

EXECUTIVE SUMMARY**Introduction**

This plan has been prepared in accordance with the *Interagency Policy Guidance and Direction: Wildland Fire Rehabilitation and Restoration (1998)* signed by the Assistant Secretary of the Interior, Policy, Management and Budget and Under Secretary of Agriculture, NRE. This plan provides emergency fire rehabilitation recommendations for all lands burned within the Cerro Grande Fire including: public lands of the US Forest Service, National Park Service, Department of Energy Los Alamos National Laboratory, San Ildefonso Pueblo, Santa Clara Pueblo, Los Alamos County, and private lands of individual ownerships. The primary objectives of the Cerro Grande Fire Burned Area Emergency Rehabilitation (BAER) Plan are:

- To prescribe post-fire mitigation measures necessary to protect human life, property, and critical cultural and natural resources.
- To promptly mitigate the unacceptable effects of fire and its suppression on lands within and adjacent to the burned area in accordance with management policies, and all relevant federal, state, and local laws and regulations.

This plan addresses emergency rehabilitation of fire suppression impacts and fire effects. Three assessment teams conducted an analysis of fire effects throughout the lands impacted by the fire. The watershed group assessed the watersheds from the top of the drainage to the Rio Grande River. In addition, reclamation engineers assessed the results of a hypothetical Diamond Drive fill bridge failure as well as other structural failures (See Appendix V). Archeologists inventoried suppression impacts for potential damage to cultural sites as well as initiating a cultural resource damage assessment. The BAER Team foresters inventoried and marked imminent hazard trees and assessed potential areas for reforestation and salvage. The vegetation specialist worked with the watershed group and resource specialists from each of the jurisdictions to identify the seeding requirements and seed mix. The wildlife biologist conducted an assessment of threatened and endangered species (T&E) and initiated and closed Section 7 consultation with Fish & Wildlife Service. The GIS specialists gathered the data layers necessary for the plan, coordinated GPS activities, and transmitted the data to the jurisdictions with GIS capability. The operations specialists coordinated the implementation of treatments by the crews and provided training and quality control of the installation of the treatments.

The assessments produced by these specialists are in Appendix I. The treatments identified in the assessments under management/monitoring recommendations can be found in Part F. A summary of the costs by jurisdictions is in Part E. Appendix II contains the National Environmental Policy Act (NEPA) compliance documentation summary. Appendix III contains the BAER Plan maps. Appendix IV contains photo documentation and Appendix V the supporting documentation.

Santa Fe National Forest Priorities

Priorities identified by Santa Fe National Forest include:

- Prevent impairment of soil productivity due to accelerated soil loss or physical or chemical degradation of the soil resources. Maintenance and improvement of soil cover and productivity would be accomplished through preventive measures and land treatments.
- Protection of cultural sites.
- Preserve and maintain healthy forest and woodland ecosystems.
- Potential reforestation/salvage within burn area.



Bandelier National Monument

Priorities identified by Bandelier National Monument include:

- Rehabilitation of suppression impacts.
- Protection of cultural sites.

Department of Energy (Los Alamos National Laboratory)

Priorities identified by DOE include:

- Minimize of runoff and transport of contaminants from Los Alamos National Laboratory (LANL) facilities.
- Protection of the Omega West reactor (decommissioned) and an office building (TA-41) in Los Alamos Canyon. Protection of TA-18 Criticality Facility in Pajarito Canyon.
- Protection of infrastructure (utility, sewer, and electrical lines and well heads) within canyon bottoms that support LANL's national defense mission.
- Evacuation plan for White Rock (down drainage from LANL and within Pajarito Canyon).
- Compliance with environmental laws pertaining to outfalls, stormwater permit, and cleanup of legacy waste.
- Protection of cultural resources, T&E species, and general forest health.

San Ildefonso Pueblo

Priorities identified by San Ildefonso Pueblo:

- Rehabilitation of watersheds
- Protection from erosion, flooding, and contaminants coming from LANL.
- Protection of cultural sites on Pueblo lands and on lands of ancestral heritage.

Santa Clara Pueblo

Priorities identified by Santa Clara Pueblo include:

- Protection from erosion and flooding down-drainage from Santa Clara, Garcia, and Sawyer Canyons.
- Protection of cultural sites on Pueblo lands and on lands of ancestral heritage.
- Rehabilitation of suppression impacts.
- Protection of infrastructure.
- Protection of water quality.
- Potential of reforestation and salvage.

