

Tres Lagunas Fire

**Burned Area Emergency Response (BAER) Team
Executive Summary**

**Pecos/Las Vegas Ranger District
Santa Fe National Forest
Pecos, New Mexico
June 24, 2013**



Executive Summary

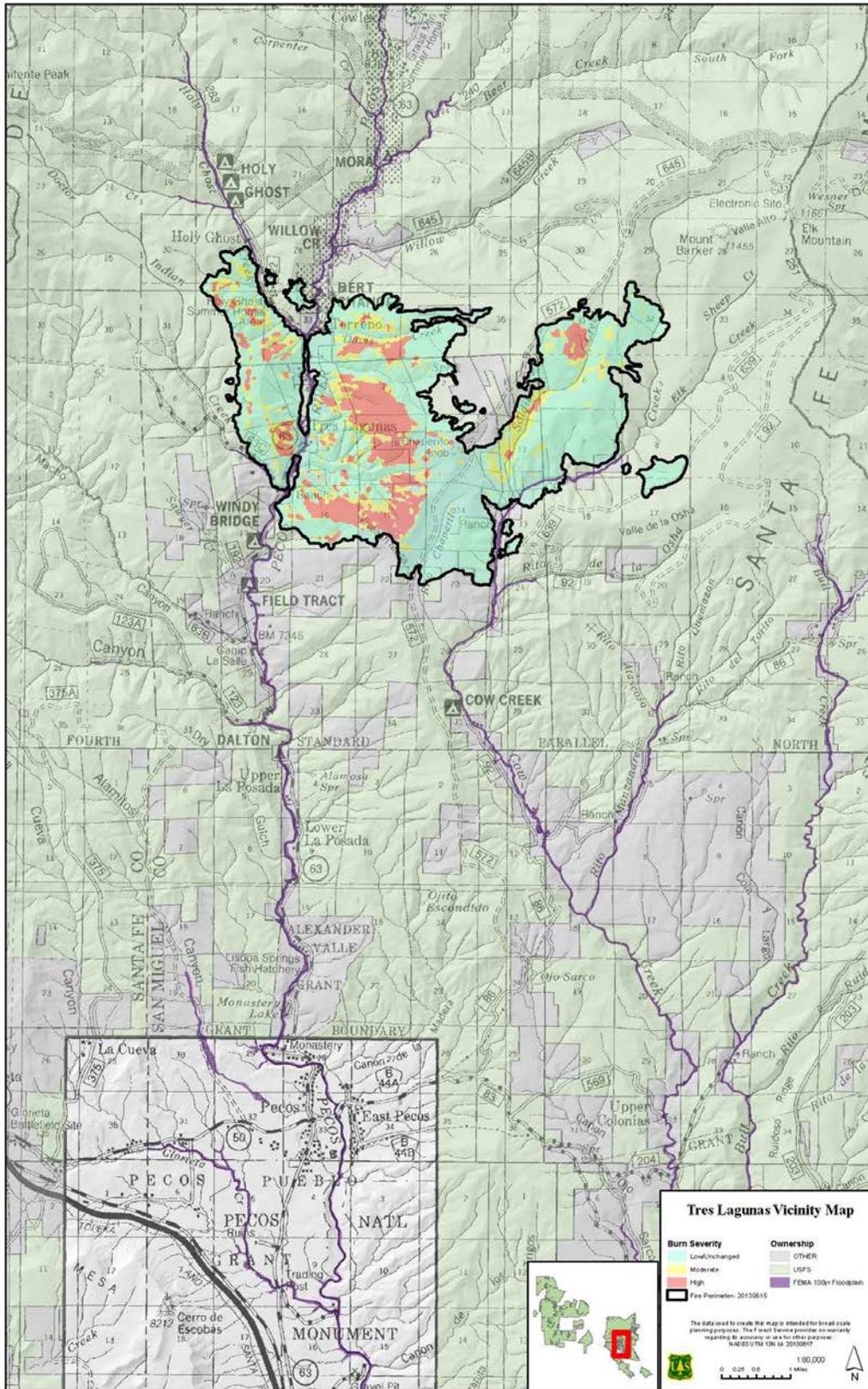
Introduction

From May 30th through mid-June of 2013 the Tres Lagunas Fire burned approximately 10,220 acres of National Forest System (NFS) lands on the Pecos/Las Vegas Ranger District of the Santa Fe National Forest. As of June 24, 2013 the fire was 90% contained and had not grown for several days. The fire started from a downed power line in the Tres Lagunas community and spread along the Pecos River canyon eventually reaching from Indian Creek in the south to Holy Ghost and Davis creeks in the North. The fire burned up to Rosilla and Chaparito peaks on the east side of the Pecos Canyon then over into the Soldier Creek and Upper Cow Creek drainages. Burn severity was high to moderate throughout 30% of the fire.

