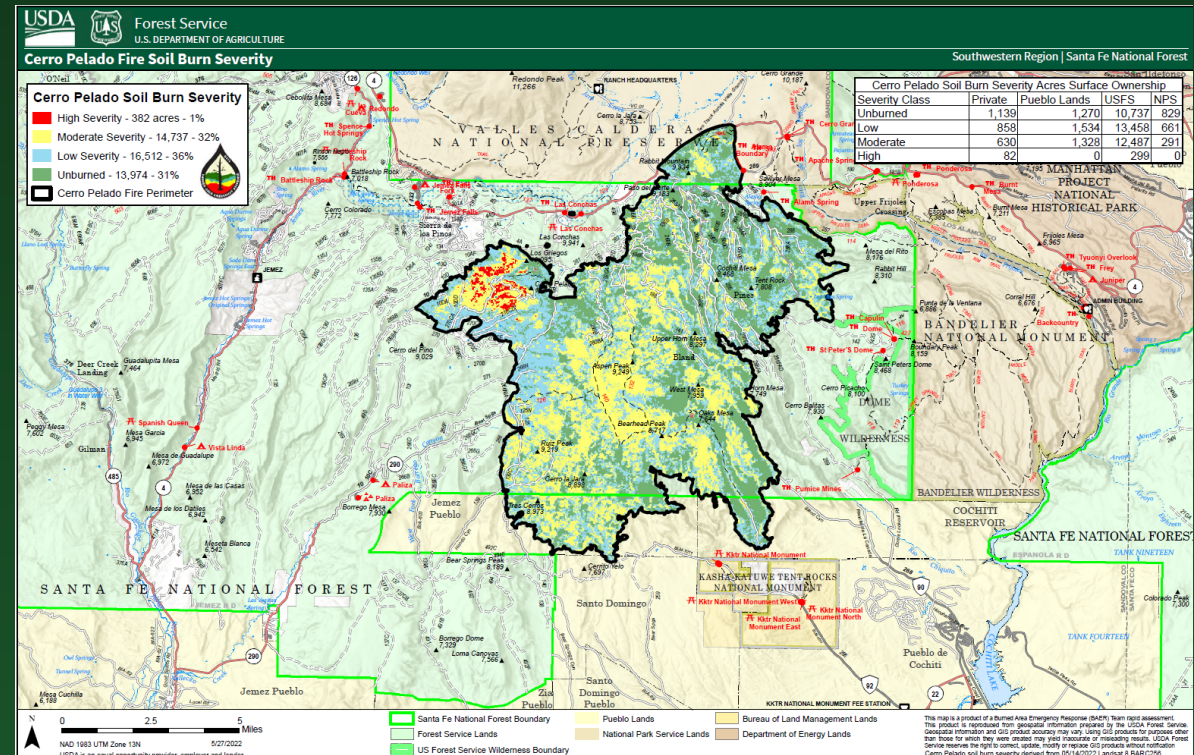
- Emergency Stabilization - \$2,200,595 authorized
 - Land Treatments – seeding and mulching
 - Cultural resource site stabilization
 - Channel and culvert clearing
 - Road stabilization
 - Storm inspection and response
 - Burned area warning signs at roads and trails
 - Gates
 - Infrastructure removal
 - Burned debris removal or stabilization
 - Invasives early detection and response



BAER Efforts to Date

Cerro Pelado Fire – Santa Fe National Forest

- Emergency Stabilization - \$213,000 authorized
 - Road stabilization
 - Storm inspection and response
 - Burned area warning signs at roads and trails
 - Invasives early detection and response

