USDA-FOREST SERVICE FS-2500-8 (6/06)

Date of Report: 7/21/08

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[**X**] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[**X**] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[ ] 2. Interim Report #____
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: **LANE 2**

B. Fire Number: AZ-PNF-080560

C. State: ARIZONA

D. County: Yavapai

E. Region: R3

F. Forest: Prescott

G. District: Bradshaw

H. Fire Incident Job Code: P3D88S

I. Date Fire Started: 06/28/2008

J. Date Fire Contained: 7/14/2008

K. Suppression Cost: $5,610,000

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 5.3 miles
2. Fireline seeded (miles): 0 miles
3. Other (identify): 1.5 miles of dozerline decommissioned, 10 miles dozerline treated with wood chips & slash, 4 acres safety zone seeded.

M. Watershed Number: 1507010205 (Agua Fria-Lake Pleasant) & 1507010203 (Black Canyon)

N. Total Acres Burned: 9,623
NFS Acres(9211) Other Federal (0) State (0) Private (412)

O. Vegetation Types: Ponderosa Pine & Chaparral

P. Dominant Soils: Lithic Haplustolls, Lithic & Udic Haplustalfs, Lithic Ustorthents

Q. Geologic Types: Granite, Metamorphic

R. Miles of Stream Channels by Order or Class: 48.3 miles, ephemeral and intermittent

S. Transportation System

Trails: 13.2 miles Roads: 20.4 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 2962 (low) 1924 (moderate) 4736 (high)

B. Water-Repellent Soil (acres): 6660

C. Soil Erosion Hazard Rating (acres):
28.1 (low) 129.4 (moderate) 9461 (high)

D. Erosion Potential: .3 tons/acre

E. Sediment Potential: 20,237 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

Horsethief Lake Sub-Watershed

A. Estimated Vegetative Recovery Period, (years):	3-5
B. Design Chance of Success, (percent):	80-90%
C. Equivalent Design Recurrence Interval, (years):	25
D. Design Storm Duration, (hours):	1
E. Design Storm Magnitude, (inches):	2.48
F. Design Flow, (cubic feet / second/ square mile):	280
G. Estimated Reduction in Infiltration, (percent):	42%
H. Adjusted Design Flow, (cfs per square mile):	725

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Background: The Lane 2 fire was a human-caused wildfire that burned approximately 9,630 acres in steep terrain. Fire behavior was terrain and wind driven (pushed by outflow events associated with thunderstorms) and was most active in the first six days of the fire. While two rounds of BARC mapping were ordered, due to problems with cloud cover and the high natural rock component of the fire area, BARC data were not reliable for severity mapping. The final burn severity map was developed from aerial and field reconnaissance.

Multiple Agency Coordination: Post fire conditions were shared with multiple agencies directly or conveyed through other channels. Yavapai Flood Control, Arizona Division of Emergency Services, Maricopa Flood Control, and NOAA were provided information predominantly affiliated with post flows and sediment yield. Arizona Department of Environmental Quality was contacted in regards to post fire condition affiliated with mining operations. The Arizona Game and Fish Department was informed of the post fire conditions associated with the aquatic habitat of Horsethief Lake. Emergency consultation is ongoing with the US Fish and Wildlife Service in regards to the Mexican Spotted Owl (MSO). The Natural Resource Conservation Service has also been appraised of the post fire conditions because of their authority to provide conservation assistance associated with private lands.

Human Life, Safety and Property

Roads: The following tables summarize the roads affiliated with the Lane 2 fire. Roads were not included if the total affected length was less than 0.1 miles.

ROUTE	NAME	LEVEL	MILES AFFECTED
52	Senator Hwy	Operational 2; Objective 3	9.1
52F	Turney Gulch	Operational 3, Objective 3	1.1
52G	Horsethief S.H.	Operational 2, Objective 3	0.1
52J	Horsethief Lake Rd	Operational 2; Objective 3	0.4
C59	Crown King Road	NA (Yavapai County Road)	1.9
100	Lane Mountain	Operational 2; Objective 2	1.7
192	Oro Belle Road	Operational 2; Objective 2	1.0
697	Twin Peaks Road	Operational 2; Objective 2	0.7
9229A	Singer Road	Operational 2; Objective 2	0.3
9230A	Savoy Mine Road	Operational 2; Objective D	1.0
9230B	Rhodes Mine Road	Operational 2; Objective 2	0.2
9257A	Fat Jack MineRoad	Operational 2; Objective D	0.7
9258A	Bartol Spring Road	Operational 2; Objective D	0.2
9259A	Silver Belle Road	Operational 2; Objective 2	1.4
9911L	Rhodes Easement	Operational 2; Objective D	0.1

The operational level is the current or de-facto performance level applicable to the road. The objective level represents the desired level of road conditions as defined in the Prescott N.F. transportation atlas. A level 2 road is classified as suitable for high clearance 4x4 vehicles and not for passenger vehicles. A level 3 road is suitable for passenger vehicles but user comfort is not a consideration. Level D represents a decommissioned road.