The Burned Area Emergency Response (BAER) team was assembled on June 11th to assess the severity of the Tres Lagunas Fire, including threats to life and property, and to recommend emergency response actions. The BAER team is an interdisciplinary group of specialists whose job is to identify and assess values at risk from a fire's "after effects," such as erosion, flooding, and debris flows.

The Tres Lagunas Fire team was composed of specialists in various fields, including hydrologists, soil scientists, a wildlife biologist, district liaisons, engineers, a public information officer, recreation specialists and archaeologists. From June 11 - 23, 2013, the team conducted field surveys, modeling, and analysis of data, and then prepared reports for the emergency assessment of post-fire resource conditions. The purpose of the emergency report was to first assess values at risk on the Pecos/Las Vegas Ranger District within the burn area of the Tres Lagunas Fire, and next to submit a funding request to implement response actions intended to reduce threats to life, property and resources.



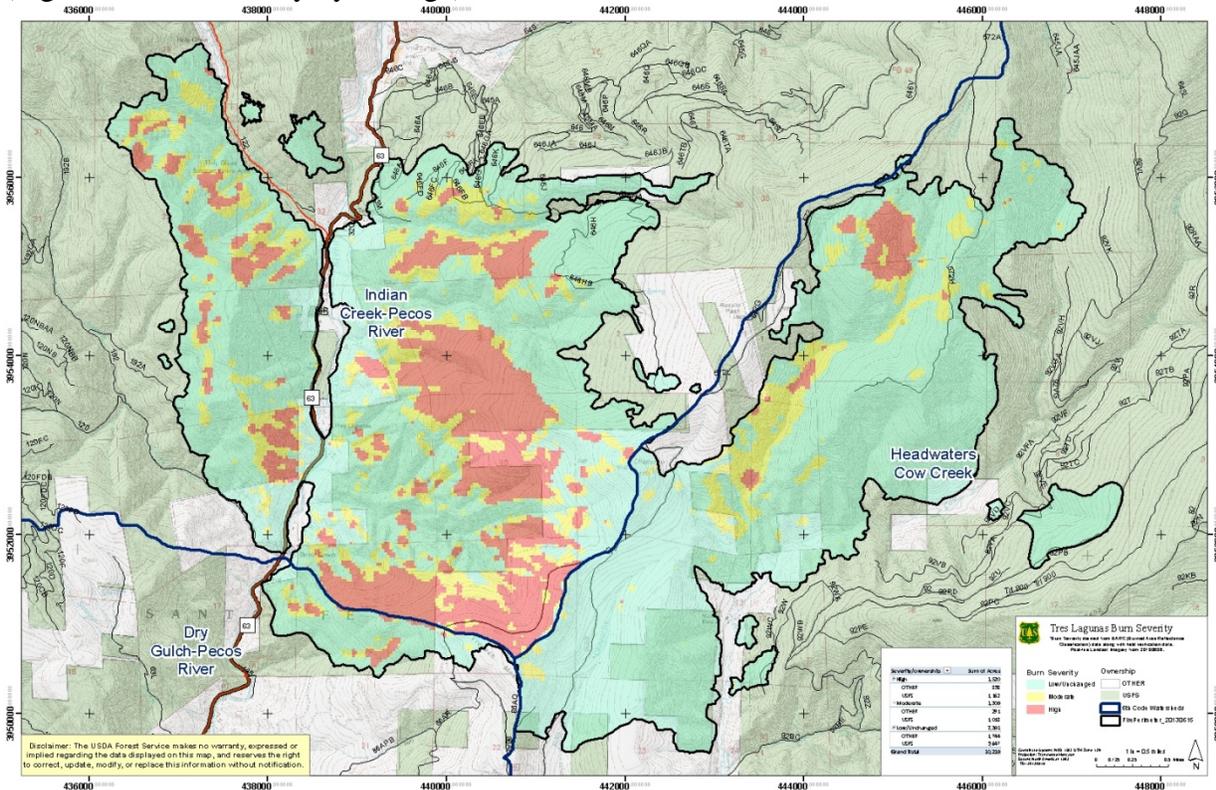


Burn Severity of the Tres Lagunas Fire

Burn severity indicates the effect the fire had on vegetation and soils. High severity burns can result in hydrophobic (water-repellant) condition of the soils, sterilization of the seedbank, removal of all vegetative ground cover, complete over-story removal and increased water flows in draws and canyons. Thirty percent of the area in this fire received high to moderate severity burn. Because this fire was a wind-driven event, total loss of pre-canopy, herbaceous ground cover, and litter occurred, even on a majority of the areas that received moderate burn severity. In addition, the parent material of the soil is mixed igneous (plutonic and volcanic) and is transported easily.

<u>Burn severity class</u>	<u>Acres burned in each class</u>	<u>Percentage of NFS area</u>
High	1,520 acres	15%
Moderate	1,309 acres	15%
Low/Unburned	7,391 acres	70%
Total Acres	10,220 acres	

(Figure 1. Burn severity by acreage)



Values at Risk

The Tres Lagunas Fire started from a downed powerline on lands under the jurisdiction of New Mexico State Forestry. The burned area is located north of Pecos NM. The majority of the

fire is on NFS lands managed by the Pecos/Las Vegas Ranger District of the Santa Fe National Forest. Approximately 7,828 acres of the burn is on NFS Lands, 2,352 acres of the burn is on privately owned lands and 40 acres is on NM Department of Game and Fish lands.