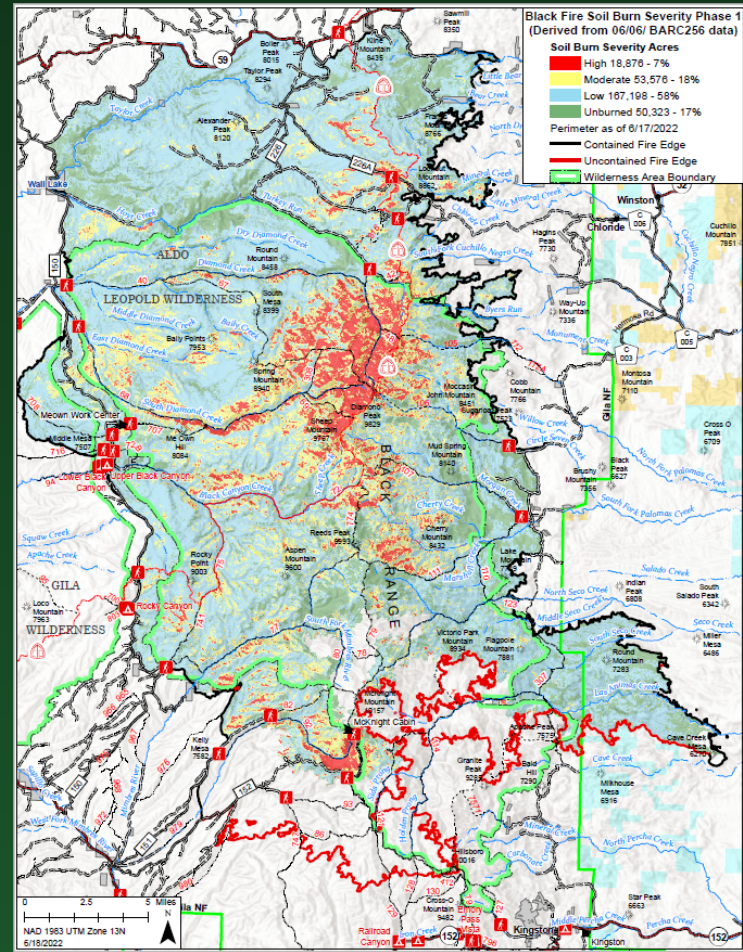


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BAER Efforts to Date

Black Fire – Gila National Forest

- Emergency Stabilization - \$391,000 authorized
 - Land Treatments – seeding and mulching
 - Storm inspection and response
 - Trail stabilization
 - Cultural resource stabilization
 - Burned area warning signs at roads and trails
 - Gates

