

Date of Report: August 28, 2016

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

- ☒ 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: Pilot Fire

B. Fire Number: CA-BDF-10205

C. State: CA

D. County: San Bernardino

E. Region: 05

F. Forest: San Bernardino National Forest

G. District: Mountaintop

H. Fire Incident Job Code: 0512-P5KK6C-16

I. Date Fire Started: 08/07/2016

J. Date Fire Contained: 08/16/16 1800 estimate

K. Suppression Cost: Approximately \$13,849,421 as of August 13, 2016.

L. Fire Suppression Damages Repaired with Suppression Funds

1. Dozer line waterbarred USFS land: 20.87 miles; Hand line waterbarred USFS land: 15.70 miles

2. Fireline seeded (miles): 0

3. Other (identify):n/a

M. Watershed Number:

Huc 6 watersheds: Silverwood Lake – West Fork Mohave River (180902080201) [640 acres = 3%], Grass Valley Creek – West Fork Mohave River (180902080202) [6,388 acres burned = 25%], Lower Deep Creek (180902080104) [1,076 acres = 4%];

N. Total Acres Burned: 8110 ac

NFS Acres (6,791 ac) Other Federal (83 ac) State/Private (1,236 ac)

O. Vegetation Types: Semi-Desert Chaparral, Lower Montane Mixed Chaparral, Scrub Oak, Coulter Pine, Singleleaf Pinyon Pine, Canyon Live Oak, Mixed Riparian Hardwoods, Mixed Desert Scrub, Willow

P. Dominant Soils: Dominant soil orders are Wapi, Pacifico, Trigo, Lithic Xerorthents, gullied land, Avawatz and Oak Glen.

Soils within the burned area generally have high rock content, coarse textures and most of the organic component is in the surface layer. Consequently, the soils are inherently sensitive to fire effects.

Soils are dominantly coarse textured, rocky, and occur on steep to very steep slopes, rendering them naturally erodible. The soils exhibit relatively low amounts of soil development.

Q. Geologic Types: Monozonite, Mixed granite rocks of Silverwood Lake, Mixed diorite and gabbro, very young wash deposits, very young colluvial deposits, young alluvial valley deposits

R. Miles of Stream Channels by Order or Class:

	Soil Burn Severity				
Stream Type	Unburned	Low	Moderate	High	Grand Total
Artificial Path	0.09	0.16			0.24
Connector		0.02	0.05		0.07
Intermittent	1.25	13.29	6.52	0.76	21.82
Grand Total	1.34	13.47	6.56	0.76	22.14

S. Forest Service Transportation System:

	Soil Burn Severity			
Route	Unburned	Low	Moderate	Grand Total
CA-173	0.38	2.38	0.04	2.81
CA-173 (unpaved)	3.41	1.26		4.67
Other Route	0.70	4.46	0.14	5.31
Grand Total	4.49	8.10	0.19	12.78

	Soil Burn Severity				
Road	Unburned	Low	Moderate	High	Grand Total
2N17X (OHV)	0.03	0.69	1.77	0.06	2.55
2N33 (OHV)	0.08	0.39	0.52	0.01	1.00
Grand Total	0.11	1.08	2.30	0.06	3.54

	Soil Burn Severity			
Non-Motorized System Trail	Unburned	Low	Moderate	Grand Total
Pacific Crest Trail	0.09	4.40	2.88	7.36
3W16	0.01	0.61	0.25	0.87
Grand Total	0.10	5.01	3.13	8.24

OHV route 2W33X:				
	Soil Burn Severity			
Subwatershed	Unburned	Low	Moderate	Grand Total

Grass Valley Creek-West Fork Mojave River	0.050	0.159	0.079	0.288
Silverwood Lake-West Fork Mojave River	0.022	0.285	0.125	0.433
Grand Total	0.072	0.444	0.204	0.720

PART III - WATERSHED CONDITION

A. Burn Severity by 6th level watershed (acres derived from GIS):

All lands

Subwatershed	Unburned	Low	Moderate	High
Silverwood Lake – West Fork Mohave River	17	188	347	89
Grass Valley Creek – West Fork Mohave River	534	3,538	2,145	171
Federal lands	380	2,582	2,019	171
State and Private	155	956	126	0
Lower Deep Creek	267	716	92	0
Totals	818	4,443	2,584	260

B. Water-Repellent Soil (acres):

The degree and extent of water repellent soils is largely unknown due to limited collection of field data. The extent of strong water repellency is estimated to be 50% of the moderate and high burn severity areas or 1,422 acres. In these areas, water repellency was observed at up to 3 inches deep. It is also likely that weaker water repellency occurs closer to the surface on low soil burn severity areas. The pattern of water repellent soils is likely to be patchy and mosaic.

Increased runoff due to hydrophobic conditions is reflected in the peak flow analysis contained in the Hydrology Report. Increased overland flow due to the hydrophobic conditions may increase hill-slope rill and sheet erosion. Hydrophobic layers will usually take six months to two years to break down. Plant root development, soil microbial activity, and freeze-thaw cycling all contribute to the degradation of hydrophobic conditions.

C. Pre-fire erosion hazard for burned area soils was obtained from existing soil erosion hazard rating information in the SBNF Soil Survey. The EHR interpretation is based on soil properties such as soil texture, slope, aggregate stability, infiltration rate, subsoil permeability, depth to restrictive layers, and soil rock content. The rating is the maximum EHR for the soil map units. Actual pre and post fire erosion potential is better reflected by the ERMit modeling runs for this project.

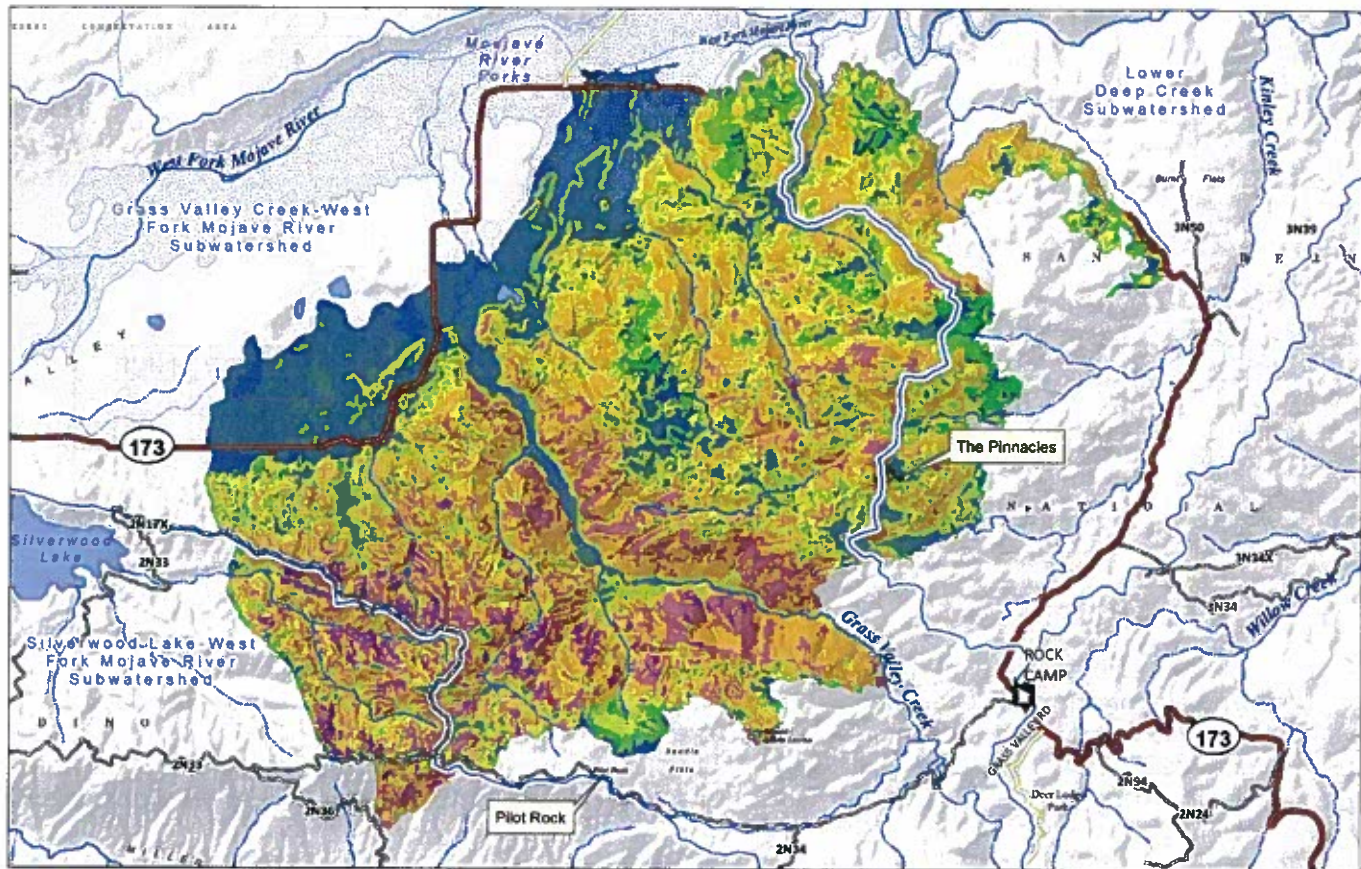
EHR	Slight	Moderate	Severe
Acres	9	745	7,137