The burn area is comprised of steep and narrow drainages reaching from the Pecos River at 7,550ft to mixed conifer and alpine grasslands at 10,183ft elevation. Several steep and short drainages will potentially transport and concentrate significant water and debris flows into the Holy Ghost and Pecos River channels. Soldier Creek has seen some moderate and high intensity burn, some of which was previously burned during the Viveash fire in 2000. Potentially heavy water and debris flows are likely to occur in Soldier Creek and continue into Cow Creek.

The Tres Lagunas soil burn severity map was based on Burned Area Reflectance Classification (BARC) imagery from 6/6/2013. This data comes from the newly available LandSat 8 and required a significant shift in the value breaks between the high and moderate categories. The lower threshold for high severity was reduced from a value of 180 to 145. Some tight steep drainages in Holy Ghost canyon were changed from low to moderate severity. These adjustments were based on air and ground observations by team specialists.

On Monday June 10th the Jaroso fire started in the Pecos Wilderness north/northwest of the Tres Lagunas Fire. As of June 23th the fire had burned approximately 524 acres within the Panchuela Creek 6th code watershed which drains into the Pecos River. This amounts to 3.6% of the watershed. The burn area is approximately 7.6 miles from the confluence with the Pecos, and 14.4 miles from the Tres Lagunas burn scar. Fire activity has increased sharply in the last two days, though primarily not in the Panchuela Creek subwatershed. The burn severity within the Panchuela Creek watershed is unknown at this time. The Jaroso Fire could potentially cause a cumulative increase in flows experienced along the Pecos River within and downstream of the Tres Lagunas fire. The BAER team advises the Pecos/Las Vegas Ranger District to monitor the potential implications to the Tres Lagunas post-fire effects.



Hydrologic Modeling:

Peak flows have been estimated for watersheds above values at-risk identified within and below the burned area. Estimated pre- and post-fire peak flows for the Wildcat 5 models are summarized in the table below. A total of twenty eight Wildcat 5 runs were completed, a post- and pre-run for each value-at-risk (VAR) drainage. All VAR modeling runs were completed simulating a 25-year/1-hour storm event. The modeled storm rainfall was 1.81 inches for the Pecos River and tributaries and 2.59 inches for the Soldier Creek tributaries, due to the differences in elevation between the modeled areas. The results were organized into four runoff response groups: Holy Ghost, Davis, Pecos and Soldier. Average peak flows were calculated for each group.