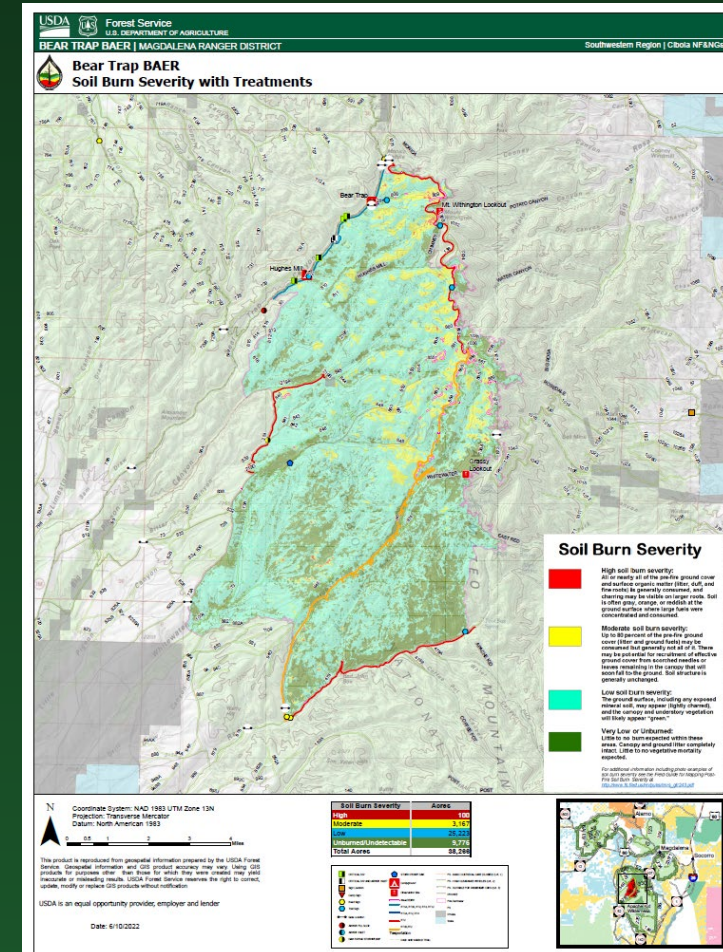


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BAER Efforts to Date

Bear Trap Fire – Cibola National Forest

- Emergency Stabilization - \$218,000 authorized
 - Road stabilization
 - Storm inspection and response
 - Burned area warning signs
 - Infrastructure protection
 - Invasives early detection and rapid response

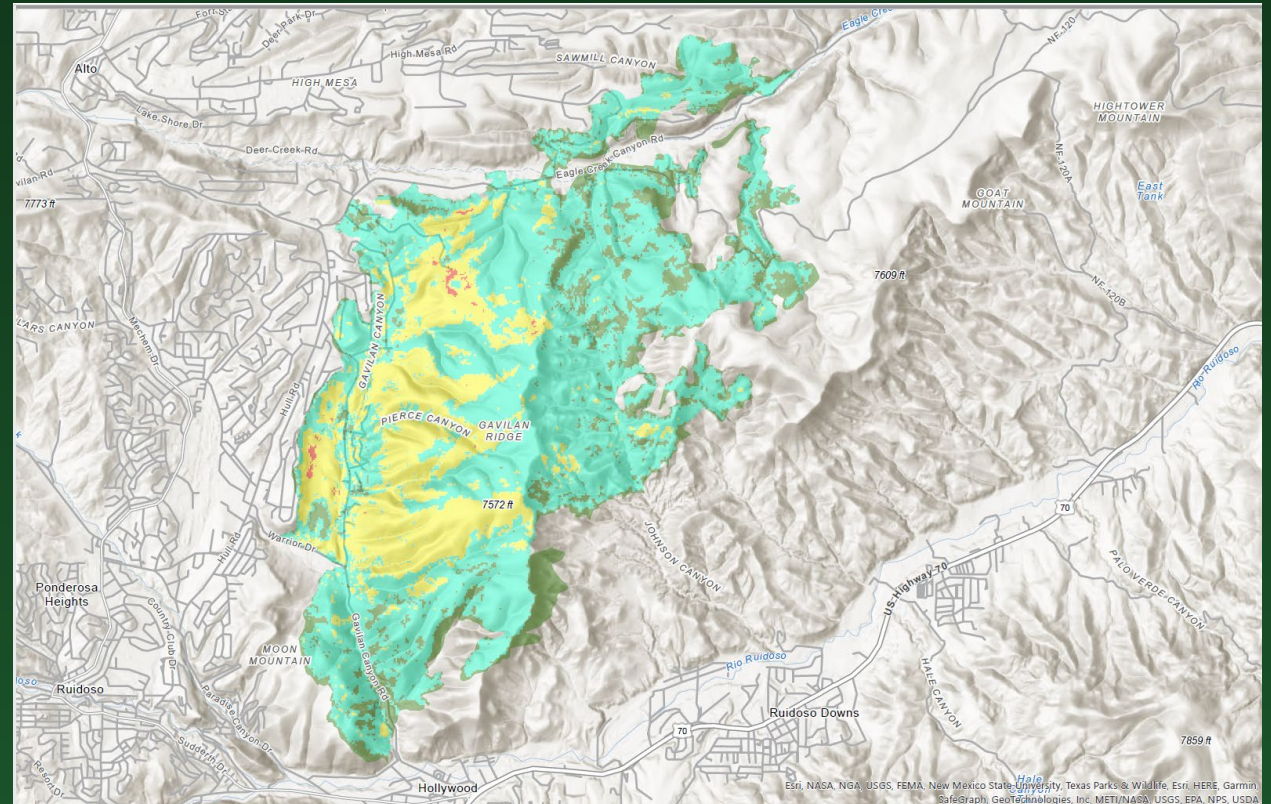


7/27/2022

BAER Efforts to Date

McBride Fire – Lincoln National Forest

- Emergency Stabilization - \$499,000 authorized
 - Land Treatments – seeding and mulching
 - Burned area warning signs
 - Barriers
 - Invasives early detection and rapid response