Soil heating affected the aggregate stability, canopy cover, ground cover, and infiltration rate. Before the fire, most of the area had protective vegetative ground cover in the form of litter and surface rock.

D. Erosion Potential (tons/acre):

ERMit Erosion Model Outputs for the First Year Following the Fire

	Erosion in tons/acre by soil burn severity			
Hillslopes	Low	Moderate	High	Unburned
0-15%	0 -10	0 - 11	0 - 13	0 -0.10
15-30%	9 - 13	11 - 23	13 - 28	0.10-0.13
30-45%	13 - 21	23 - 25	28 - 31	0.13-8
45-60%	21 - 25	25 - 30	31 - 35	8 - 13
60-75%	25 - 28	30 - 40	35 - 46	13-15



POST FIRE SOIL EROSION

PILOT FIRE
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Erosion (tons/acre)



0 0.5 1 2 Miles



E. Sediment Potential (cubic yards / square mile): [1st year following; using Rowe et al (1949)]

West Fork Mohave: 10,500 to 22,500 (400 to 1000% increase)

Grass Valley Creek: 4,700 to 27,000 (390 to 2000% increase)

Deep Creek: 1,000 to 1,400 (10 to 50% increase)

F. Debris Flow Potential:

Dry Ravel: Dry ravel was observed on steep hill-slopes within the burned area. Dry ravel may occur on loosely consolidated soils on steep slopes (>50%) under dry conditions immediately after a fire. It can often produce higher soil loss rates than that created by rainfall events, especially during a low rainfall year. Dry ravel is an ongoing process that occurs on steep slopes. Dry ravel increases after a fire because the vegetation that was holding the soil in place on the hillside is removed and/or aggregate stability is lowered by the fire. Dry ravel can produce an additional 2-25 tons/acre of soil loss.

Geologic Response: Debris flows are eminent in the Pilot Fire Area. Debris flows and flooding have occurred in the past under non-fire conditions. Within the burned area, some watersheds show a great deal of past debris slide/debris flow activity that will be increased during future storms. Predictive debris flow model results were not requested from the USGS-Geologic Hazards Division but the soil erosion and hydrologic modelling indicates it is highly likely debris flows will occur.

Pre-fire slope stability and recovery of watershed hydrologic response is dependent on many factors and typically occurs within 3-5 years following the fire.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-5

B. Design Chance of Success, (percent): 60

Over the last five years southern California has been in a drought. The vegetative regrowth of the chaparral species in the adjacent fire areas is less than expected. Despite the strong El Nino prediction of last winter, less than normal precipitation was reported. Vegetative recovery depends on both precipitation and limiting unauthorized access, which is primarily an OHV problem. Various treatments have been applied with various success rates. Given the continuing issues with variable precipitation, drought, increased population, and climate change, the 3-5 year recovery for groundcover is not given as high a rate of success as it has in the past.

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 1 (short duration monsoonal)

E. Design Storm Magnitude, (inches): 0.84
Using NOAA Atlas 14 (Volume 6, Version 2) precipitation frequency estimates for California.

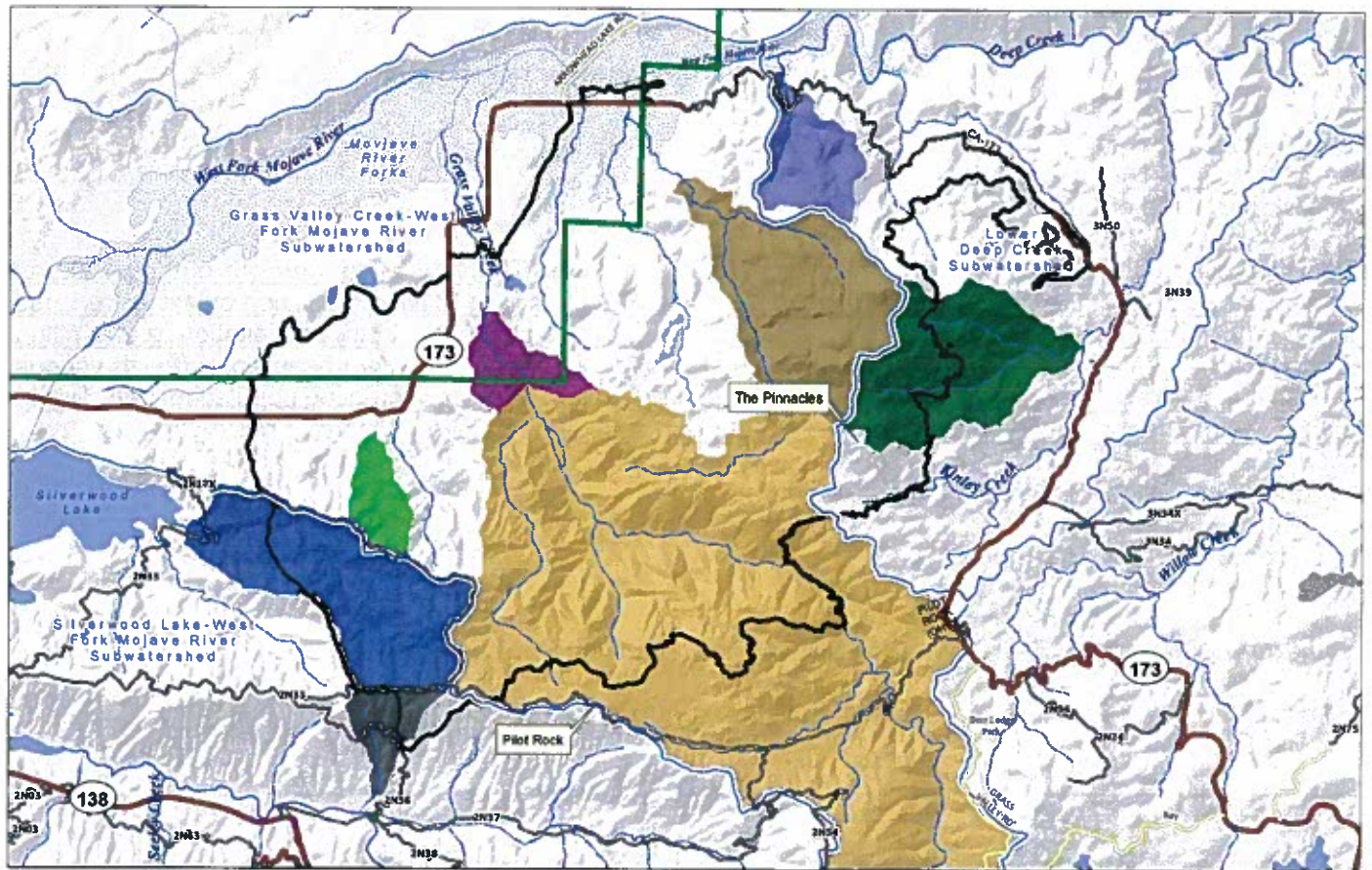
F. Design Flow, (cubic feet / second/ square mile):