Tres Lagunas Fire Wildcat5 Model Summary for individual drainages

Sub-watershed Huc6	Acres	pre fire CN	post fire CN	Pre (cfs)	Post (cfs)	post burn % increase	pre cfs/mi ²	post cfs/mi ²	Avg % Increase
DAVIS	1189	71	75	295	457	55%	159	246	55%
GHOST 1	71	69	87	25	147	488%	226	1330	255%
GHOST 2	9	72	87	5	21	320%	363	1524	
GHOST 3	122	72	81	62	150	142%	326	789	
GHOST 4	6	72	85	4	12	200%	402	1207	
GHOST 5	65	72	83	35	99	183%	343	971	
GHOST 6	82	72	85	44	147	234%	343	1146	
GHOST 7	488	70	81	141	445	216%	185	584	
PECOS 1	58	64	73	9	36	300%	99	396	323%
PECOS 2	57	65	73	11	35	218%	123	392	
PECOS 3	198	69	84	57	269	372%	184	869	
PECOS 4	880	74	79	359	589	64%	261	428	
PECOS 5	571	61	76	31	307	890%	35	344	
PECOS 6a	105	70	83	35	134	283%	214	819	
PECOS 6b	42	70	81	18	54	200%	273	820	
PECOS 7	33	72	81	18	44	144%	347	849	
PECOS 8	22	73	88	14	55	293%	406	1595	
PECOS 9	64	73	79	40	70	75%	401	702	

Horse	314	69	92	57	408	716%	116	832	
Soldier 1	105	64	88	34	382	1124%	207	2328	1094%
Soldier 2	50	64	85	16	170	1063%	205	2176	
Soldier Ck	1770	71	78	320	1480	463%	69	320	463%

Modeled Storm = 25 yr/1 hour; Davis, Ghost, Pecos, Horse = 1.81"; Soldier = 2.59"

CN = overall basin Curve Number indicates runoff response from burned areas

Post-fire flows predicted by Wildcat5 show high variability in modeled runoff due to basin size and burn severity. Small drainage basins with much of the area in high fire severity and hydrophobic soils, such as the Soldier Creek headwaters (Soldier 1 and 2), indicate an order of magnitude (10 times pre-fire flows) increase in runoff may occur. Larger drainages, such as Davis Creek, with a mosaic of burn severity, showed a much lower potential hydrologic response.

The risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2013-1, was used to evaluate the Risk Level for each value identified during Assessment:

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.	– Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects	Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable or localized effects
	RISK		
Very Likely (>90%)	Very High	Very High	Low
Likely (>50% to <90%)	Very High	High	Low
Possible (>10% to <50%)	High	Intermediate	Low
Unlikely (<10%)	Intermediate	Low	Very Low

The following risks are based on the BAER risk assessment matrix. The Very High and High Risk are unacceptable risk levels due to threats to human life, property, infrastructure and resources, therefore treatments should be applied. For an Intermediate Risk, this could be unacceptable if

human life or safety is the critical value, and treatments may be needed. The above matrix only applies to values on NFS lands. Values on other jurisdictions have been assigned a probability of damage or loss but *not* a magnitude of risk. Due to the post-fire watershed condition, no vegetative ground cover remains in high to moderate severity burn areas. There is a high presence of hydrophobic soils and steep to very steep slopes, in addition to the erosive nature of the soils within the burn area. These combine to result in excessive erosion, sedimentation, and loss of control of water. These highly unstable conditions put the following values at risk:

Human Life and Safety

There is very high risk of loss of life on NFS land within and downstream of the burned area. Individuals who may find themselves in drainages within or below the burned area or on roads affected by fire upstream are at very high risk during storm events. The drainages affected by high burn severity will be subject to higher than usual run off and debris flows which could cause injury or death. Hazard trees throughout the burn pose a very high risk to anyone entering the area. In particular, multiple hazard trees threaten the life and safety of crews working along FR 122 and among the historic cabins.

There is a high probability that life and safety will be threatened by post-fire storm events on private and State lands in Pecos Canyon downstream from the burn area. There is also a high likelihood that the Pecos River could be contaminated by hazardous materials from commercial and private properties during a flood event such as septic waste and household chemicals. Highway 63 is currently the only escape route out of Pecos Canyon. In the event of a catastrophic fire or flood, the highway could be a limiting factor in successfully evacuating this canyon. Consideration of the number of cars that can safely travel and park along NM Highway 63 without causing traffic jams during an emergency evacuation is crucial to the safety of Pecos Canyon residents and visitors

Property

Forest Service recreation and transportation infrastructure within and downstream from high and moderate burn severity are at a high risk of damage. There is a high probability of other public and private property sustaining damage due to storm runoff and debris flows. Hydrologic modeling predicts elevated runoff in Holy Ghost Creek, Davis Creek, Soldier Creek and the Pecos River. The increase in peak flows predicted (shown in the hydrologic modeling table above) from areas of high and moderate burn severity, and the loss of channel structure pose a significant threat of flood waters and debris flows that are likely to impact downstream property and infrastructure (e.g. homes, businesses, roads, culverts, bridges and low water crossings.)