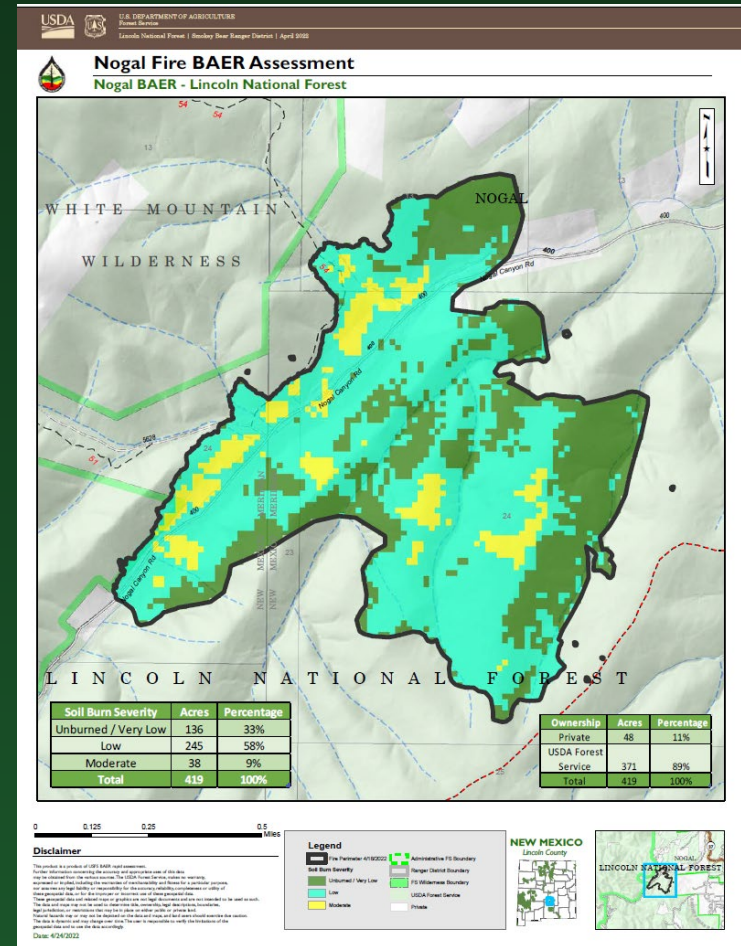


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BAER Efforts to Date

Nogal Canyon Fire – Lincoln National Forest

- Emergency Stabilization - \$22,355 authorized
 - Burned area warning signs
 - Invasives early detection and rapid response



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BAER Efforts – On the Ground

Hermits Peak/Calf Canyon – Santa Fe National Forest



BAER Specialist Nikki Berkebille (Santa Fe NF Archaeologist) is using the Survey123 data collection program to document this burned cultural resources site in the Upper Mora River Watershed area of the Hermits Peak-Calf Canyon Fire perimeter



BAER Soil Scientist Christopher (Kit) Macdonald and BAER Wildlife Biologist Matthew Oneill assessing soil burn conditions and collecting data.

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BAER Efforts – On the Ground

Hermits Peak/Calf Canyon – Santa Fe National Forest



BAER Civil Engineer Lisa Archuleta assessing road culverts for drainage.



BAER Trails & Recreation Specialist Sarah Smith is working with the BAER engineering and hydrology specialists to assess bridges within the Gallinas headwaters watershed.