Los Alamos County

Priorities identified by Los Alamos County include:

- Pueblo Canyon - access to White Rock
 - Diamond Drive fill bridge
 - Rendija and Guaje Canyons - country road crosses San Ildefonso Pueblo
 - wells and evacuation route
 - Los Alamos Canyon
 - reservoir
 - ice rink
 - - well heads
 - hazard trees
 - potential release sites from LANL
- Bayo Canyon
- sewer filtration plant in bottom

Other Lands Management Direction

Private lands, consisting of the Baca Ranch, management ranges from aesthetics to timber harvests and grazing. The primary concern is rehabilitation of suppression impacts.

Fire Background

The Cerro Grande Fire originated in the late evening on Thursday, May 4, 2000, when National Park Service personnel ignited a prescribed burn to reduce fuel loads. Sporadic wind changes caused spotting over the fireline. Because of the slopover, the prescribed burn was declared a wildfire at 1300 hours on May 5, 2000. The fire was contained on May 6 and early on May 7, however, at approximately 1100 hours on May 7, winds increased significantly resulting in major fire activity. The fire spread rapidly over the next few days through ponderosa pine, mixed-conifer, aspen, white fir, grass, and pinyon juniper plant communities on public, private, and Pueblo lands. On May 10-11, the wildfire, carried by very high winds, entered Los Alamos Canyon and moved toward Los Alamos, New Mexico. The towns of Los Alamos and White Rock were evacuated of approximately 18,000 people. The fire spread to Los Alamos National Laboratory burning over one-fourth of LANL lands: numerous small structures, including historic structures; vehicles; utilities; and environmental monitoring stations. The fire continued to spread onto private lands and lands of San Ildefonso and Santa Clara Pueblos. The fire encompassed a total of approximately 42,878 acres. A total 235 residences were burned as well as an assortment of other structures. Burned acreage included: Santa Fe National Forest - 25,606 acres; Department of Energy/Los Alamos National Laboratory - 7,403 acres; Santa Clara Pueblo - 6,681 acres; Los Alamos City/County - 1,359 acres; Bandelier National Monument - 827 acres; Baca Ranch - 708 acres; and San Ildefonso Pueblo - 294 acres.

A Type I Team took charge of the Cerro Grande Fire suppression operation on May 8, 2000. The fire was contained on June 6, and anticipated control is July 7, 2000.

The Forest Service and Bureau of Indian Affairs each requested a Burned Area Emergency Rehabilitation (BAER) Team. Wayne Patton, Boise National Forest, Boise, ID and Erv Gasser, Pacific West Region, Seattle, WA responded. The two team leaders decided from the start to operate as a unified command, producing one BAER Plan for all jurisdictions. Because of the LANL facilities (an active nuclear Criticality Facility and the Omega West reactor, decommissioned, no reactor fuel but has a large inventory of contaminants discharged from radioactive liquid waste treatment plant and present in canyon bottom sediments; historic radioactive waste; and storage in the canyon bottoms), soils, watershed concerns, burned residences, urban interface, Pueblo lands, and flooding potential a full array of disciplines were dispatched. The BAER Team arrived on May 14, and began field reconnaissance. Upon arrival at the

Cerro Grande Fire, the BAER Team was requested to prepare a BAER plan to address potential effects of the fire and fire suppression impacts to all jurisdictions affected by the fire. There were 62 people on the BAER Team with an additional 22 Resource Advisors to assist in the field implementation of the treatments. In addition, a number of resource specialists from local agencies assisted in providing resource information and help in the assessment.

Because of the inherent capacity for flooding to wash radioactive and hazardous materials from LANL facilities and canyon bottom sediments located in Los Alamos, Pajarito, and Pueblo Canyons to the Rio Grande River and the close onset of the monsoon season, implementation of watershed stabilization treatments began as soon as field assessments identified treatment locations. This urgent effort was initiated to help avert a potential national disaster involving flooding at two nuclear facilities and transport of radiological contamination from LANL into public areas.

Eight jurisdictions are involved in this incident. To facilitate cooperation a Multi-Agency Coordinating (MAC) group was established, consisting of one representative from each of the involved jurisdictions, to streamline and cut through any jurisdictional barriers. The MAC group identified the high priority areas within which to initiate field assessments and also selected the date of July 1 as the goal to have treatments in place.