Natural Resources

Fish and Wildlife Species

Threatened and Endangered species (T&E) are identified as BAER critical values. T&E affected by the fire are: Holy Ghost Ipomopsis, an Endangered species; and Mexican spotted owl, a

Threatened species. The fire will have moderate impacts on wildlife, fish and rare plant populations and their associated habitats. Additional biological natural resources that may be impacted by imminent post-wildfire threats such as flooding and erosion include several Forest Service Sensitive species including Northern leopard frog, and rare plants such as the Pecos fleabane. Fisheries in the Upper Pecos watershed, including Holy Ghost, Soldier, and Cow Creeks, and the Pecos River, may experience significant impacts due to ash-flows and habitat loss from excessive stream scouring that may occur during monsoonal rain events. Game species, especially elk, mule deer, and wild turkey, could be impacted as well. These effects could last several years.

Invasive Plants

Bull thistle and Scotch thistle occur in and around the Pecos River drainage. Populations of Scotch thistle are documented all along the NM Highway 63 within the Pecos river corridor. In addition, an 18-acre bull thistle site was documented on the east side of the river. Generally a 25-30% increase in non-native invasive plant species is seen after a major wildfire event. Invasive plant seeds may also be introduced during suppression efforts and may result in new populations of noxious weeds.

Soils

The overall scale of the fire is within the natural range of variability for the forest cover type within the Tres Lagunas Fire. High elevation mixed conifer stands typically burn at high severity, often resulting in stand replacement. These conditions are essential for regeneration of early-seral species such as aspen, which typically regenerate following large scale, high severity wildfire. However, downstream effects of erosion and slope destabilization are likely. These effects have the potential to damage forest infrastructure and other natural resources.

Hydrologic Function

Establishment of vegetative cover is critical to reducing erosion rates, improving hydrologic function, and maintaining site productivity. Mulching and seeding provide immediate or short-term cover which reduces erosion and runoff. Natural re-establishment of cover can require up to five or more years to reach pre-burn cover conditions, which will assist in re-establishing natural runoff and erosion rates. If large-scale heavy rainfall events occur within the five-year period, extreme erosion events could also occur, resulting in a loss of hydrologic function and soil productivity. This would further delay natural cover re-establishment and cause longer term accelerated erosion and high runoff events.

While water quality is a vital part of the natural landscape it is not a BAER critical value and it is not appropriate to address with emergency response actions. The team recognizes that in the short term, water quality will be greatly degraded due to ash and sediment deposition from post-fire conditions. Holy Ghost Creek, Pecos River, Soldier Creek and lower Cow Creek will be highly impacted. Indian Creek will be impacted to a lesser degree by ash and sediment deposition.

Wild and Scenic Rivers (WSR)

A 20.5 mile section of the Pecos River, from its headwaters in the Pecos Wilderness to the town site of Terrero, NM, was designated as a Wild and Scenic River (WSR). The southern-most end of the WSR segment was affected by the Tres Lagunas fire. Long term effects will have minimal impacts to the scenic/wild character of the Pecos River. The existing condition of the designated WSR that overlaps the burn area is already compromised by private and government improvements and public impacts. The majority of designated WSR is north of the burn area and will experience minimal or no impacts.

Riparian Habitats

While riparian habitat is a vital part of the natural landscape, it is not a BAER critical value. Riparian Habitat restoration post-fire is a long process that the Santa Fe National Forest must undertake and it is not appropriate to address with emergency response actions. These areas will be affected on NFS lands due to changes in peak flows, which will result in channel erosion and damage to, or loss of, the riparian vegetation. Riparian habitat within the stream drainages is expected to be subject to increased channel erosion and scour as well as deposition of ash, sediment and debris from upstream areas of high burn severity. This will cause warming of surface waters due to the loss of streamside shade, resulting in impacts to, or loss of, aquatic habitat for fish and macro- invertebrates.