The Crown King Road (C59) is a heavily traveled route and the primary access to the community of Crown King, Horethief Lake and the residential homes permitted on USFS land. This road is administered by the Yavapai County Roads Department, who has primary responsibility for road maintenance. This road has not been impacted by the fire nor will it be impacted by post fire runoff and accelerated erosion events.

Forest Service Roads located within the fire perimeter have a high probability of being impacted by increased flows, accelerated erosion and sedimentation, and being impacted by unstable rock and soil wasting associated with cut banks. Post fire flow events are expected to plug culverts, fill and/or scour road crossings, and overtop the road prism causing degradation of fill slopes and potentially concentrated flows within the road prism causing hazardous conditions.

Forest roads within the fire perimeter receive high amounts of use as a travel corridor to recreational facilities and recreational residence permitted on USFS lands. It is not practical for the Forest Service to close roads within the fire perimeter.

If no action is taken to alleviate potential damage and loss to the forest road infrastructure the potential cost of road repair/replacement is $200,000.

Trails: The following table summarizes the trails affiliated with the Lane 2 fire:

TRAIL	NAME	DESIGATED USE	MILES AFFECTED
30	Horsethief Canyon	Pack and saddle	2.2
201	Horsethief Recreational	Pack and saddle	3.6
225	Algonquin	Pack and saddle	4.2
233	Lane Mountain	Motorcycle	0.4
240	Twin Peaks	Pack and saddle	2.2
241	Twin Peaks Start	Pack and saddle	0.7

Approximately 2/3 of Tr. 30 and major/minor segments of Tr. 201, 240, and 225 have been decimated by this fire. 60-80% of the above trail lengths have been exposed by vegetative removal adjacent to the trail(s). The loss of vegetative cover associated with moderate and high burn severity is expected to accelerate erosion adjacent to and within the trail tread resulting in the loss of the trail(s) and creating hazardous conditions.

Recreation Sites: The following table displays the recreational facilities located within the fire perimeter.

Recreation Site Name	Burn Severity
Horsethief Boat Launch	Low
Horsethief Basin Lake	Low
Horsethief Playground	Low
Turney Gulch	Low
Silver Mtn Observation Pt.	Moderate
Hell's Hole Trailhead	High

Review of the above recreation sites indicates there is no threat to public life or safety and no additional emergency response is needed to protect the facilities.

Lorena Gulch Private Residence: Less than 1 acre located directly upslope of a private residence was subjected to high burn severity on Forest Service Lands. It appears that the convex shape of the slope has resulted in the runoff being diverted prior to reaching the home. The private landowner was appraised of the high probability that higher runoff rates and accelerated erosion upslope may impact his private residence.

Critical Natural and Cultural Resources

Soils: The majority of the burned area (70%) was subjected to high (4736 acres) and moderate (1924) burn severity. Essentially all of the soils have a severe erosion hazard rating (98%). Average erosion rates within the entire fire perimeter are expected to increase from 2.6 tons/acre/yr to 9.9 tons/acre/yr but the armoring effect of high levels of rock cover are expected to provide some stability.

Soils with high and moderate burn severity generally experienced high hydrophobicity. Ponderosa sites with high/moderate burn severity had strong water repellency from .5 to 1 inch thick while chaparral soils associated with high burn severity only experienced strong water repellency on the soil surface.

The following describes the conditions associated with each burn severity.

- Low Burn Severity: These areas are associated with an understory burn and generally did not experience canopy cover consumption. Consumption of vegetative ground cover was minimal with a loss of up to 35%. The litter was usually only singed and charred. The majority of the soils did not experience hydrophobic conditions but there were inclusion of low to medium hydrophobicity.
- Moderate Burn Severity: These areas are normally associated with mosaic conditions associated with high and low burn severity. Ground cover consumption is variable depending on the mosaic nature of the burn. Some of these areas experienced a loss of canopy cover of approximately 50% and a loss of ground cover of approximately 65%.
- High Burn Severity: The majority of the canopy cover and vegetative ground cover has been consumed. High hydrophobicity is also associated with these sites.