To manage this large operation of field assessment and immediate implementation the fire area was again divided into a North and South zone with the north escarpment of Pueblo Canyon as the dividing point. This canyon was selected because the workload would be evenly distributed. Two Type Two incident management teams were brought in and an Area Command was established to facilitate the coordination between the BAER Team and the two implementation teams. Over 1,200 people occupied the two Incident Command Posts. BAER Team Operations Specialists developed a "demonstration garden" with on-the-ground examples of each of the treatments that the fire crews would be installing. Treatment examples included: contour log felling, log erosion barriers, straw wattle installation, contour raking, seeding and mulching, and grade control structures. Each of the Resource Advisors and some Division Supervisors and overhead staff were provided training through this "demonstration garden". In the field, crews were additionally trained in straw bale placement and power pole and well head protection. A BAER Team Operations Specialist with a liaison to each IMT provided an information conduit between the BAER Team specialists and IMT operations.

The aerial operation included: one fixed wing and helicopter conducting aerial seeding over 20,000 acres; 3 helicopters delivering crews and materials to installation sites; and a continued flight restriction is still in place over the fire area. Aerial operations will become more involved when aerial hydromulching and aerial removal of large woody debris from channels begins.

On June 1 and 2, the BAER Team conducted agency debriefings in Los Alamos and at Santa Clara Pueblo providing preliminary findings and identifying treatments that had already been initiated and those yet to come. On the evening of June 2, the BAER Team conducted a public meeting in Los Alamos. Another public meeting was held on June 7 at San Ildefonso Pueblo. Agendas for these meetings can be found in Appendix V.

The BAER Team, tasked with evaluation of short- and long-term rehabilitation needs, developed this plan to address the following issues:

- Residences, facilities, and structures within the floodplains of Los Alamos, Pajarito, Pueblo, Garcia, Sawyer, and Santa Clara Canyons.
- Facilities or improvements impacted by the fire or the suppression of the fire.
- Cultural and natural resource values impacted by the fire or fire suppression actions.
- Rehabilitation requirements established by federal law, policies, and relevant Department of the Interior and US Forest Service resource management mandates.
- Rehabilitation requirements established by state laws, policies, and regulations.
- Implementation of treatments in a timely manner, prior to the first damaging rains.

Resource Damages and Threats to Human Safety and Resources

The Cerro Grande Fire burned 42,878 acres, on public, private, and Pueblo lands within a perimeter of 108 miles. Fire suppression impacts included: approximately 43 miles of dozer line, 16 miles of handline, degradation to 60 miles of gravel/unimproved road, 7 drop points, 4 heliports, 3 helibases, 4 water sources, 1 staging area, and 2 incident bases.

The entire fire has been mapped by the BAER Team. Approximately 14,733 acres (34%) are classified as high burn severity, 3,586 acres (9%) as moderate burn severity, and 24,559 acres (57%) are mapped as low burn severity.

The fire area was divided into 73 watershed and sub-watershed units for analysis purposes. These watersheds were analyzed to determine the likelihood of flooding and sedimentation due to changes in watershed efficiency resulting from the fire. As a result of the Cerro Grande Fire, hydrophobic soil conditions were created which will cause water to run off and soil to erode much faster than an unburned watershed.

The primary watershed responses of the Cerro Grande Fire are expected to include: 1) an initial flush of ash; 2) gully and rill erosion in the drainages and on the steep slopes within the burned area; and 3) debris and sediment transport and scouring in the canyons with deposition along downstream reaches of the canyons. Peak flows from the burned area are expected to increase by up to two orders of magnitude for the same storm pre- and post-fire. **Release of sediment from high to moderate burn severity areas could place humans, animals, and resources at risk in the lower portions of drainages and below steep slopes. Resources at risk include residences, structures, roads, and culverts located in the lower portions of the drainages.**

The Department of Energy, along with BAER Team assistance, continues to assess their lands for potential treatment types and locations. As mentioned above, the primary purpose of treatments is to protect LANL facilities and stabilize soils on the slopes and prevent movement of canyon bottom sediments, some of which contains radiological and hazardous waste materials. To accomplish this DOE is conducting an extensive emergency rehabilitation effort. Because the assessment on DOE lands is continuing, there may be treatments installed that have not been identified in this plan.

The Natural Resources Conservation Service (NRCS) will be conducting additional assessments of Pueblo lands for the purposes of determining whether individual structures need protection from potential flooding.