BAER Specialists assessing Culvert off of Forest Service NFSR 156 Road in Hermits Peak/Calf Canyon Burned Area.

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BAER Efforts – On the Ground

Cerro Pelado – Santa Fe National Forest



BAER Hydrologist Kelly Mott-Lacroix documenting her assessment data downstream and outside the fire perimeter of the Cerro Pelado burned area at the Soda Dam off of Highway SR4



BAER Soil Scientist Nori Koehler & BAER Hydrologist Kelly Mott Lacroix Prepare for Recon Flight of the Cerro Pelado Burned Area

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BAER Efforts – On the Ground

Black Fire – Gila National Forest



Prepping Link Ranch for Possible Flooding



Main Diamond Creek Holding Pen in the Black Burned Area for Gila Trout to be Evacuated and Transported to the FWS Mora National Fish Hatchery

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What Comes Next:

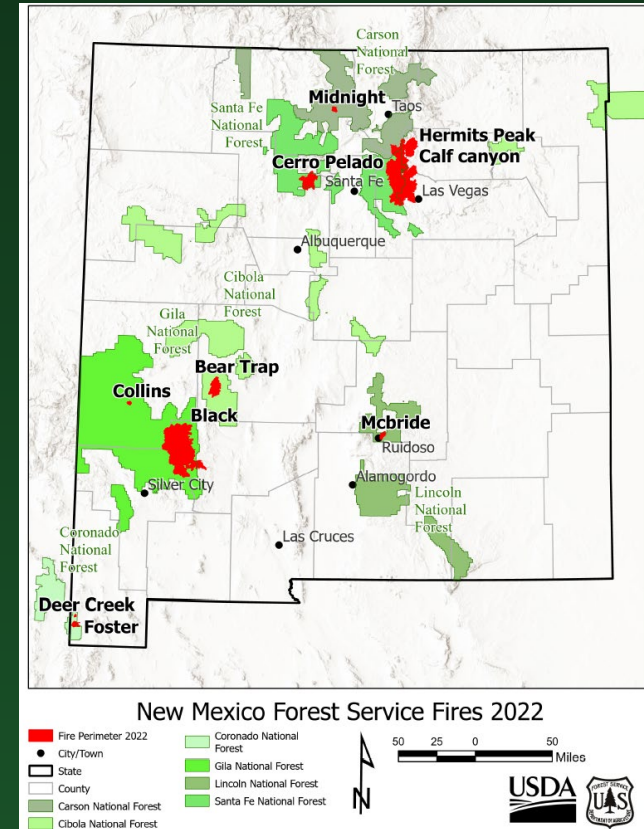
Long-term efforts

- Long-term post-fire recovery efforts have already begun
- Each incident involves assessing and implementing actions toward post-fire repair and restoration
 - Safety
 - Signing, road and area opening/closures
 - Continuance of land and road stabilization, debris removal, channel clearing
 - Recognition and communication of potential flooding
 - Land Treatments
 - Seeding/mulching, debris removal, water channel treatments
 - Forestry and Grazing
 - Rangeland fence repair/replacement, water features, salvage, tree planting, firewood availability, wood products
 - Infrastructure
 - Road repair and reconstruction
 - Trail repair and reconstruction
 - Acequia, ditches, powerlines, etc. repair and reconstruction
 - Recreation infrastructure repair, reconstruction, or decommission

Overcoming Challenges

Continued Collaboration Needs

- Scale of efforts
 - Capacity limitations
 - Timeline
 - Funding
 - Dedicated post-fire funding
 - Long-term funding
- Material and supply
 - Shortages and costs
- Procurement
 - Different authorities pose a challenge for joint procurement efforts



7/27/2022

Recap

- Post-fire response and long-term recovery is a shared commitment
- Primary Forest Service responsibility is emergency and post-fire response on National Forest System lands
- We are committed to continued collaboration between the USDA Forest Service, USDA Natural Resources Conservation Service, USDA Farm Service Agency, USDA Rural Development, State agencies, the Governor's office, the New Mexico delegation, local government, tribes, land grants, acequias, and the public we serve