Watershed area of concern	Normal watershed peak discharge per storm type (cfs/sq.mi.)		
	Q2	Q5	Q10
1. Pilot Rock Conservation Camp	10	130	350
2. Silverwood Lake east side	16	70	164
3. Forest boundary above private residence along 173	75	100	330
4. Grass Valley Creek at forest boundary	11	32	98
5. Grass Valley Creek and critical habitat for toads	11	32	98
6. PCT crossing east of Grass Valley Creek	10	31	165
7. Unnamed tributary at Deep Creek spillway above toad presence	16	95	237
8. Tributary to Kinley Creek at 173 (critical habitat for toads)	10	31	166

G. Estimated Reduction in Infiltration, (percent): 50%

H. Adjusted Design Flow, (cfs per square mile):

Peak discharge (cfs/sq.mi.) increases to the watersheds for the 2-year (Q2 – 0.63 inches in 1 hour), 5-year (Q5 – 0.84 inches in 1 hour), and 10-year (Q10 – 1.74 inches in 3 hours) storm events [per NOAA Atlas 14] for the year following the Pilot Fire (Note: The modeled peak flow values should only be used as an indicator of the relative increase in peak flows after the fire.) Peak flow was estimated at various points in the watershed using the Rational Equation, Curve Numbers, the Kirpich formula for time of concentration, ERMit, and the FS Peak Flow Calculator. The equivalent storm interval is provided (e.g. a Q5 result with Q10 indicates that the watershed is likely to respond as if there was a Q10 event occurring).



BAER TREATMENTS

PILOT FIRE
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AUG 2016

Catchment



0 0.5 1 2 Miles



In addition, a GIS exercise estimated the percentage of the watershed affected by unburned, low, moderate, and high burn severity, to determine a weighted average of the increase in flow following the Pilot fire.

	1-year post burn peak discharge per storm type (cfs/sq.mi.) with approximate equivalent recurring storm rank		
Watershed area of concern	Q2	Q5	Q10
1. Pilot Rock Conservation Camp	86 (Q4)	216 (Q7)	392 (Q12)
2. Silverwood Lake east side	132 (Q8)	232 (Q14)	310 (Q20)
3. Forest boundary above private residence along 173	300 (Q10)	461 (Q15)	529 (Q17)
4. Grass Valley Creek at forest boundary	42 (Q7)	71 (Q10)	120 (Q12)
5. Grass Valley Creek and critical habitat for toads	42 (Q7)	71 (Q10)	120 (Q12)
6. PCT crossing east of Grass Valley Creek	66 (Q6)	294 (Q19)	379 (Q25)
7. Unnamed tributary at Deep Creek spillway above toad presence	202 (Q9)	292 (Q12)	
8. Tributary to Kinley Creek at 173 (critical habitat for toads)	23 (Q4)	110 (Q8)	232 (Q14)

PART V - SUMMARY OF ANALYSIS

BAER Risk Assessment Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to three years (depending on the resource):

- Very likely- nearly certain occurrence (>90%)
- Likely- likely occurrence (>50% to < 90%)
- Possible- possible occurrence (>10% to <50%)
- Unlikely- unlikely occurrence (<10%)

Magnitude of Consequences:

Major- Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.

Moderate- Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.

Minor- 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.

A. Describe Critical Values/Resources and Threats:

Summary of fire burned area characteristics and watershed response:

The Pilot Fire burned approximately 8110 acres with 6790 acres on the San Bernardino National Forest, and 1320 acres on non-Forest Service lands on BLM, USACE, State, County, and the Summit Valley in San Bernardino County. The fire was within three sixth field watersheds; Silverwood Lake – West Fork Mohave River (draining into Silverwood Lake), Grass Valley Creek – West Fork Mohave River (draining north to Mojave River basin), and Lower Deep Creek (draining north to Mojave River Basin).

The Pilot Fire started in the afternoon on August 7, 2016 along Forest Service road 2N36, a designated OHV motorized route. The fire burned north under a 15-20 mile an hour wind causing mandatory and voluntary evacuations in unincorporated Summit Valley and southeastern Hesperia. On August 8, 2016, the Pilot Fire established in Grass Valley creek and moved uphill with the topography, but never in line with the wind. Mandatory and voluntary evacuation zones were set in Lake Arrowhead. The evacuations remained for multiple days, but the number of resources (up to ~1700 personnel and in excess of 20 aircraft) established a line and conducted strategic burnouts to prevent the loss of structures.

The watershed effects from the Pilot Fire could pose a threat to Highway 173, Forest Service roads and trails, the Pacific Crest Trail, natural and cultural resources, threatened and endangered wildlife (arroyo toad, desert tortoise, least Bell's vireo, and southwestern willow flycatcher), private landowners (off-Forest), Silverwood Lake recreation and water quality, the Pilot Rock conservation camp (Calfire), special use permitted power lines and towers, soil productivity and vegetative regrowth.

The Forest Line Officer (District Ranger) detailed initial values at risk including life and property for sites adjoining and within the fire area (Highway 173, Forest Service roads and trails, the Pacific Crest trail, off-Forest residences, water quality in Silverwood Lake, threatened/endangered species habitats). Forest Line also showed great concern for an assessment of potential threats to soil productivity, vegetative recovery, protection of cultural resources, and other similar damage from the increased opportunity of OHV incursions. The BAER team has been coordinating with Caltrans, Calfire, US Fish and Wildlife Service, and the NRCS with regard to the initial BAER assessment, findings, and recommendations.

The BAER Team Leader-Hydrologist and Soil Scientist field verified soil burn severity on August 13, 2016 using the BARC map product. Adjustments were made to lower the percentage of High soil burn severity and broaden the pixels mapped as moderate soil burn severity. Teams of BAER members including wildlife, botany, archaeology, trails, OHV, engineering, and local district patrol officer conducted field work primarily from August 13-15, with specific values at risk trips later in the process.

The final soil burn severity map shows the overall soil burn severity to be 65% low and unburned to the northeast portion of fire, 32% moderate, and 3% high concentrated in the upper portions of Grass Valley Creek and the western and southwestern portions of the fire draining to Silverwood Lake. Accelerated hill slope erosion and watershed response is expected on slopes with moderate to high soil burn severity. Soils with low soil burn severity still have good surface structure, contain intact fine roots and organic matter, and should recover in the short-term once revegetation begins and the soil surface regains cover. The moderate class has evidence of severe soil heating in isolated patches; these areas could have long-term soil damage and high erosion hazard. Water repellency is present throughout the fire area, and in areas of moderate and high soil burn severity showed no infiltration for >2 minutes below the ash cover at 2 inches depth. While a proportion of eroded soil will remain on the hill-slope, delivery of eroded soil, by dry ravel or water erosion, to stream channels is expected to occur. These eroded sediments are a primary source of material for debris flows and sediment laden stream flows.

Watershed and Geology and Soils

The Pilot Fire occurred primarily in the Grass Valley Creek – West Fork Mohave River drainage area which transitions from a forested condition in the southeastern portion of the fire to a chaparral ecosystem in the other portions of the fire.

The San Bernardino Mountains are some of the most tectonically active and rapidly uplifting mountains in the United States. The forces lifting the mountains to great heights are being counteracted by erosive forces tearing them down, such as gravity, moving water, wind, earthquakes and human activities. When the Pilot Fire removed vegetative cover and burned surface soil structure, slopes and channels became even more unstable than normal. Rocks which have lost their supporting vegetation on steep slopes have already started to roll down to roadways or canyon bottoms, or to places where they are stopped by obstructions or gentler slopes. Groundwater which previously fed vegetation may now surface as seeps and springs on some slopes and in canyon bottoms, and may initiate slope movements in some areas, even before the arrival of winter rains.

Deep seated rotational landslides and earth flows are relatively few in these mountains, but could occur in deep saturated slopes, especially if shaken by an earthquake. Many earthquake faults crisscross and border these mountains, and quakes could significantly increase all types of slope movements when slopes are saturated. Thin surficial slides and deeper translational debris slides will increase due to the destruction of soil structure and loss of root support.