Water Resources: The Lane 2 fire occurred in watersheds which are characterized by very steep side slopes and steep average stream gradients. Soils are generally shallow with high surface rock content and significant inclusions of rock outcrop. Surficial geology is characterized by igneous rocks (primarily granites) and metamorphic rocks. As a consequence of the above factors, surface runoff rates are naturally high and stream flows flashy in these watersheds. Conversely, soil and geology characteristics lead to low infiltration rates and reduced groundwater storage, which in turn has resulted in a general lack of perennial streams with well developed riparian vegetation. Despite the relatively high average stream gradient, many stream reaches observed were reacting in a depositional character in response to the increase sediment coming from the fire.

The Lane 2 fire burned hot resulting in a high percentage of the area (70%) sustaining moderate to high soil burn severity. Field reconnaissance indicated that virtually all of the moderate and high severity acres exhibited hydrophobicity extending up to 1 inch below the soil surface. This condition further retards infiltration resulting in even higher levels of runoff. However, the increase in runoff may not be as significant as would be expected in severely burned forests with deeper soils where pre-burn infiltration is higher.

Stream channel stability in the area of the fire is generally good due to the rocky, armored nature of the stream beds. Sediment deposition and subsequent transport through the system is expected to be more prevalent than stream bed degradation (down cutting).

Water Quality: The most immediate impact on water quality from the fire will be related to ash washed into the stream channels from adjacent burned slopes. The ash is quick to be mobilized by summer rains and tends to be rapidly conveyed through the stream network. Impacts are generally short term but can be severe to aquatic life where the ephemeral or intermittent stream channels that cross the burned area convey ash to lakes or reservoirs. The principal water body of concern is Horsethief Lake. Ash entering the lake has likely lowered the pH, and changed the ionic balance of lake chemistry which in turn is likely to result in fish kills. There is little that can be done to effectively prevent the ash input to the lake. Once the ash is flushed out of the system, probably within a year's time, the lake chemistry is likely to improve naturally.

Of longer term concern is the accelerated levels of sedimentation that will occur in streams crossing the burned area. As noted elsewhere, streams in the burned area are primarily ephemeral in nature. Sediment transport capacities of the streams should allow rapid redistribution of sediments conveyed to the channels after a few years of normal storm events. The principal impacts of the increased sedimentation therefore would be related to a short term potential to plug any inadequately sized culverts and the longer term issue of deposition of sediment in lakes and reservoirs within or downstream of the fire. Once again, the principal water body of concern is Horsethief Lake.

The watershed areas burned contain a number of hard rock mines, both active and abandoned. Most of these mines are on private lands within the National Forest. Hard rock mines and associated processed tailings can be a source of acid mine drainage which contains elevated levels of arsenic and lead and minor concentrations of other constituents of concern. Most of the larger operations known or believed to have an effect on water quality are outside of the FIRE and will not be affected by it. The National Forest is aware of only limited amounts of process tailings on private lands which might be impacted by the fire. Most of these are on the west side of the fire in areas tributary to Humbug Creek. One concern is the deposits of tailings and waste rock associated with the New Savoy Mine on private lands in the Humbug Creek watershed. Approximately 114 acres of steep rocky lands above the tailings were burned with high severity. It is estimated that this will result in about a 90% increase in peak flows in the small drainage leading to the tailings. The tailings were already exhibiting rilling and head cutting prior to the fire. It is likely that this pre-existing situation will be exacerbated by the increased runoff. The Forest knows of no analytical data on the heavy metal and arsenic content of the tailings and therefore cannot assess the potential for water quality impacts from the eroding deposits. Also most of the watershed area above the deposit is private land. Little treatment potential exists on the remaining steep and rocky slopes on National Forest lands above the site.

Horsethief Lake: The Horsethief Lake is located north of forest road 52 and in the southern portion of the fire

area. This high value recreational lake serves both the Horsethief recreational residences and the community of Crown King. Additionally it is a destination spot for visitors from the Prescott, Verde Valley, and Phoenix areas. Arizona Department of Game and Fish regularly stock the lake, and it serves as a popular recreational fishery.

The area immediately surrounding the lake burned with low severity. However, a large percentage of the lake's feeding watershed burned with high severity. Currently, large amounts of ash from the fire have been washed into the lake, and there is already evidence of a negative impact to the fishery. Treatment to the feeding watershed will be required to prevent a long term loss of this fishery and recreational lake via sedimentation and excessive ash. If no action is taken to reduce the sediment and ash movement into the lake the cost of recovering this value-at-risk will be in excess $500,000.00 for dredging.

Mining: Seven mines were evaluated to determine possible effects to values at risk. Other mines within the burned area are mostly small prospects and/or located in areas of light burn severity.