THREE PHASES OF WILDFIRE RECOVERY

There are **three phases of recovery** following wildfires on federal lands:

- Fire Suppression Repair
 - Emergency Stabilization-Burned Area Emergency Response (BAER)
 - Long-Term Recovery and Restoration
- **Fire Suppression Repair** is a series of immediate post-fire actions taken to repair damages and minimize potential soil erosion and impacts resulting from fire suppression activities and usually begins before the fire is contained, and before the demobilization of an Incident Management Team. This work repairs the hand and dozer fire lines, roads, trails, staging areas, safety zones, and drop points used during fire suppression efforts.
 - **Emergency Stabilization-Burned Area Emergency Response (BAER)** is a rapid assessment of burned watersheds by a BAER team to identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources on **National Forest System** lands and take immediate actions to implement emergency stabilization measures before the first post-fire damaging events. Fires result in loss of vegetation, exposure of soil to erosion, and increased water runoff that may lead to flooding, increased sediment, debris flows, and damage to critical natural and cultural resources. BAER actions such as: mulching, seeding, installation of erosion and water run-off control structures, temporary barriers to protect recovering areas, and installation of warning signs may be implemented. BAER work may also replace safety related facilities; remove safety hazards; prevent permanent loss of habitat for threatened and endangered species; prevent the spread of noxious weeds, and protect critical cultural resources.
 - **Long-Term Recovery and Restoration** utilizes non-emergency actions to improve fire-damaged lands that are unlikely to recover naturally and to repair or replace facilities damaged by the fire that are not critical to life and safety. This phase may include restoring burned habitat, reforestation, other planting or seeding, monitoring fire effects, replacing burned fences, interpreting cultural sites, treating noxious weed infestations, and installing interpretive signs.



Post-Fire BAER Assessment

Burned Area Emergency Response (BAER)

Information Brief



Forest Service BAER Program Overview

The **Burned Area Emergency Response (BAER)** program is designed to identify and manage potential risks to resources on **National Forest System** lands and reduce these threats through appropriate emergency measures to protect human life and safety, property, and critical natural or cultural resources. **BAER** is an emergency program for stabilization work that involves time-critical activities to be completed before the first damaging event to meet program objectives:

BAER Objectives:

- Determine whether imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources on **National Forest System** lands exist and take immediate actions, as appropriate, to manage the unacceptable risks.
- If emergency conditions are identified, mitigate significant threats to health, safety, human life, property and critical cultural and natural resources.
- Prescribe emergency response actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to critical values resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources.
- Implement emergency response actions to help stabilize soil; control water, sediment and debris movement and potentially reduce threats to the **BAER** critical values identified above when an analysis shows that planned actions are likely to reduce risks substantially within the first year following containment of the fire.
- Monitor the implementation and effectiveness of emergency treatments that were applied on **National Forest System** lands.

While many wildfires cause minimal damage to the land and pose few threats to the land or people downstream, some fires result in damage that requires special efforts to reduce impacts afterwards. Loss of vegetation exposes soil to erosion; water run-off may increase and cause flooding, soil and rock may move downstream and damage property or fill reservoirs putting community water supplies and endangered species at-risk.

The **BAER** team presents these findings in an assessment report that identifies immediate and emergency actions needed to address post-fire risks to human life and safety, property, cultural and critical natural resources. This includes early detection and rapid response (EDRR) treatments to prevent the spread of noxious weeds into native plant communities. The **BAER** report describes watershed pre- and post-fire watershed response information, areas of concern for life and property, and recommended short-term emergency stabilization measures for **Forest Service** lands that burned.

In most cases, only a portion of the burned area is actually treated. Severely burned areas steep slopes, and places where water run-off will be excessive and may impact important resources, are focus areas and described in the **BAER** assessment report if they affect critical values. Time is critical if the emergency stabilization measures are to be effective.