Based on the direction of the MAC group, the BAER Team conducted intensive field surveys after the fire to identify impacts and compile the following recommendations for rehabilitation of affected lands:

Fire Suppression Treatments:

- Inventory dozer and hand lines for potential archeological sites prior to rehabilitation
- Restore natural conditions to approximately 43 miles of dozerline
- Rehabilitate 16 miles of handline
- Rehabilitate Puye Visitor Center safety zone
- Rehabilitate 7 drop points, 4 heliports, 4 water sources, and 2 incident bases

Urgent Emergency Fire Rehabilitation Treatments (initiated under Emergency Spending Authority, see discussion below):

- Reseed approximately 20,000 acres designated as high or moderate burn severity
- Fixed wing/Helicopter services to support seeding operation
- Protect structures at risk in severe, high, and moderate watersheds
- Install deflectors using K-rails (concrete barriers), straw bales, and sand bags
- Install 80 flood hazard warning signs
- Conduct hazardous materials inventory and removal
- Remove floatable debris from channels
- Hire 4 emergency rehabilitation implementation team leaders and overhead

- Install 9 RAWS stations
- Contour felling on 2,625 acres
- Mulch 1,229 acres
- Contour rake/seed/mulch 1,317 acres
- Install straw wattles on 863 acres
- Remove 469 hazard trees
- Inventory and clean 104 culverts
- Install log erosion barriers on 179 acres
- Install 585 grade control structures
- Hydromulch along roads
- Aerial hydromulching of 2,103 acres on slopes > 60% in upper watersheds
- Emergency stabilization of one archeological site

Emergency Fire Rehabilitation Treatments:

- Conduct cultural resource damage assessment
- Remove tree hazards - long term
- Consult engineer on diversion structure stability
- Inventory & determine flow capacity of drainages & culverts
- Evaluate properties at high risk & develop treatments
- Inventory and assess wellheads
- Monitor water quality
- Monitor seeding effectiveness
- Monitor vegetative recovery
- Monitor water quality impacts to Federally threatened Coho Salmon
- Conduct public information dissemination
- Install 3.5 miles of range fence

Emergency Watershed Protection:

- Construct debris (catchment) basins
- Clean culverts, ditches and roadways
- Replace culverts
- Install trash racks
- Stage equipment @ culverts during storms

Other Treatments:

- Monitor CFI plots
- Conduct Section 7 consultation
- Monitor T&E species
- Provide salamander habitat on 3,825 acres
- Monitor invasive species

For the protection of human life and property, an emergency spending authority request was initiated by the BAER Team Leaders. This authority was requested and approved by BIA in the amount of \$1,350,000, on May 26, 2000. A request was also made to the FS in the amount of \$4,148,000, and approved on June 2, 2000. The formal request and approval is shown in Appendix V. All treatments listed above as "Urgent Emergency Rehabilitation Treatments" were initiated and/or completed under this authority. The BAER Team developed contract specifications and processed over 100 resource orders for equipment, materials and/or personnel required for implementation of these urgent treatment measures.

Because of the heightened awareness by the public of potential flooding following fire and the potential to move radioactive and other hazardous materials as a result of flooding residents were anxious to see protection measures put in place quickly before the first significant post-fire rainfall, estimated to be July 1. To respond to this public interest, a BAER website was developed and can be accessed at www.baerteam.org. In addition, news releases were distributed to the press and local TV and radio. At least 15 briefings were conducted for various dignitaries and politicians. Two public meetings were held as well as a number of agency briefings. A Burned Area Emergency Rehabilitation hotline, intended for use by residents who had questions relative to flood potential or the rehabilitation effort was established.

The public meetings provided residents with detailed information on the protection measures being installed, as well as an Emergency Response Plan. Residents were encouraged to ask questions in a public forum followed by a breakout session whereby residents could ask team members specific questions relating to their own individual interest.

Over 300 people attended the public meetings. The meetings also emphasized the importance of establishing BAER Plan Implementation Project Leaders, an individual who would assume the responsibilities of implementing the plan once the BAER Team is demobilized.

Urgent emergency treatments will continue to be installed until completed. A second emergency spending authority is expected to be submitted prior to plan approval. To date aerial seeding has been completed on 20,000 acres, K-rails have been placed at high priority locations, crews have begun brushing and cleaning diversion channels, straw bale deflectors have begun to be placed, 2,000 sand bags have been filled, and the Lewiston rehabilitation office has been opened.

Specifications were developed for all actions meeting the requirements of fire suppression or Emergency Fire Rehabilitation (EFR) funding. In addition, specifications were developed that meet the criteria for Emergency Watershed Protection (EWP) program administered by the Natural Resource Conservation Service (NRCS) and other specifications that could be funded by BLM base operating funds or other agency emergency funding sources.

While some less critical treatments are designed for the long-term, such as monitoring, most flood mitigation measures take into account the normal anticipated rainfall patterns that are expected to occur over the next two to three years, during which time revegetation of burned over sites is likely to occur and the site will once again become somewhat stabilized. Other flood control treatment mitigation has been implemented to protect residences and to direct any runoff around residences and into channels. In addition, the Team has placed an emphasis on flood and debris flow warning systems and heightened public awareness.