NAME	LOCATION	LAND STATUS	OPERATION STATUS*	BURN SEVERITY
New Jersey Mine	T. 10 N., R. 1 W., Sec 26	Private	NA	Severe
Savoy Mine	T. 10 N., R. 1 W., Sec 26	Private	NA	Light-Moderate
New Savoy Mine	T. 10 N., R. 1 W., Sec 26	Private	NA	Light
Mascot Mine	T. 10 N., R. 1 W., Sec 27	Private	NA	Light
Rapid Transit Mine	T. 10 N., R. 1 W., Sec 24	Prescott N.F.	Inactive	Light
Oro Belle Mine	T. 10 N., R. 1 W., Sec 34	Private	NA	Light
Fat Jack Mine	T. 10 N. R. 1 W. Sec 34	Prescott N.F.	Active	Severe

*** USFS does not regulate mining operations outside of Forest Service jurisdiction**

The New Jersey, Savoy, Mascot, and Oro Belle mines are located on private in holdings, do not contain large volumes of waste rock or tailings, and are located in areas of light to moderate burn severity. Based on these conditions, these mines do not present a risk to critical natural resources and public safety.

An estimated 5,000 cubic yards of mine wastes (waste rock and yellow colored tailings) are present in the channel at the New Savoy mine site. Only a small volume (< 5%) of this material is on USFS land, the reminder is situated on a private in holding. This material began eroding prior to the Lane 2 fire, and this erosion will likely accelerate in post-fire hydrologic conditions. No analytical measurements of arsenic, lead or other constituents are available for these mine wastes. The downstream channel was not burned during this fire and remains vegetated. Because this is private land, this situation will be referred to the Arizona Department of Environmental Quality. The Natural Resource Conservation Service will also be informed because the New Savoy site is private property.

An unauthorized cabin at the Rapid Transit Mine was cited by the USFS prior to the Lane 2 fire. The violator has entered into an administrative agreement with the USFS to remove the cabin and all personal property by October 4, 2008, and this agreement is being monitored by the Federal Magistrate in Flagstaff, Arizona. This structure is therefore not considered a value at risk.

The Fat Jack mine is an active operation on USFS land which produces specimen crystals (quartz and amethyst). A backhoe loader was on site during the fire, but only incurred minor damage (heat warping of some plastic parts) and no fuels or engine fluids have leaked. Only waste rock/overburden is on site. The claimant/operator will be informed of the post-fire situation. Any post-fire drainage issues that may develop will be addressed through the USFS minerals administration procedures. Therefore, this mine is not considered a value at risk.

Wildlife: The following table summarizes acres of wildlife resources affected by the lane 2 fire:

RESOURCE	PAC or PFA	High Severity (acres)	Moderate Severity (acres)	Low Severity (acres)
Northern Goshawk	03090304	367.6	83.9	150.9
MSO PAC	03090305	232.9	30.9	411.3
MSO Restricted	NA	944.7	407.2	474.3
MSO Critical	NA	3324.1	1511.9	1951.7

Approximately 1,351 acres (75%) of restricted habitat, and 4,836 acres (71%) of the designated Critical Habitat experienced moderate – severe burn intensities. Loss of habitat including tree canopy and understory vegetation occurred throughout the moderate – severe burn areas. Loss of prey habitat occurred in the understory vegetation throughout all the burned areas.

Post-fire, MSO are known to continue occupancy within the PACs even in heavily burned areas (pers. comm. USFWS). Future impacts to MSO and its habitat include additional loss of trees as moderately burned areas experience die-off and existing snags fall. Foraging habitat is expected to recover with rainfall reestablishing understory vegetation in areas with intact soils, allowing prey species to return. Areas that experienced moderate-severe burn intensities will take longer to recover nesting and foraging habitat within the PAC. Additionally, off-road vehicle operators may have increased opportunities for illegal access along the expanded/newly created firebreaks, increasing human activity in the area. Rehabilitation efforts in these areas could help minimize this potential.

A post-fledging family area (PFA) for the Northern goshawk, a Forest Service sensitive species, also occurs within the burn area. Approximately 743 acres (83%) of the PFA experienced moderate – severe burn intensity with the remainder having low burn intensity. Similar to the MSO, habitat impacts include the loss of canopy structure and prey availability from wildfire and suppression activities within the moderate-severely burned areas, and temporary loss of prey within the low intensity burn areas. Prey populations are expected to rebound with rainfall and understory regeneration in areas with intact soils.