A **BAER** assessment team conducts field surveys and uses science-based models to rapidly evaluate and assess the burned area and prescribe emergency stabilization measures. The team generates a "**Soil Burn Severity**" map by using satellite imagery which is then validated and adjusted by **BAER** team field surveys to assess watershed conditions and model potential watershed response from the wildfire. The map identifies areas of soil burn severity by categories of very low/unburned, low, moderate, and high which may correspond to a projected increase in watershed response. The higher the burn severity, the less the soil will be able to absorb water when it rains. Without absorption, there will be increased run-off with the potential of flooding.

BAER Funding:

Special Emergency Wildfire Suppression funds are authorized for **BAER** activities and the amount of these expenses varies with the severity of the fire season. Some years see little **BAER** activity while other years are extremely busy.

Because of the emergency nature of **BAER**, initial requests for funding of proposed **BAER** treatments are supposed to be submitted by the Forest Supervisor to the Regional Office within 7 days of total containment of the fire. The Regional Forester's approval authority for individual **BAER** projects is limited. Approval for **BAER** projects exceeding this limit is forwarded onto the Washington Office.



December 2021

Postfire Stabilization and Recovery

The frequency and severity of wildfires has increased in recent years. Hotter, drier conditions associated with changing climate make this problem more acute. U.S. Department of Agriculture (USDA), Forest Service research helps inform the efforts of land managers working to keep forests and grasslands healthy. By providing state-of-the-art knowledge and tools, Forest Service scientists help land managers and private landowners select the best strategies to ensure that forests recover quickly from wildfires and other disturbances.

Immediate Postfire Stabilization

Major concerns after wildfires are increased water runoff and soil erosion due to the loss of protective soil structure and forest floor plants. Wildfires can also create soil conditions that repel water, which increases the risk of flooding. Examples of Forest Service research that informs land management strategies to reduce postfire soil erosion and flooding include:

- Developing [online soil erosion prediction tools](#) to allow for better postfire land management decision-making and testing them in field studies throughout the Western United States.
- Investigating the [effectiveness of mulch treatments](#) (agricultural straw, wood strands, wood shreds) to reduce erosion following wildfire. These treatments can be effective even for heavy rainfall events.
- Measuring prefire fuels and vegetation, active-fire behavior, and postfire effects. Scientists on the [fire behavior assessment team](#) then use these measurements to inform postfire recovery and Burned Area Emergency Response activities.
- Discovering that [strategic placement of fuels reduction treatments](#) on the landscape can effectively reduce fire spread and severity, even under severe fire weather conditions.

Many oak species, like this bur oak on the Black Hills National Forest, can naturally regenerate, even after high-severity fires. USDA Forest Service photo.

Reseeding and Replanting

Forest Service scientists study patterns in how forests naturally regrow after a wildfire or other major disturbances to develop the best practices for revegetation and tree planting, both naturally and through tree replanting. Seeding an area after a fire is a common strategy for restoring damaged ecosystems, controlling erosion, and suppressing invasive grasses like cheatgrass. The spread of invasive plants, especially grasses, has dramatically increased the spread of wildfire. Forest Service scientists have developed the following place-based seed and planting guidelines and tools to identify plant species with the highest likelihood of successful establishment:

- The [climate-smart restoration tool](#) helps land managers match seeds with geographic areas, or “seed zones,” under current and projected conditions, while [native seed mix](#) research helps land managers choose the right seed mix for postfire rangeland restoration and to suppress invasive plants.
- Postfire regeneration of conifers is not happening in many forest types where high-severity patches are large and surviving trees are absent. Tools like the [climate-wise reforestation toolkit](#) can assist managers in prioritizing areas for reforestation based on species of interest and the likely absence of natural regeneration.
- Some forests do not need to be replanted after some types of fire; for example, lodgepole pine, aspen, and oak can regenerate naturally after high-severity fire, while shortleaf and longleaf pines have prolific natural regeneration after low-severity or prescribed fire.
- [Prescribed fire](#) is often used to reduce wildfire risk, manage fuel loads, create wildlife habitat, and maintain resilient forest ecosystems.