Soils are dominantly coarse textured, sandy, and occur on steep to very steep slopes, rendering them naturally erodible. Relatively recent tectonic uplifting and high geomorphic erosion rates are responsible for relatively low amounts of soil development. The nearly flat high desert washes are broad and deep and indicate only moderate erosion potential. Pulse erosion following fire is a natural, long-term process in this region. Cover is critical for soil stabilization. Cover has been reduced over the majority of the fire. Areas of low soil burn severity still show fine organic matter on the surface and skeletons of bushes that have fine branches remaining.

Fire effects on soil productivity range from beneficial to damaging, depending on fire severity, soil type, and site history. Adverse fire effects increase as burn severity increases and the effects are often proportional to the amount of surface litter and soil organic matter consumed.

Physical Effects:

- Loss of litter layer, soil and soil organic matter
- Loss of soil structure
- Hydrophobicity (formation of water repellent layer)
- In extreme cases, destruction of clay minerals

Chemical Effects:

- Increase in pH
- Loss of cation exchange capacity
- Loss of nutrients by volatilization, in fly ash, or by leaching
- Increase plant available N (ammonia) under low severity burns
- Oxidation reactions from extremely severe burning can discolor the surface soil
- Potential for increased release of heavy metals in contaminated soils

Biological Effects:

- Direct mortality of soil organisms and loss of their habitat with soil heating

Consumption of ground cover by the fire was extensive within the moderate and high soil burn severity polygons, rendering the soils vulnerable to high rates of post fire erosion. However, other fire effects on soils are generally limited in spatial extent and occur in patchy patterns based on consumption of heavy fuels on the forest floor.

Threats to Life, and Property

Threats to life, safety, and property exist from the increased potential for flooding and sediment delivery along roads that border the fire area (immediately downstream of the origin and downstream of a highly burned watershed), roads that pass within the fire area (2N33, 2N17X), and along the Pacific Crest Trail.

The transportation system within the fire perimeter consists of approximately 12.78 miles of roads controlled by Caltrans or non-Forest Service entities, 3.54 miles of designated OHV roads, 0.72 miles of the OHV trail 2W33X, 0.87 miles of the Pinnacles Trail, and 7.36 miles of the Pacific Crest Trail. All of NFSR roads in the burned area are suitable for high-clearance vehicles (maintenance level 2), with the majority allowing non-highway legal vehicles (Green-sticker). Unauthorized roads also exist within the burned area and surrounding areas, which pose a high risk to post-fire vegetation recovery from off-highway vehicles.

The BAER risk assessment matrix was used to evaluate risk to life on Forest Service lands:

- Forest Service roads 2N33, 2N36, and 2N17X: The probability of damage to life is "Possible" because the roads are generally near to or just below ridgelines, but the area is heavily used by the recreating public. The magnitude of consequence is "Major" because rockfall or erosion could cause loss of life or injury to humans. The risk is "High."
- The Pacific Crest Trail: The probability of damage to life is "Possible" because of the high public use but the limited locations for damage from storm flows coming from upper watersheds with higher soil burn severity. The magnitude of consequence is "Major" because rockfall, flooding, or erosion could cause loss of life or injury to humans. The risk is "High."

- The Pinnacles Trail: The probability of damage to life is "Unlikely" because the trail is within a low burn severity area and is quite rocky requiring boulder hopping even before the fire. The magnitude of consequence is "Moderate" because the increased rockfall could injure recreationists. The risk is "Low."
- Highway 173 (dirt): The probability of damage to life is "Unlikely" because the road is within a low burn severity area. The magnitude of consequence is "Moderate" because of limited use by the public and damage the BAER team estimates that injury is more likely than loss of life. The risk is "Low."

The BAER risk assessment matrix was used to evaluate risk to property infrastructure on Forest Service lands:

- Forest Service roads 2N33, 2N36, and 2N17X: The probability of damage is "Likely" because the roads have insufficient drainage and have lost energy dissipation through lack of vegetation. The magnitude of consequence is "Moderate" because the damage could be repaired but there are long term effects of loss of access. The risk is "High."
 - Although 2N33 is near to the ridge, it doesn't run directly along the ridge. OHV trails traverse on and next to the actual ridge, providing conduits for high velocity flows to interact with the road. In addition, through the burn area, the vegetation that was providing energy dissipation off the road has been removed by the fire. Without this energy dissipation, scour and gullies is expected on the slopes below the road.
 - 2N36: Culverts, low water crossings, dips, drains, roadside ditches, and other road drainage features are at risk from adjacent burned watersheds. Increased runoff and sediment from the burned areas can negatively affect the road prism, damaging the road, eroding land downslope of the road and routing flow and sediment directly to stream channels. Culverts associated with these roads are at risk of plugging from debris carried down channels from burned watersheds. Some culverts are undersized for the expected increases in peak flows and are at risk of failure from overtopping. Culvert failures may increase the magnitude of flood, sediment and erosion hazards in non-NFS and private lands and increase scouring of stream channels on NFS lands.
- The Pacific Crest Trail: The probability of damage is "Very Likely" because the trail is within the Grass Valley Creek drainage which is the largest and has the highest soil burn severity, and is on the midslope to within drainages. The magnitude of consequence is "Moderate" because of the level of property damage possible. The risk is "Very High."
- The Pinnacles Trail: The probability of damage is "Unlikely" because the trail is within a low burn severity area and is quite rocky requiring boulder hopping which limits the area of tread. The magnitude of consequence is "Minor" because the damage would be very localized. The risk is "Very Low."
- Highway 173 (dirt): The probability of damage is "Unlikely" because the road is within a low burn severity area. The magnitude of consequence is "Minor" because the damage would be very localized. The risk is "Very Low."
- Powerline and SUP roads: The probability of damage is "Likely" because the spur roads are within the Grass Valley Creek drainage which is the largest and has the highest soil burn severity. The magnitude of consequence is "Moderate" because of the level of property damage possible. The risk is "High."

Threats to water quality

The Pilot Fire burned a portion of the Silverwood Lake watershed above an eastern inlet to the recreation area where aerial imagery indicates user created paths and access to the lake's edge downstream of the fire area. The water contained in Silverwood Lake is primarily (>97%; average annual 781 thousand AFy) State Water Project domestic water which is transferred from Silverwood Lake through the San Bernardino Tunnel and into the Devil Canyon power plant under a FERC license and then distributed to municipal suppliers. Modeling suggests that the increase in peak flows from this area will result in a 5-year return interval storm acting like a 14-year return interval storm, and the sediment potential will increase by 10 times.

The water quality objectives for Silverwood Lake include: a nondegradation objective to maintain all waters from reduced quality, the suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses, waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial

uses. Increases in turbidity shall not exceed natural levels by more than 10 percent. Site specific objectives for Silverwood reservoir include an average annual value of 220 mg/L TDS.

Under these conditions, the probability of damage is "Likely" and the consequences of damage (sediment delivery, infilling of the reservoir, reduction in water quality) are "Moderate"; the risk level is "High" for the inlet bay draining from the high and moderate soil burn severity subwatershed.

Off highway vehicle (OHV) use within and around the burned area is high. Before the fire, vegetation played a major role in limiting OHV activity to system roads and trails. It is very likely that, following removal of vegetation by the fire, expansion of OHV use will expand beyond system roads and trails.

Threats to Soil Productivity & Vegetative Recovery

A threat to long-term soil productivity comes from the threat of increased access to the area. Despite high rates of post-fire soil erosion (dry ravel, increased overland flow, and wind), burned area soils will support recovery of fire adapted vegetation in the burned area. Slope stability is likely to recover to pre-fire conditions within 3-5 years (given normal rainfall), though full vegetative recovery of all species types may take up to 20 years.

Increased access due to the loss of vegetative barriers along access roads on the perimeter of the fire area is expected to result in unauthorized off highway vehicle use. Motorcycle tracks and historical/current use were observed by the BAER team in the fire area in open spaces within the fire. Vegetative recovery is critical for the reduction of sedimentation, stabilization of the watershed, and soil productivity.