A recreational fishery managed by the Arizona Game and Fish Department is located within Horsethief Basin Lake and experienced some moderate to severe burn intensities within the surrounding hillsides. It is approximately 5 surface acres in size with a storage capacity of 64 acre-feet of water and a maximum depth of 20 feet. Horsethief Basin Lake is the only sport fishing lake in the southern three-quarters of the Bradshaw Mountains. In 2006, the fishery consisted of 91 fish representing three species: largemouth bass, redear sunfish, and channel catfish. The fishery is maintained by an aerator which was not damaged in the fire. However, the power supply to the aerator was lost, and this, in combination with the post-fire infiltration of sediment into the lake, will likely result in the loss of the entire fishery. Post-fire soil stabilization activities above the lake could reduce additional infiltration and facilitate the reestablishment of the fishery in the future. If this fishery habitat were to be lost, it is estimated that it would cost $150,000.00 for habitat restoration.

Presently, there are no wildlife resources susceptible to unacceptable or irreversible resource degradation.

Soil and Hydrological Response: The BAER team conducted hydrologic and soil modeling on eight small watersheds that are totally or mostly within the burned area. The watersheds were delineated based on downstream values. Refer to the attached map for delineated watersheds location. Hydrologic modeling predicted peak flows using the Wildcat program and was based on a 25yr/ 1hr monsoon storm event. Soil modeling predicted average erosion rates and sediment yield using the FS WEPP program and was based on a 30 year return period of precipitation.

The following table provides hydrologic and soil modeling results in relation to pre and post fire conditions.

Hydrologic Modeling

Watershed Name	Watershed Size		Peak CFS (25 year storm)			CFSM Pre-Fire	CFSM Post Fire	Runoff Volume (ac-ft)	
	Acres	Square Miles	Pre Fire	Post Fire CFS	Increase Decrease	cfs/mi2	cfs/mi2	Pre	Post
New Savoy	114	0.18	295	551	1.87	1656	3093	11	17
Gazelle Mine	1652	2.58	1601	2725	1.70	620	1056	116	191
Horsethief Lake - Untreated	523	0.82	232	662	2.85	284	810	14	38
Horsethief Lake - Treated	523	0.82	232	592	2.55	284	724	14	35
Horsethief Canyon	7310	11.42	4167	6892	1.65	365	603	419	696
Lorena Gulch	655	1.02	474	1388	2.93	463	1356	30	79
Marceds Gulch	680	1.06	944	1063	1.13	888	1000	54	60
Upper Poland	4497	7.03	3127	4203	1.34	445	598	279	373

Soil Modeling

Watershed Name	Soil Loss Measure	Pre-fire	Post-fire	Pre-fire to Post fire Increase	Post-fire to Treatment Decrease
New Savoy	Average Erosion Rate (t/acres/yr)	2.9	14.6	407%	NA
	Total Sediment Yield (t/acres/yr)	230	1322	475%	NA
Gazelle Mine	Average Erosion Rate (t/acres/yr)	2.6	9.8	269%	NA
	Total Sediment Yield (t/acres/yr)	2189	8870	305%	NA
Horsethief Lake	Average Erosion Rate (t/acres/yr)	2.0	5.8	188%	11%
	Total Sediment Yield (t/acres/yr)	580	1976	241%	18%
Horsethief Canyon	Average Erosion Rate (t/acres/yr)	2.3	7.8	238%	NA
	Total Sediment Yield (t/acres/yr)	5918	22885	287%	NA
Lorena Gulch	Average Erosion Rate (t/acres/yr)	3.0	12.6	316%	NA
	Total Sediment Yield (t/acres/yr)	1089	5366	393%	NA
Marceds Gulch	Average Erosion Rate (t/acres/yr)	2.0	3.1	54%	NA
	Total Sediment Yield (t/acres/yr)	538	830	54%	NA
Upper Poland	Average Erosion Rate (t/acres/yr)	2.3	5.2	126%	NA
	Total Sediment Yield (t/acres/yr)	3063	8105	165%	NA

New Savoy Mine Drainage: This drainage is located within the Agua Fria – Lake Pleasant 5th code watershed and downstream values consist of the New Savoy Mine. Refer to the Mining and Water Quality Section for more specifics in regards to the New Savoy and other mines within this drainage. Peak flows in this drainage are expected to increase by 87%. This is relatively low given the high portion of high burn severity within the drainage but is understandable because these soils naturally have high runoff rates. Conversely, erosion rates and sediment yield are expected to increase drastically because of the very steep slopes and high burn severity associated with this watershed.