Cultural Resources

The Santa Fe National Forest contains high densities of cultural resources; however, much of the Tres Lagunas burn is in a lower density area. Increased flows of water, sediment, and debris pose a threat to archaeological sites and historic properties.

There are approximately 48 archaeological sites and historic properties including the Holy Ghost Historic District (a group of cabins located next to Holy Ghost Creek at the bottom of Holy Ghost Canyon), and these sites are immediately adjacent to the burn perimeter. These cabins are privately owned and protection/maintenance of the cabins are explicitly the responsibility of the owners as outlined in the special use agreements. Of the 48 archaeological sites or historic properties, most are eligible or recommended as eligible for the National Register of Historic Places and have a high probability of being affected. The types of sites associated with the high risk Category include historic cemeteries, historic cabins, prehistoric artifacts, and scatters.



Emergency Response Action Objectives:

The NFS values are at-risk from significant increased peak flows, debris torrents and excessive sedimentation. Peak flows are predicted to increase from two to five times across the burned area. Soil erosion will increase by over an order of magnitude on the burned area. Residences on private land have a high probability of being affected by sediment and debris torrents from increased peak flows. NM Highway 63 and adjacent private roads, along with associated infrastructure, may be overtopped by flood waters and require maintenance or repair. Culverts may overtop and fail due to increased peak flows and/or from being plugged by floatable debris. Bridges may be weakened or washed out. Public use may be hazardous because of falling trees, flash floods, and falling debris. Infrastructure delivery systems may be damaged by hillslope erosion and/or gulying. Residential wells have a high potential of being inundated with storm runoff, providing health and safety issues.

The objective of recommended response actions is primarily to mitigate the threats to life and safety on NFS lands, NFS infrastructure, and NFS-managed natural and cultural resources. These recommendations are detailed below. The BAER team has shared its analysis and findings regarding the potential of impacts to life and safety, property, and resources on State and private

lands with a wide group of cooperating agencies in order to help these agencies to make their own recommendations for actions. The BAER team has worked with various groups to ensure that these same messages are disseminated to the area residents and general public.

Recommendations/Response Actions (Treatments)

Straw Mulch

Application of straw mulch on 512 acres of high and moderate burn severity with highly erosive soils, that drain into the Pecos River. The areas of moderate burn severity proposed for treatment exhibit high hydrophobicity and a lack of needle cast to provide natural mulch. Mulch is the most effective treatment for controlling erosion and reducing runoff as it provides immediate ground cover (Robichaud, et al, 2010, Napper, 2006, Larsen, et al, 2009). Areas proposed for mulching would be treated at a rate of one ton per acre. Mulch would be applied by helicopters at locations identified on the attached treatment maps, avoiding slopes of greater than 60%. Mulch would be applied to reduce erosion and peak flows. It would be effective for reducing loss of soil productivity and hydrologic function and would also provide some reduction in peak flows that threaten downstream life and safety as well as downstream property and infrastructure.

Seeding

A total of 1,653 acres of high and moderate burn severity would be seeded to provide vegetative ground cover where the soil seedbank has been eliminated. Most of the high burn severity that occurred as a result of the Tres Lagunas Fire burned in mature ponderosa pine and mixed conifer. This dense, closed canopy accumulated a thick layer of duff over approximately a 100-250 year period, essentially excluding forb or graminoid cover. The tree seeds are often destroyed in the organic duff layer, as are grass and forb seeds. Seeds are consumed in the fire or heat sterilized. Therefore, these soils do not have a viable seed bank of their own and will not stabilize naturally without sacrificing site potential. A quick-germinating, nonpersistent annual species would provide rapid ground cover and native perennial species would provide longer term ground cover. Seeding would reduce impacts to soil productivity and hydrologic function, and reduce threats to life, safety, property, and infrastructure downstream by reducing erosion and runoff. Seeding would also provide benefits for critical natural resources by accelerating vegetative recovery that would reduce erosion and sedimentation into streams, and by accelerating habitat recovery. Seeding is recommended on the headwaters of Soldier creek in a high severity burn section and in a strip of high to moderate severity burn running parallel to the creek. This seeding is critical since it treats areas that reburned through the Viveash burn scar. The Viveash fire burned with high intensity, resulting in total stand replacement over 80% of the burn scar. The advantage of seeding will be to establish a vegetative cover on this twice-burned area in order to protect the remaining soil and retain what remains of the soil productivity and the hydrological function of the sites. Treatment areas are identified on the attached seeding map. Two seeding rates will be used: a lighter seed mix will be used in conjunction with straw mulch and a heavier mix will be used for areas that will not be mulched. The proposed seed mixes are identified in the tables below.