In addition to conducting and developing the above assessments and rehabilitation specifications, the BAER Team directed the implementation of short-term suppression rehabilitation actions of suppression impacts. Suppression impacts around the perimeter in Divisions U and V will not be rehabilitated for approximately 30 days to ensure that any rekindles of the fire will remain within the fireline. The FS BAER implementation leader will advise when the control lines can be rehabilitated. Suppression rehabilitation treatments for each watershed were based upon the watershed summary found in this plan. Proper accounts were established for both programs (short and long-term). In addition, this plan was submitted to BIA and USFS in accordance with interagency BAER guidelines, within 10 days of fire control. The BAER Plan was submitted prior to control of the fire.

Other resource impacts reviewed as a result of the Cerro Grande Fire included a review of cultural sites impacted, impacts to Federally listed Threatened and Endangered species, and forest and vegetation resources. The cultural resource assessment addressed cultural resource localities, including artifact scatters, and prehistoric and historic structures. Prior to rehabilitation of the suppression lines an archeological inventory was conducted. In addition, one site has already been stabilized. A cultural resource damage assessment still needs to be completed as quickly as possible.

Section 7 Consultation was initiated for four Federally listed Threatened species: Mexican spotted owl, peregrine falcon, and southwestern willow flycatcher. The determination of fire effects to the bald eagle and southwestern willow flycatcher in all jurisdictions is no effect. The determination of fire effects to Mexican spotted owl varies by jurisdiction. On Santa Clara Pueblo and Bandelier National Monument the determination is no effect. For Santa Fe National Forest and Department of Energy lands the determination is adverse effect. The determination of proposed emergency rehabilitation treatments is may effect, not likely to adversely affect. Additional emergency rehabilitation measures are currently being developed for the Department of Energy lands. Effects of these additional measures should be assessed for effects. This determination may change and the need for consultation should be addressed.

There were no Federally listed Threatened or Endangered plant species identified within the fire area. Without assistance vegetative recovery within the fire area, especially the high and moderate burn severity

areas will be marginal. On approximately 90% of the high burn severity areas, complete consumption of vegetation resources was observed and seed within the soils have been consumed or viability significantly reduced by the intense heat. In most moderate burn severity areas, a mosaic burn pattern was observed whereby some plant associations experienced greater than 70% mortality but the majority experienced a 10-40% loss. Seed banks have been impacted but some natural regeneration via sprouting has already started. Because of this and the need to stabilize the steep slopes an initial aerial seeding was applied May 31-June 10. The intent of this seeding of the high and moderate burn severity areas was to take advantage of any potential moisture between now and the monsoon season. A second seeding is anticipated for the fall. In addition, as house sites are cleaned of debris there should be a ground seeding and mulching around and upslope from house sites, again to stabilize soils.

Tree hazards were inventoried around burned structures, roads, and work sites. Approximately, 1,000 imminent tree hazards were identified on FS, Pueblo, and private lands, permission was granted by landowners, where necessary, and the trees have been dropped. An inventory of forest mortality and potential reforestation was also conducted. The level of forest mortality throughout the burn was categorized into three severity levels: 1) low mortality (less than 25% of stand basal area killed) on 2,612 acres; 2) moderate mortality (25-80% of basal area killed) on 24,101 acres; and 3) high mortality (over 80 % of basal area killed) on 16,145 acres. Potential salvage areas were determined by forest type, ownership, and fire intensity. Approximately 4,418 acres were identified for potential salvage on Forest Service, San Ildefonso and Santa Clara Pueblo lands. Approximately 6,594 acre were identified for potential reforestation on Forest Service, San Ildefonso and Santa Clara Pueblo lands.

Emergency fire rehabilitation treatments will continue until completed or monsoonal rains prevent access. Each jurisdiction has identified an implementation leader and should continue to communicate and coordinate rehabilitation activities. The BAER Team recommends that a MAC group continue for the purposes of implementation.

This BAER Plan is the initial funding request for Emergency Fire Rehabilitation funds. This plan may also be used as a justification to seek funding from other sources. Additional supplemental requests may be made after this document has been reviewed and approved by National BAER Coordinators or approval authorities of the various agencies.

At the conclusion of the funding period, (three years from the date of approval), a final Accomplishment Report will be due to the approval authority. The Accomplishment Report will document the funding received, (initial and supplemental funding), treatments installed, the effectiveness of the installed treatments and the results of monitoring activities. A template for this report is provided with this BAER Plan to the MAC group member.

Graphics illustrating the various treatments were drawn by McToliver Eriacho from Fire Crew Ramah #9, Ramah, New Mexico.