Prior fires in the area and management after fires indicate that the amount of unauthorized use increases when areas are denuded of vegetation. During the BAER assessment, off-highway vehicles were already in the fire area despite the closure orders. Multiple unauthorized routes were observed.

Although high rates of post fire soil erosion are expected to occur, **an emergency for long-term soil productivity was not caused by the direct effects of fire in this fire adapted ecosystem.** However, threats to recovery of native vegetation and long-term soil productivity from increased unauthorized OHV use in the burned area were identified.

- The probability of loss of soil productivity is "Possible", given the soil burn severity and the fire adapted ecosystem. The magnitude of consequence to soil productivity is "Moderate". This results in an "Intermediate" risk.

Expansion of OHV impacts is very likely to impact recovery of native vegetation and long term soil productivity. These impacts are associated with increased risk for establishment of noxious weeds in the burned area and chronic (long term) soil disturbance and sedimentation associated with increased post fire OHV trespass off system roads and trails. Increased chronic sedimentation is likely to impact occupied Arroyo Toad habitat (listed species) and water quality downstream. Expansion of OHV impacts is very likely to occur on NFS lands adjacent to State Highway 173 and FSR 2N17X. Additionally, removal of vegetation has increased potential for illegal OHV use on the Pacific Crest Trail.

- The probability of loss to normal vegetative recovery is "Very Likely" given the experience and already observed off-highway vehicle access and unauthorized use from the opening of the area. The magnitude of the consequences of increase OHV use are "Moderate" given the potential long term effects. The overall risk is "Very High."

Threats to wildlife and botanical resources

The burned area has a long history of unauthorized OHV use; there is now potential for increased use to occur as a result of the loss of vegetative barriers. Loss of vegetative cover which has acted as a natural barrier substantially increases the threat of cross-country vehicle travel. The burned area and areas downstream of

the fire support occupied, suitable, and Critical Habitat for the following threatened/endangered animals: southwestern willow flycatcher, arroyo toad, least Bell's vireo, and desert tortoise.

The greatest post-fire risk to arroyo toads and desert tortoise is lack of cover and forage where vegetation burned off. Lack of vegetative cover increases the off-road cross-county vehicle traffic. This will slow the recovery of habitat for this species, further degrade the habitat, increase the probability of predation and collecting by the public, and increase the risk of being killed or injured (e.g., vehicles driving over burrowed toads and tortoise, etc.). Lack of vegetative cover and barriers also allows more access to riparian areas, slowing post-fire recovery of suitable southwestern willow flycatcher and least Bell's vireo habitat.

The following sites were addressed for post-fire threats to arroyo toad and southwestern willow flycatcher:

- Grass Valley Creek (within the fire): The lower portion of Grass Valley Creek is occupied and Critical Habitat for arroyo toad. Portions of Grass Valley Creek are suitable for southwestern willow flycatcher. The BAER hydrology and soil models for Grass Valley Creek (Section III.E. and IV.H.) indicate that there would be a 122% increase in flow and 455% increase in sediment in the arroyo toad Critical Habitat in Grass Valley Creek during a 5-year storm event. The arroyo toad risk determination is: VERY HIGH Risk (Likely Probability and Major Magnitude of Consequences). The southwestern willow flycatcher risk determination is: LOW Risk (Likely Probability and Minor Magnitude of Consequences)
- Kinley Creek (downslope of fire): The first mile of Kinley Creek above the confluence with Deep Creek is considered occupied by ARTO. Kinley Creek is designated Critical Habitat between Deep Creek and the Highway 173 area. The BAER hydrology and soil models for Kinley Creek at the arroyo toad Critical Habitat at Hwy 173 (Section III.E. and IV.H.) indicate that there would be a 255% increase in flow and 52% increase in sediment in the occupied during a 5-year storm event. The arroyo toad risk determination is: LOW Risk (Possible Probability and Minor Magnitude of Consequences).
- Deep Creek @ Mojave Forks Dam (downslope of fire): Deep Creek at the dam is occupied and Critical Habitat for arroyo toads and southwestern willow flycatcher. The BAER hydrology and soil models for this unnamed tributary to Deep Creek at Mojave Forks dam (Section III.E. and IV.H.) indicate that there would be a 207% increase in flow and 10% increase in sediment in the occupied and arroyo toad Critical Habitat at the Mojave Forks Dam during a 5-year storm event. The arroyo toad risk determination is: HIGH Risk (Possible Probability and Major Magnitude of Consequences). The southwestern willow flycatcher risk determination is: INTERMEDIATE Risk (Possible Probability and Moderate Magnitude of Consequences)
- East Fork of the West Fork Mojave River (downslope of fire): Although not known from this drainage, the habitat is suitable for arroyo toads and southwestern willow flycatcher. The BAER hydrologist modeled the post-fire response for at the Pilot Rock Conservation Camp (about 400' above the East Fork West Fork Mojave River). The BAER hydrology and soil models for that site (Section III.E. and IV.H.) indicate that there would be a 66% increase in flow and 389% increase in sediment in the occupied during a 5-year storm event. The arroyo toad risk determination is: LOW Risk (Possible Probability and Minor Magnitude of Consequences). The southwestern willow flycatcher risk determination is: INTERMEDIATE Risk (Possible Probability and Moderate Magnitude of Consequences)
- East Fork Mojave River (downslope of fire): All of the East Fork Mojave River is occupied and Critical Habitat for arroyo toad. This site is near the "bird farm" at the Hwy 173/SBNF boundary (and PCT crossing of Hwy 173). It is mapped as occupied and Critical Habitat for southwestern willow flycatchers, although portions does not currently support suitable riparian habitat for nesting or foraging. The BAER hydrology and soil models for this unnamed drainage in arroyo toad Critical Habitat (in East Fork Mojave River) (Section III.E. and IV.H.) indicate that there would be an 848% increase in flow and 387% increase in sediment in the occupied during a 5-year storm event. The ARTO risk determination is: INTERMEDIATE Risk (Possible Probability and Moderate Magnitude of Consequences). The southwestern willow flycatcher risk determination is: LOW Risk (Possible Probability and Minor Magnitude of Consequences). *Note: Primary constituent elements for Critical Habitat were not present at the time of the fire.*

The risk determinations for least Bell's vireo are the same as southwestern willow flycatcher since they utilize the same habitat types.

The northern edge of the fire area supports suitable habitat for desert tortoise. All of the area below about ~4500' in elevation with desert soil and vegetation types is considered occupied habitat if suitable soils and habitat components are present. The desert tortoise risk determination is: INTERMEDIATE Risk (Possible Probability and Moderate Magnitude of Consequences)

Threats to Ecosystem Stability and Vegetation Recovery

Invasive Weed Populations: An emergency threat exists with post-fire invasive weed introduction and spread due to the potential for the establishment of new and persistent weed populations in previously un-infested area of disturbance from the fire and fire related activities. Invasive weed invasions interfere with habitat recovery and ecosystem health within burned areas and fire suppression sites (e.g. hand and dozer lines, drop points, and staging areas). In particular, invasive non-native weeds hinder the recovery of native vegetation by aggressive colonization, degrading plant community composition by reducing native species diversity, competing for nutrients, reducing habitat quality by allelopathy, and reduction of water quality and quantity. Forest Service policy mandates the Forest to minimize the establishment of non-native invasive species to prevent unacceptable degradation of the burned area.

Several species of invasive weeds are known to occur within the burn area and/or on access routes used by fire suppression equipment based on USFS NRIS database information and post fire field surveys conducted on August 14 and 15, 2016 including:

Bromus diandrus - ripgut brome
Bromus tectorum – cheatgrass
Centaurea solstitialis – yellow star thistle
Cirsium vulgare - bull thistle
Cytisus scoparius - Scotch broom
Hirschfeldia incana – short pod mustard
Lathyrus latifolius - perennial pea
Melilotus officinalis – sweet clover
Nicotiana glauca - tree tobacco
Sisymbrium altissimum - tall tumble mustard
Spartium junceum - Spanish broom
Verbascum thapsus - common mullein
Tamarisk ramosissima – tamarisk

Consequences of the fire on values at risk

There was no weed wash station for equipment on initial attack and no preventative weed spread measures implemented for incident suppression activities, therefore there is the potential for the establishment of new and persistent weed populations introduced by fire equipment. Particularly bulldozers and brush engines are vectors for the introduction and dispersal of invasive weeds into soils disturbed by fire suppression and rehabilitation work. New invasive weeds from other Forests and fires in other states could be introduced in this way. Suppression-activity disturbances are expected to accelerate erosion and soil compaction that will also inhibit the recovery of native plant populations.