Seed mix for use in combination with straw mulch (512 ac). This mix has a reduced level of annual barley. Areas treated with straw mulch will provide immediate ground cover and a lighter seeding rate is prescribed.

For Seed and Mulch Treatment Area

Species	Planting Rate (pls #'s/acre)	Seeds/ft2 Contribution from Planting Rate
Barley (<i>Hordeum vulgare</i>)	22.5	6.5
Little Bluestem (<i>Schizachyrium scoparium</i>)	.25	1.5
Muttongrass (<i>Poa fedleriana</i>)	0.05	1.00
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	2.46	9.00
Total	25.26	18.00

Seed mix for use in treatment areas that will **not** receive mulch (1,141 ac). The second table is the seed mix for use in 1,141 acres of treatment areas that will not receive mulch. This mix includes a higher concentration of barley in the absence of straw mulch. The heavier seeding rate is for 60% and higher slopes. This heavier seeding is necessary to ensure establishment of a vegetative cover on the steeper slopes, especially in the high to moderate severity burned areas. The Tres Lagunas fire burned at a higher severity in strips up the steep slopes, resulting in a series of chutes that have no vegetative cover to slow the increased hydrological flow that will occur during intense rain events. Further, these areas have little to no chance to accumulate any organic layer or mulch from discarded pine needles. Due to the steep inclines, straw mulch is unlikely to remain in place to provide that cover. This higher rate of seeding has a good chance to provide a rapid response ground cover, since the elevated seeding is composed primarily of annual barley. In addition, once the barley has grown, establishing roots to hold the soil in place, a snow cover causes the barley to bend over, thus creating an organic thatch that retains moisture and shades recovering native vegetation from direct solar radiation. This technique has been shown to be successful when used on steep slopes in the absence of mulch on both the Whitewater-Baldy and the Little Bear burn scars.

For Seed Only Treatment Area

Species	Planting Rate (pls #'s/acre)	Seeds/ft2 Contribution from Planting Rate
Barley (<i>Hordeum vulgare</i>)	62.70	18.00
Little Bluestem (<i>Schizachyrium scoparium</i>)	0.50	3.00
Muttongrass (<i>Poa fedleriana</i>)	0.05	1.00
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	4.38	16.00
Total	67.57	38.00

Noxious Weed Detection and Response Actions:

Field visits for the detection of invasive noxious weed species will take place post-monsoon season and again in the spring. Visits will focus on areas around known populations of bull thistle and Scotch thistle. Any weed species found will be treated.

Channel Response Actions:

Channel response actions are necessary in order to reduce the threat to life and property downstream due to dislodged woody debris that could become projectiles during a flood event. In addition, actions are necessary to reduce the threat to downstream life and property due to breaches of debris jams, and reduce the threat of severe damage to valuable Forest Service resources and infrastructure. Floatable woody debris will be removed from 1.09 miles of the Holy Ghost Creek channel.

Channel realignment and armoring of Holy Ghost Tributary 4:

This response action is needed to protect public safety from debris flows onto FR122 and minimize the potential for a flow of debris into Holy Ghost Creek that could block the culverts, thereby threatening public safety and road stability. This response action would realign approximately 250 ft of the tributary 4 approach into Holy Ghost Creek.

Roads and Trail Response Actions:

Road armoring and rolling dips along FR 92, 86A, and 646. Culvert and Side Ditch cleaning along 1.5 miles of FR 192 (Indian Creek Rd) and 1.5 miles of FR 122 (Holy Ghost Rd).

Protection/Safety Response Actions:

Implementation of an administrative closure order recommended for the Holy Ghost Canyon and FR 122, to remain in effect for at least two years. Access for recreational cabin owners shall be negotiated with the District Ranger, as appropriate, to allow for source point protection of the cabins and property covered under the special use permit.