Gazelle Mine Drainage: This drainage includes the New Savoy Drainage and is located within the Agua Fria – Lake Pleasant 5th code watershed. This drainage is a tributary to Humbug Creek which eventually drains into Lake Pleasant. Peak flows and sedimentation in this drainage, which is downstream of the New Savoy

Drainage, have decreased when compared to the New Savoy Drainage because of the buffering effect of the unburned areas and large size. The area burned contributing to the Agua Fria - Lake Pleasant watershed is less than 1%.

Horsethief Lake: This drainage is located within the Black Canyon 5th code watershed and downstream values include Horsethief Lake. Refer to the Horsethief and Water Quality Section for more specifics in regards to the values associated with this lake. Only 56% of the watershed above Horsethief Lake was burnt but the peak flows are expected to increase by 185%. This increase is due primarily to the effects of hydrophobic conditions occurring on the relatively deeper soils in this basin. Average erosion rates and sediment yield are also expected to increase drastically which is expected to have a negative impact to this resource. Refer to the Horsethief Lake and Water Quality section for specifics of the implications of these increases to this value at risk. Proposed mulch and seed treatment is expected to decrease peak flows from 810 to 724 cfs and total sediment yield by 18%. Also, refer to the Horsethief Lake – Treatment section for specifics on treatment proposals and benefits to this resource.

Horesthief Canyon: This drainage includes the Horsethief Lake Drainage and is located within the Black Canyon 5th code watershed. This drainage is a tributary to Poland Creek which eventually drains into Black Canyon and Agua Fria. Peak flows are expected to increase by 65% and sediment yield is expected to increase by 287%. The increase of peak flows is minimal but the increase of sediment is expected to silt in pools within Horsethief Canyon.

Lorena Gulch: This drainage is located within the Black Canyon 5th code watershed and downstream values include private lands within the drainage. However, no residence is located within this private land and the landowner is aware of the high probability of increased flows and sediment yield. Yavapai Flood Control has also been appraised of the situation. This watershed is steep and has been completely burnt with a high percentage of high burn severity. The drainage shows a substantial increase of peak flows (193%) and sediment yield (393%). However, no residence is located within this private land and the landowner is aware of the high probability of increased flows and sediment yield. Yavapai Flood Control has also been apprised of the situation.

Marceds Gulch: This drainage is located within the Black Canyon 5th code watershed and downstream values include the town of Crown King. Marceds Gulch, which flows through the town of Crown King, shows only a 13% increase in expected peak flows from a 25 year monsoon storm event. Post fire average erosion rates and sediment yield is also only expected to increase minimally. These soils are generally bouldery, well armored, naturally have high runoff rates and were exposed to a very light burn severity.

Upper Poland Creek: This drainage includes the Lorena Gulch and Marceds Gulch and is located within the Black Canyon 5th code watershed. This drainage is a tributary to Poland Creek which eventually drains into Black Canyon and Agua Fria. Peak flows and sedimentation in this drainage, which is downstream of the Lorena Gulch and Marceds Gulch, have decreased when compared to the Lorena Gulch because of the buffering effect of the unburned areas and large size. To put these increases in context regionally, the area burned by the Lane 2 Fire amounts to only 5% of the watershed of the Black Canyon Creek watershed

Heritage: A total of 19 previously recorded heritage resource sites and 1 newly recorded site are present within the perimeter of the Lane 2 Fire. 3 sites have been previously determined eligible, 11 sites potentially eligible and 6 sites ineligible to the National Register of Historic Places (NRHP). 2 potentially eligible heritage sites, AR-03-09-03-617 and 799 have been evaluated as having values at risk from fire related erosion and/or off-highway vehicle (OHV) use within those heritage properties.
If no action is taken to alleviate potential damage and loss to the 2 heritage sites the potential cost of unacceptable degradation would be $15,000.

Noxious Weeds: No existing weed surveys were in place for the fire area prior to the Lane 2 incident. During BAER severity mapping, one small infestation of Dalmatian Toadflax (Linaria dalmatica) was identified northeast of Lane Mountain (N 34º 09’ 12.1” x W 112º 19’ 11.6”). It is expected that other infestations may

have also occurred within the burned area, but were burned up in the fire. The autecology of this species indicates it is likely to spread as a result of the fire disturbance. In response to fire, "toadflax is able to recover after fire and may even be promoted by fire, especially if other species are reduced. The post fire environment is well suited to toadflax establishment by seed" (FEIS 2003). The tri-forest EIS for noxious weeds identified an objective of contain/control for this species, and in order to track and mitigate possible spread, it will be necessary to provide for detection of possible infestations. (Zouhar, Kris. 2003. Linaria spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2008, July 11]).