There are approximately 11.5 miles of dozerline, 14 miles of handline, 15 miles of forest road and/or OHV routes used by suppression equipment, 5 drop points, and 3 helispots were constructed outside and within the burn perimeter. Dozer tracks were observed running through existing weed infestations (including Spanish broom and bull thistle on Pilot Rock road 2N33) on several roads used to access areas that required dozer lines. Therefore those access roads will be included in the weed monitoring proposal. In addition to introduction or spreading of weed invasions, these suppression activity disturbances are expected to accelerate erosion and soil compaction that will also inhibit the recovery of native plant populations. Heavy aerial application of retardant, in many cases in close proximity to dozer lines will also provide extra nutrients in areas of bare soil disturbed by suppression activities. This generally favors the establishment and dominance of early successional invasive weeds.

If left unmanaged nascent infestations expand quickly making control more difficult, expensive, and if left to proliferate, nearly impossible to eradicate. Vegetation type conversion is possible, making rapid response to control these infestations critical.

Invasive weeds:

An emergency has been determined for the Pilot Fire due to the high potential for spread of existing populations of weeds into un-infested areas in the burned area on Forest lands. Seeds from known sources in and adjacent to the fire will likely establish in burned and disturbed forest areas, with a potentially significant threat to native vegetation communities.

There is also a high potential of new weed introductions carried into the burned area on unwashed fire suppression equipment. This BAER emergency can be mitigated by evaluating and treating known populations to limit fire-induced population growth and geographic expansion, as well as monitoring and treating specific locations for new infestations.

Probability of Damage or Loss: Very Likely. This determination is due to the extensive soil-disturbing suppression work done to control the fire without precautions for invasive weed seed removal on the equipment, and due to the likelihood of weed colonization and spread.

Magnitude of Consequence: Moderate. This determination is due to the probability that invasive non-native weeds hinder the recovery of native vegetation by aggressive colonization, degrading plant community composition by reducing native species diversity, competing for nutrients, reducing habitat quality by allelopathy, and reduction of water quality and quantity.

Emergency Determination:

Probability of Damage or Loss: Very Likely

Risk Level: Very High.

Magnitude of Consequences: Moderate

Threats to Heritage Sites

Summary of Cultural Resources BAER assessment

The Pilot Fire burned within the Kaiwiem territory of the Serrano which extended from the Barstow region in the Mojave Desert up into the San Bernardino Mountains, from Deep Creek drainage in northwestern San Bernardino Mountains to the Summit Valley area just north of the headwaters of the Mojave River and to Big Pine Flats in the east (Bean et al. 1981). Expected site types under these conditions are seasonal habitations, lithic deposits, bedrock mortar and metate processing locations and ceremonial activities related to rock art.

At the time of containment, known heritage resources extant in the burn area consisted of 22 recorded cultural resources. Six of those sites are within the San Bernardino National Forest Boundary. One additional site is located on a discontinuous parcel of Bureau of Land Management (BLM) land. All but one of these resources are prehistoric consisting of temporary camps, resource processing, and single event knapping sites with the lone historic period resource being a toll road that was constructed between Lake Arrowhead and Hesperia between 1921 and 1923. The remaining fifteen resources are located on private land.

CA-SBR-05062 is recorded as a temporary campsite and is likely to be affected by unauthorized OHV use. Due to the recent effects of the Pilot fire (ground cover of ash, charcoal, and soot), the site was not able to be relocated but the location was visited to determine the likelihood of post-fire effects. The vegetation on the site has completely burned away exposing the terrain to OHV use. Access for OHV is high; there are several roads crossing the landscape and access from SR 173 is good. The probability for damage is Likely.

Since CA-SBR-05062 is recorded as a temporary campsite there exists the potential for subsurface deposits. Therefore, damage to the site from unauthorized OHV traffic would constitute a Moderate Magnitude of

consequence.

Emergency Determination:

Probability of Damage or Loss: Likely
Magnitude of Consequences: Moderate
Risk Level: High.

The recommended treatment is fencing to close access routes. Fencing has already been recommended along SR 173 due to concerns of OHV use from other BAER Trails evaluation. The proposed fencing will prevent alteration and the loss site integrity from disturbances due to OHV access. The trails fencing plan is sufficient to protect the site from unauthorized OHV access and will meet the heritage resource needs.

Any proposed ground disturbing treatments including but not limited to, gates or fencing or other barriers in or near archaeological sites, that the Forest plans to implement will require an archaeologist to review for potential impacts to cultural resources.

Compliance with Section 106 of the National Historic Preservation Act is required for all proposed BAER treatments that are ground disturbing or are otherwise considered an undertaking. Should any cultural materials be uncovered during BAER treatment implementation, federal and state laws require work be stopped immediately in that area. Contact the Heritage Program Manager to assess the finds and provide appropriate protection or mitigation measures.

Summary of Values at Risk and Emergency Determination

Value Category	Hazard	At Risk	Emergency Yes/No
Life/Health/Safety	Debris Flows, flooding, rockfall, sediment deposition	Drivers on roads, vehicle users in unroaded area, Trail users	Yes
Property/ Infrastructure	Debris flows, flooding, rockfall, sediment deposition	Forest Service and Special Uses Roads, and Highway 173, Pacific Crest Trail, Calfire conservation camp under SUP, Utility lines under SUP	Yes
Water Quality	Increased sedimentation and turbidity	Silverwood Lake - Water quality, reservoir storage	Yes
T&E Wildlife and rare plant habitat	Increased unauthorized OHV use, increased flooding, sediment deposition	Wildlife habitat	Yes
Vegetative recovery	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides. Increased unauthorized OHV use leading to reduced vegetative recovery	Vegetative recovery and long-term soil productivity	Yes
Cultural resources	Increased unauthorized OHV use, increased looting	One archaeological sites of Native Indian origin	Yes for 1 site; No for others

B. Emergency Treatment Objectives:

The primary treatment objectives are to reduce threats to life, safety, and natural and cultural resources.

1. Roads/Trails –

- a. Protect and stabilize the transportation system roads at risk of damage as a result of increased sedimentation, stream diversion, and erosion from the fire.
- b. Increased protection of water quality by reducing risk of road damage and failure.

- c. Improve post-fire vegetation recovery and reduction of risk of unauthorized motor vehicle travel within the burned area.
 - d. Mitigate public safety hazards associated with flooding and debris flows along NFS roads.
2. **Ecological integrity** - Reduce the potential for impaired vegetative recovery. Minimize unauthorized OHV use in the burned area to prevent impaired vegetative recovery.
 3. **Heritage** - Potential loss mitigation.
 4. **Interagency Coordination** - Continue to work with affected parties and stakeholders to describe the findings of the BAER Team. Work with private landowners to implement the Wyden Authority for putting fencing infrastructure on private lands to protect Forest Service resources.
 5. **Special Uses/Developed Recreation** – Maintain access to PCT, Pinnacles Trail, and OHV road 2N17X. Work with SCE to prevent their access tower spurs from becoming OHV pass through features.