Implementation of administrative closure orders for the entire burn area is recommended for two years. Signs should be installed at key access points, due to safety concerns and unstable road conditions, especially during the monsoonal season. Install 7 closure signs on roads and approximately 6 hazard warning signs at key entry points around the burn area. Pump 5 vault toilets located in areas that have the potential to flood will be pumped. Install closure signs at key access points around the burned area to warn the public of the dangers of hazard trees, flood, and debris flows. Recreation sites recommended for closure include: Holy Ghost CG, Windy Bridge CG, upper and lower Dalton day-use areas, and Field Tract CG. These closures should remain in effect for a minimum of the next two monsoon seasons. Install closure gates at Windy Bridge CG and Dalton day use areas.

Hazard trees will be felled along 1.93 miles of Forest Service roads to allow safe travel through a small segment of the burn area.

Sand bags have been recommended for source point protection of two historic cabins at the Rosilla administrative site. The cabins are up out of the floodplain, but directly below a high severity burn area, and will be subject to increased overland water flow, ash and sediment flows as well as potential debris. Sandbag should be an effective treatment for the expected sedimentation.

Storm patrols will be scheduled for immediate monitoring after significant rain events targeting affected roads and low water crossings for debris and sediment removal. Storm patrol for debris jams: 2 teams of 2 employees times 10 storm events.

Monitoring treatment implementation will include verification of proper seeding and mulching rates as it is being applied to the ground. This will allow any adjustments, if necessary, to ensure proper and appropriate coverage of the treatment to the affected area. In addition, monitoring by archeologists will be done at the cultural heritage sites to ensure proper placement of treatments. Initial photo points will be established in both monitoring endeavors.

Tres Lagunas BAER treatments will be monitored to determine 1) if treatments were successful (effective ground cover, recreation site damage minimization, resources protection, road damage minimization) and 2) if treatments resulted in undesirable results (i.e., introduction of noxious weeds). Final summaries will be provided annually.

1) Treatment effectiveness:

Monitoring treatment effectiveness will consist of monitoring the seeding and mulching following contract completion to ensure effectiveness. Initial plots for repeatable photo points will be established before the contracts commence, to provide baseline data. The monitoring efforts will be completed in September of each year.

2) Monitoring undesirable results:

Monitoring for undesirable outcomes (i.e., noxious weed populations) will be done on the Tres Lagunas Fire along the perimeter of Holy Ghost road, the aerial mulch staging area, and in areas that were mulched in landscape treatments. Noxious weeds have been identified by the Chief of the Forest Service as one of the top four threats to NFS lands. Monitoring of noxious weeds will be conducted at the end of monsoon season.

Conclusion

The Tres Lagunas Fire burned an area approximately 6 miles wide and 4 miles long, centered between the Pecos River and Cow Creek. A significant portion of the fire re-burned a section of the 2000 Viveash Fire. This area, already identified as a potentially high urban interface fire risk, now faces the increased effects of post-fire storm events. Roughly 30% of the fire burned at high and moderate severity, and the majority of this area is in the Holy Ghost Canyon and Pecos River. Canyons and draws in this burn area drain directly into the urban interface. The residences, infrastructure and commercial properties below the burn run a very high probability of experiencing post-fire effects from the burn area during the next 2-3 monsoon seasons. In addition, the area attracts many visitors and summer residents, and the threat to downstream areas in these watersheds is very high.

The use of aerial seeding and mulching has been found to be very successful in establishing ground cover on high to moderate severity burn areas. Timing is the key to success, and the team projects the completion date of these treatment operations for July 15, 2013. The seed and mulch will be

applied roughly during the onset of monsoon season. If there is light rainfall it can help stimulate germination and growth of the seeds. The other treatments, including road protection, channel clearing, closure and hazard warning signing, etc. can be implemented immediately upon receiving funding.

The BAER team wishes to remind the Santa Fe NF and Pecos/Las Vegas Ranger District that these are mitigative measures only. Efforts can and will be expended in putting these treatments into place, but both sedimentation and increased flows as a result of the fire is highly likely. Monitoring the effectiveness of the treatments will be critical, and the Forest will need to be aware of the continued need for specialists and Forest personnel both during implementation and post-monsoons. In addition, personnel will be needed to patrol portions of the burn area after high intensity rainfalls during the monsoon season. Due to the continuing risk, the BAER team has recommended maintaining a public information team that could pull together public meetings, work with public officials and cooperators, and provide critical updates on emergency response action work.