B. Emergency Treatment Objectives:

- Promote natural recovery
- Minimize potential threats to human life and safety by warning the public at access points of hazardous conditions including flooding, unstable soils hazardous trees and falling rocks.
- Minimize potential threats to traveler safety and damage to infrastructure through road drainage protection measures.
- Mitigate potential threats to natural resources through hillslope stabilization measures in upper Horsethief Lake watershed.
- Stabilize and protect sites eligible for the National Register of Historic Places.
- Mitigate invasiveness of noxious weeds.

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

Land **70** % Channel **70** % Roads/Trails **70** % Protection/Safety **80** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	90	95
Channel	70	70	70
Roads/Trails	85	90	95
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): $4,355,745

F. Cost of Selected Alternative (Including Loss): $3,744,045

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[X] Geology	[ ] Range	[ ]
[ ] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[ ]
[ ] Contracting	[X] Ecology	[ ] Botany	[X] Archaeology	[ ]
[ ] Fisheries	[ ] Research	[ ] Landscape Arch	[X] GIS	

Team Leader: David Moore

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H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Protection of Life and Safety Treatments:

Storm Patrol: Emergency response to road resources will consist of monitoring and storm patrol to identify post-fire road conditions that may present a risk to public heath and safety. Responses to any such conditions may include the following:

- Armoring and/or cleaning of low-water crossings
- Emergency road closures
- Cleaning or replacement of culverts
- Road grading

Road Signage*:* A total of four signs will be installed on four roads (Senator Highway, FS 259, FS 711 and FS 192). The signs will warn the public of hazardous road conditions due to flooding, falling rocks, and unstable soils. This is intended to mitigate the potential loss of human life and safety.

Trail Signage*:* A total of four warning signs at two separate locations each on Trail 381 and 281will be installed at Trail 201, Trail 30, and both ends of Trail 225. The signs will warn the public of potential hazardous trail conditions from flooding, unstable soils, hazardous trees and falling rocks. This is intended to mitigate the potential threat to human life and safety.

Lorena Gulch Private Residence: Seed will be provided to the landowner or fire crews will hand seed approximately 1 acre of high burn severity upslope of the private residence. Seeding efforts will take place on National Forest lands. The intent of the seeding is to expedite ground cover recruitment for erosion control, site stabilization, and minimize runoff. A non-persistent annual cover crop will be included in the seed mixture to provide immediate short term ground cover. The seed mixture and rates are as follows:

1. Sideoats Grama – 3 pls/acre
2. Sand Dropseed – 1 pls/acre
3. Western Wheatgrass – 2 pls/acre
4. Barley – 10 pls/acre

Recreation Sites*:* No treatments identified or proposed.

Protection of Critical Natural and Cultural Resources

Horsethief Lake: Fire crews will hand seed and mulch approximately 50 acres of high burn severity in the watershed feeding Horsethief Lake. Certified weed-free straw will be spread at a rate of 2000 lbs/acre with the intent of providing immediate vegetative ground cover and assist the seed in germination. The intent of the seeding is to expedite ground cover recruitment for erosion control, site stabilization, and minimize runoff. A non-persistent annual cover crop will be included in the seed mixture to provide immediate short term ground cover. The seed mixture and rates are as follows:

1. Sideoats Grama – 3 pls/acre
2. Sand Dropseed – 1 pls/acre
3. Western Wheatgrass – 2 pls/acre
4. Barley – 10 pls/acre

Crews will also install 25 straw bale check dams in first order drainages to promote channel stability by

reducing the amount of runoff and the potential for downstream sedimentation. The check dams will promote stability by trapping sediments (reducing sediment delivery), slowing channel runoff and reducing potential for down cutting of channels. These structures will be installed within a small trench within the soil surface to minimize the potential for undercutting and piping beneath the dams. Construction will include staking the straw bales in place using rebar and reinforcing with rocks on-site.

It is anticipated that this treatment will reduce the amount of sediment movement by roughly 20%. Not only will this reduce the sediment delivery into the lake, but it will also provide a valuable long-term benefit to the lake's feeding watershed. By maintaining the deep, productive soils on site, the watershed will better serve to regulate flows and sediment delivery into the lake in the long run than it would if erosion were allowed to proceed unchecked and the watershed were converted to shallow, rocky soils. While it is recognized that there is already, and will continue to be some short term impacts to the lake and associated fishery due to ash deposition, the intent of this treatment is to mitigate impacts and prevent total loss of the lake and fishery.