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

Land 80 % Channel N/A % Roads/Trails 90 % Protection/Safety 80 %

D. Probability of Treatment Success

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

E. Cost of No-Action (Including Loss): \$

F. Cost of Selected Alternative (Including Loss): \$

Fire Name	Pilot Fire
Location	Mountaintop RD; San Bernardino National Forest
Date	8/19/2016

SUMMARY	Total Treatment Cost	\$ 327,493
	Expected Benefit of Treatment	\$ 263,287
	Implied Minimum Value (IMV)	\$ 207,113

MAP ZONE A	Value Type	Value at Risk	Implied Value and/or Benefit Cost
	Life and Safety	Yes	
	Non-Market: Cultural Values	Yes	

Non-Market: Ecological Values	Yes	\$
Market Values: Direct	Yes	500,000
Market Values: Loss of Use	Yes	\$ 349,314
<i>Total Market Resource Value</i>		\$ 849,314
<i>Proposed Treatment</i>		\$ 327,493
Reduction in Probability of Loss		0.31
Expected Benefit of Treatment		\$ 263,287
Exp B/C Ratio of Treatment for Market Resources Only		0.8
Implied Minimum Value (IMV) of Protecting Non-Market Resource Values		\$ 207,113

Non-Market: Ecological	Description
TES species	Arroyo Toad occupied and critical habitat; southwestern willow flycatcher, least Bell's vireo; loss of critical and occupied habitat on and off-Forest if OHV incursions not stopped
Soil productivity and vegetation recovery	Long term recovery depends on access to remain on pre-designated trails
Recreational experience	PCT is nationally recognized and draws a large number of hikers that support recreational businesses. 2N17X is used as an OHV access from the ridgeline to Silverwood Lake.
Water quality	Long term recovery of landscape required to reduce sediment loading for water quality. Multiple access points from Highway 173 side

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input type="checkbox"/> Geology	<input type="checkbox"/> Range	<input checked="" type="checkbox"/> Recreation/Trails
<input type="checkbox"/> Forestry	<input checked="" type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	<input type="checkbox"/>
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

Team Leader: Robert Taylor

Email: rgtaylor@fs.fed.us

Phone: 909-382-2660

FAX: 909-383-xxxx

Core Team Members:

- Robert G. Taylor – Hydrologist
- Deb Nelson – Botanist
- James Hughes – Botany (trainee)
- Damon Romero – Engineering-Roads
- James Healy – Escort, local patrol officer
- Jeannette Granger - Trails
- Tracy Tennant – GIS
- Jay Marshall – Archaeologist (trainee)
- Travis Mason – OHV/Roads
- Dave Bentley – OHV (trainee)
- Robin Eliason – Wildlife biology

H. Treatment Narrative:

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments cannot fully mitigate the effects of the fire on the watershed. Detailed information of the treatments is summarized below. Hill slope treatments (such as hydromulching, aerial seeding, and straw application) were not proposed because they are infeasible and/or would not reduce the probability of damage to assets. The treatments listed below are those that are considered to be the most effective on National Forest System lands for the identified threats.

Previous fires and restoration activities in the area have given the Forest numerous opportunities to determine the best treatments that have the highest chance of success. After the Hill Fire (2011), the Forest attempted to conduct a closure using 3-strand smooth wire and 6-foot T-posts at the Forest boundary. Materials and installation in 2011 was \$13,000 per mile. After installation, these fences were cut and the T-posts stolen. For a closure to succeed, a heavier duty fence and gate system is required, and has been shown to be successful in other areas of the Forest undergoing OHV restoration treatments (Coxey area). The North Fire (2015) installed cable and post fencing along the Forest Service boundary. This level of protective fencing has held up despite attempts by the OHV public to illegally cross it.

Protection/Safety Treatments:

Area closure

Given the methodology of treatment choice (natural recovery, administration, road/trail/land treatments) hierarchy, an area closure was discussed with the BAER Team and the District Ranger. The risk matrix for users in the burned area predicted: Unlikely for overland and overnight presence, Moderate to Major for consequences, and a risk of low to intermediate. This level of risk does not justify an area closure, though does speak to warning signs at likely access points. Mitigation for life/safety on the roads and trails and resources adjacent to the roads/trails is addressed in further treatments.

Road/Trail Treatments:

Trail Storm Proofing

Prior to the first damaging rain events and within the first year following the fire, storm proofing is recommended to minimize erosion or removal of trail tread. Storm proofing treatments, implemented with hand-tools, would include out-sloping, de-berming, rolling dips, armored crossings at ephemeral drainages, and other suitable treatments outlined in the BAER Treatments Catalog to protect the trail from accelerated post fire flows and soil erosion.

Pre Winter projects would include 3-4 days of storm proofing treatments. Following winter storms, it is likely additional repairs would be needed.

NOTE: This schedule will ensure the trail will be in good repair for 2017 Through Hikers.

Treatments are recommended for 8.9 miles of the Pacific Crest Trail (Section 2000.9) and would only be applied where post fire scouring and/or depositional processes are likely to impact the trail.

Trail Storm Proofing

Item	Unit	Unit Cost	# of Units	Cost
Type 2 Crew	Days	\$5500	5	\$2500.
GS-09 Trail Specialist	Days	\$250	5	\$1250
1 GS-09 Botanists clearance	Days	\$250	3	\$750
1 GS-09 Archeology clearance	Days	\$250	3	\$750
1 GS-07 Wildlife Bio. Clearance	Days	\$200	3	\$600
Travel (mileage)	Miles	\$1.00	1500	\$1,500
Total Cost				\$32,350

Storm Inspection and Response

The inspectors would repair and maintain storm proofing treatments by correcting minor expected problems. Information gathered during these site visits may also be used to submit an interim funding request to the region. This treatment would be applied in the same zones of concern identified in the trail storm proofing section, above.

Initial Storm Inspection and Response

Item	Unit	Unit Cost	# of Units	Cost
1 GS-9 Trails Specialist	Days	\$250.	3	\$750.
Trail rehab. (6 person crew UCC crew)	Days	\$1500.	3	\$4500.
Vehicle (\$1.00/mile)	Mile	\$40	20	\$800.
Total Cost				\$6050.

Warning Signs for the Pacific Crest Trail:

Closure of the PCT is not anticipated due to strong public interest in the trail as a recreational opportunity and minimal hazardous tree risks. BAER Risk Conditions that do not support closure. Signs to warn users of hazardous conditions will be installed as soon as practical. Ongoing trail and watershed conditions will be evaluated, especially after the first winter following the fire. Early spring monitoring and repair of trail and watershed conditions will be scheduled to ensure the safety of heavy, annual "through hiker traffic".

Warning Signs

Item	Unit	Unit Cost	# of Units	Cost
GS-9 Trails Specialist	Days	\$250	2	\$500
Warning Signs along PCT (includes hiking and installation)	Each	\$400	8	\$3,200
Treatment Monitoring (2)	Each	\$400	6	\$2400
Total Cost				\$6100

After interacting with the Regional Office to assess the applicability of using BAER funds on roads near to and on the ridgetops (2N33) as well as those downstream of the fire area that are modeled to get twice the peak flow and four times the sediment (2N36), the road treatments were adjusted down to meet the following standards:

- The following table has been paired down from the original, to areas that are immediately within (or adjacent to) the burn area with no vegetative buffer zone that are at elevated risk of failure due to the burn. All new OSD's have been removed from 2N33, and the focus was changed to adding Energy Dissipation for features that are already there to protect the downhill slopes.

[illegible]

Land Treatments:

Fences, Gates and Unauthorized Route Decommissioning

The objective of these treatments is to reduce expansion of OHV impacts and associated impacts on critical BAER values at risk. These impacts include increased risk for establishment of noxious weeds in the burned area and chronic (long-term) soil disturbance and sedimentation. Increased chronic sedimentation is likely to impact occupied Arroyo Toad habitat (listed species) and water quality downstream. Additionally, post fire OHV disturbance is the primary concern for impacts on cultural resources within the burned area.

Access points into the fire area are multiple and spread across the landscape through the Grass Valley Creek area. The Wyden authority, to put treatments off of Forest Service land to protect Forest Service resources, will be used to support a smooth wire fence proposal along Highway 173.