Postfire Restoration

Wildfire effects can be very long lasting. Loss of vegetation can expose underlying soils to erosion; subsequent rainfalls can lead to runoff, flooding, and landslides that threaten communities, roads, and water supplies. These negative impacts can continue for years after the fires are extinguished. Forest Service scientists have developed resources to help land managers plan and execute long-term landscape restoration strategies. These include:

- The newly [published postfire restoration framework for national forests in California](#) report presents a framework that land managers can use to guide the development of postfire restoration.
- The [after fire toolkit](#) includes guidance and tools that communities, private landowners, and resource managers can use to plan for and implement postfire management actions to reduce risks associated with erosion and flooding.
- Fire drives ecosystem structure, selecting for species that survive burning from those that cannot. While measuring postfire tree survival on the Ouachita National Forest in Arkansas, scientists found that, despite the dry, hot weather when the fire began, most [overstory trees survived](#). This illustrates that some managed fires may help to restore more open conditions that will be more resilient to the next wildfire.
- [Forest Service research](#) shows that local communities typically invest in enhanced wildfire suppression, emergency response, and education after a wildfire. Despite these investments, land use planning changes and regulations that could reduce the severity of future fires rarely occur, reinforcing the need to engage our partners and stakeholders in both prefire and postfire planning. Lack of changes may lead to increased human population density in the wildland-urban interface.

Salvage logging

Postfire logging, or “salvage logging,” is the practice of cutting and removing dead or damaged trees after a large natural disturbance, such as a wildfire. Salvage logging is often used in the Western United States to recover economic loss from burned timber and to make planting activities safer. Forest Service scientists are evaluating impacts of wildfire on postfire

salvage options and management scenarios involving stream buffers, hillsides, and wildlife habitat and sharing information that land managers can use. This includes:

- In unburned forests, best management practices for logging call for leaving undisturbed buffers along streams. However, research on [postfire salvage logging](#) near streams shows that these buffers need to be at least twice as wide as, or wider than, unburnt buffers.
- With wildfire frequency expected to increase, land managers are challenged with managing an increasing number of acres comprised of dead, dying, and living trees. A new model helps forest managers predict tree mortality and [plan for salvage](#) and other management activities.
- U.S. forests are home to many woodpeckers that use the dead and dying trees found in recently disturbed forests, such as those impacted by wildfire and beetle outbreaks, for food and nesting. Until recently, managers couldn't be certain where suitable woodpecker habitat was located and whether the salvage logging would negatively impact the population. A new [habitat mapping tool](#) enables managers to locate probable woodpecker habitat within a given area.
- Scientists found that, while postfire logging created a temporary pulse of increased small- and medium-sized fuels shortly after harvest, in the long-term, woody fuel loadings were lower in salvage-logged stands. In fact, their study found that coarse woody [fuels were reduced by postfire logging](#) for nearly 40 years, though this does not guarantee a reduction in future fire severity.



Hairy woodpeckers are one of many species benefiting from dead and dying trees that may be considered for salvage logging. Habitat mapping tools help land managers make informed decisions by identifying areas important to wildlife. USDA Forest Service photo.

About Forest Service Research and Development: The Research and Development (R&D) arm of the Forest Service works at the forefront of science to improve the health and use of our Nation's forests and grasslands. Research has been part of the Forest Service mission since the agency's inception in 1905. The organization consists of 7 research stations and 81 experimental forests and ranges. Forest Service R&D partners with other Federal agencies, States, Tribes, nongovernmental organizations, universities, and the private sector. Today, more than 400 Forest Service scientists work in a range of biological, physical, and social science fields to promote sustainable management of the Nation's diverse forests and rangelands.