Effects of Proposed Treatment above Horsethief Lake on Water Quality: Opportunities exist to reduce the water quality impacts of the Lane 2 fire on Horsethief Lake. Model results indicate that sediment input to the lake will increase by 73% due to the burned conditions. 193 acres of the watershed area above the lake have burned with high severity and exhibit hydrophobic conditions. Most of these acres occur on very steep and rocky slopes. However, immediately up gradient of the lake is an area of approximately 50 acres of high burn severity / hydrophobic conditions with relatively deep soils and gentler slopes which should respond positively to land treatment. The proposed treatment of seeding with grasses and hand mulching has the potential to immediately reduce the onsite soil erosion on these acres and accelerate the recovery of vegetative ground cover. Without treatment, the sediment delivery ratio from these acres to the lake would be high. With treatment, we expect that the amount of sediment generated from the area will significantly decrease. Once treated, and especially after revegetated, the area will act as a sediment filter for the untreated slopes above. However, sediment delivered from the slopes above the treatment area to existing channels will likely still be conveyed to the lake. Horsethief Lake is an important recreational resource in the area, both scenically and as a sport fishery. However, it is not a large body of water (approximately 4 acres) and increases in sedimentation will likely require dredging to maintain the fishery potential of the water body. In addition, retention of soils in place on the upper watershed will maintain the ability of the watershed to infiltrate precipitation, regulate runoff, retain groundwater and provide filtration of ions and nutrients which otherwise might be easily transported to the lake.

The treatment is not designed to protect the lake from the effects of ash input but may have a limited effect keeping some of the ash from being transported to the lake.

Mining: No treatments identified or proposed.

Heritage:
Elgible NHRP site: AR-03-09-03-617. Hand seeding is proposed on steep, severely burned slopes within the site near Bartol Spring. Road closure (gate or earth movement for obliteration) is proposed at the junction of FSR 100 and 9258A leading to the site. Forest Road 9258A has an objective class D for decommission. The site has been evaluated as potentially eligible to the NRHP.
Eligible NHRP site: AR-03-09-03-799. Hand seeding is proposed on steep, severely burned slopes within the site overlooking a rocky gulch to the east. The site is located on the northern edge of the Horsethief Basin Powerline right-of-way. The site has been evaluated as potentially eligible to the NRHP.

Noxious Weed Detection: Personnel and time will be allocated for the detection of weed infestations associated with the Lane 2 fire. This detection effort will allow the forest to track and mitigate any possible infestations within the burned area. Resources allocated: Ecologist, 5 days @ $238/day ($1,190.00 total).

I. **Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Horsethief Lake Land Treatment Monitoring: Qualitative monitoring will entail evaluating the effectiveness of the stabilization efforts associated with the mulch treatment, seeding success, and the straw bale effectiveness of capturing sediments. Monitoring will also entail evaluating the amount of sediment and ash entering the lake and making a qualitative determination of the impacts upon the aquatic habitat.

Trail Monitoring: Trail condition monitoring will be conducted using forest accounts.

Heritage Monitoring*:* Measure the effectiveness of the seeding efforts and road closure in protecting the two eligible National Register of Historic Places.

Part VI – Emergency Stabilization Treatments and Source of Funds **Interim #**

			NFS Lands				Other Lands			All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Mulch/seed/25 straw bale check dams	acres	1500	50	$75,000	$0		$0		$0	$75,000
Heritage seed	site	150	2	$300	$0		$0		$0	$300
NW Detection	days	300	5	$1,500	$0		$0		$0	$1,500
Lorena seed	acres	50	1	$50	$0		$0		$0	$50
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$76,850	$0		$0		$0	$76,850
B. Channel Treatments										
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
Storm Patrol	miles	750	20	$15,000	$0		$0		$0	$15,000
Heritage Rd Closure	closure	500	1	$500	$0		$0		$0	$500
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$15,500	$0		$0		$0	$15,500
D. Protection/Safety										
Road Signage	signs	250	4	$1,000	$0		$0		$0	$1,000
Trail Signage	signs	150	5	$750	$0		$0		$0	$750
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$1,750	$0		$0		$0	$1,750
E. BAER Evaluation										
				---	$15,239		$0		$0	$15,239
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$15,239		$0		$0	$15,239
F. Monitoring										
Mulch/seed/straw bale check dams	days	300	8	$2,400	$0		$0		$0	$2,400
Heritage seed	days	300	2	$600	$0		$0		$0	$600
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$3,000	$0		$0		$0	$3,000
G. Totals				$97,100	$15,239		**$0**		**$0**	**$112,339**

PART VII - APPROVALS

1. /s/ Laura West — 7/21/08
   Forest Supervisor (signature) — Date

2. /s/ Gilbert Zepeda — 7/21/2008
   Regional Forester (signature) — Date