**NOTE: All treatments are subject to Heritage Review and Approval prior to Implementation*

Highway 173 OHV prevention fencing (Smooth Wire and Post/cable Fencing)

Item	Unit	Unit Cost	# of Units	Cost
Agreement staff member for Wyden authority building on private land along Highway 173 (TEAMS cost rate)	Days	\$800	10	\$8,000
Installation work crew	Days	\$2000	12	\$24,000
2-strand smooth wire with T-posts	Mile	\$3000	2.5	\$7500
Post and Cable (materials and installation)	Mile	32,600	0.5	\$16,300
GS-11 Archeology monitor	Days	\$310	4	\$1240
GS-11 Wildlife monitor	Days	\$350	2	\$700
Vehicle Mileage	Miles	\$0.44	2000	\$880
Total Cost				\$58,620

Heavy Gate Installation (major access routes from 173 into fire area)

Item	Unit	Unit Cost	# of Units	Cost
Large Steel Gate (Angeles type)	Each	\$10,500	2	\$21,000
Road Closure signs	Each	\$350	2	\$700
Archeology monitor	Day	\$310	1	\$310
Total Cost				\$22,010



At both the top (pictured) and bottom of 2N17X there are locations where OHVs could leave the primary route, due to lack of vegetation, and traverse through the fire area.

The treatment includes 2,500 feet of pipe and cable and 1,000 feet of smooth wire fencing for 2n17x and 2n33, respectively.

2N17X top and bottom & 2N33 specific location OHV prevention

Item	Unit	Unit Cost	# of Units	Cost
Implementation Team Leader with COR/agreement qualifications (+ per diem) {TEAMS cost rate}	Days	\$950	4	\$3,800
Post and Cable (materials and installation)	Mile	32,600	0.48	\$15,648
2-strand smooth wire with T-posts	Mile	\$3000	0.19	\$570
Installation work crew	Days	\$2000	1	\$2,000
GS-11 Archeology monitor	Days	\$310	2	\$620
GS-11 Wildlife monitor	Days	\$350	1	\$350
Vehicle Mileage	Miles	\$0.44	2000	\$880
Total Cost				\$23,868

With the recreational use and vegetation types found in the Miller Canyon and Pinnacles OHV area the Forest found the use of "chunking", as decommissioning of unauthorized route entries, with excavators an effective tool in protecting resources after a fire when combined with fencing, signs, and most importantly frequent patrols. Chunking is described as using the bucket of an excavator or articulating blade on small trail dozer to decompact roads/trails by digging into the compacted area and creating divets. These divets act as mini-catch basins (increasing infiltration), require minimal maintenance, and are found to collect seed and promote germination (See photos below.)

Decommissioning (See BAER Catalog - Decommissioning)

Item	Unit	Unit Cost	# of Units	Cost
Contract excavator	Days	\$1200	12	\$14,400
Mobilization costs	Each	\$1000	2	\$2000
IDIQ contract preparation (GS-7 Roads/OHV; Inspector)	Days	\$280	8	\$2240
IDIQ contract administration/COR – Implementation Team leader with per diem (TEAMS cost rate)	Days	\$950	2	\$1900
Biological monitor	Days	\$350	2	\$700
Archeology monitor	Days	\$310	4	\$1240
Vehicle Mileage	Miles	\$0.44	1000	\$440
Total Cost				\$22,920

Treatment Effectiveness Monitoring (gate, fence, decommissioning and trail treatments)

Item	Unit	Unit Cost	# of Units	Cost
FPO Patrol	Day	\$200	50	\$10,000
Biologist or Watershed Specialist	Day	\$350	4	\$3,000
Total Cost				\$13,000



Photo 1: Chunking with a small trail dozer that has an articulating blade.

Invasive Weed Detection and Rapid Response

Weed detection surveys will determine whether ground disturbing activities related to the Pilot Fire Incident and the fire itself have resulted in new introductions associated with fire suppression or resulted in the expansion of existing invasive weed infestations. Survey work is proposed for the first year following the fire (spring of 2017) to document the suspected infestations and determine the fires' potential impact on weed populations and native plant communities within the burned area.

Surveys will be conducted for invasive plant species in disturbed areas within the fire perimeter on FS land at known infestations and all priority areas identified within the fire perimeter (see table below). Early Detection Rapid Response (EDRR) is a strategy developed to increase efficiency of weed work by combining surveying, mapping and immediate treatment of new weed populations as they are discovered. If infestations are found, funding will be requested for hand and/or mechanical where feasible.

Surveys and rapid response eradication treatments in priority areas will begin in spring of 2017 during the flowering periods of weed species. Because of differences in rainfall and flowering times for all potential species, two visits may be required over the next year.

Several invasive weed species known from the area that are difficult to impossible to detect the first year after germination because seedlings are very small or first year rosettes are so low growing that they are difficult to see until the second year when bolting and flowering occur.

Difficult to detect the first year - attention needed to find first year growth:

Spanish broom
Bull thistle
Yellow star thistle
Sweet clover
Tumble mustard
Scotch broom

Surveys of dozer lines, roads, staging areas, safety zones, and known invasive and sensitive plant populations will be the first priority. The second survey priorities would be along handlines, helispots, and drop points. Surveys of the general habitats in the burned area would be the lowest priority.

Miles of Dozer Line and Hand Line on FS Land to Monitor:

	Miles
Dozer Line	11.50
Hand Line	14.62
Total	26.13

Miles of FS Roads to Monitor

Road Name/Number	Land Ownership	Primary Maintainer	Miles
CA-173	USFS	State	4.93
2N37 MILLER CANYON	USFS	USFS	3.52
2N17X PILOT FUELBREAK	State	USFS	0.36
2N33 PILOT ROCK	USFS	USFS	4.62
2N36 PILOT ROCK RIDGE	USFS	USFS	0.73
2N34 TUNNEL TWO	USFS	USFS	0.54
Grand Total			14.70

Miles of Retardant Drop intersecting TESW plant Occurrences:

Species	Miles
All species	0.90

Fire Points to Monitor for Weeds:

Drop Points 3

Helispot 3

Priorities for Weed Surveys (see maps below)

1. Dozer line, with special attention to the sewage treatment plant on the east end of 2N33 where tamarisk, bull thistle and short pod mustard are present above a drainage above a very wide dozer line.
2. safety zones, staging areas (with special attention to areas within or near special status plant occurrences - check NRIS data)
3. Known invasive weed occurrences (check NRIS data) near special status plant occurrences
4. Handline on the SW side of the fire near the origin
5. Drop points, helispots
6. Areas where retardant drops intersect with known special status plant species occurrences.
7. Other handline
8. BAER treatment sites where ground disturbance was involved or erosion control measures such as straw or hay bales, or sand bags have been deployed.

Documentation of new infestations will include:

- Mapping perimeter of new/expanded infestations
- Filling out Weed Element Occurrence Form
- Treatment method and dates of minor treatment conducted during survey work
- Incorporating data into local GIS spatial database
- Entering data into National Resource Information System (NRIS) database
- Entering treatment data into FACTS database

Weed Surveys and Rapid Response Costs if implemented by contractors:

Item	Unit	Unit Cost	# of Units	Cost
1 GS-11 local botanist for coordination	Days	\$475	2	\$ 950
Implementation leader with COR qualifications (TEAMS)	Days	\$800	4	\$ 3,200
per diem for TEAMS lead	Days	\$150	4	\$ 600
Travel expenses for TEAM lead				\$ 00
2 person contracted crew	Days	\$1600	8	\$12,800
Vehicle	miles	\$.60	1100	\$ 660
Total Cost				\$18,210

The probability of preventing explosive expansion of weeds spread or introduced by fire related activities into areas not previously infested is 90% with qualified botanists conducting the survey work.

Fiberglass Guzzler Removal:

The proposed treatment is to remove the burned fiberglass guzzlers. During installation in the early 1990s, the guzzlers were carried to the site via helicopter sling-load. Removal would require a crew with hand tools and appropriate PPE to cut up the fiberglass into small enough pieces to be sling-loaded out. The guzzlers have not been inspected yet. According to the Province hazmat coordinator (Belinda Walker), burned fiberglass is non-hazardous.

Item	Unit	Unit Cost	# of Units	Cost
<i>Phase 1: Inspection to see if guzzlers burned.</i>				
Inspection team of 2 people @ \$250/day	Day	500	1	\$500

If the guzzlers are found to have been burned beyond repair, additional funds will be requested to replace them.

Channel Treatments: N/A

PART VII - APPROVALS

1. Jody Noiken
Forest Supervisor (signature)

8/29/2016
Date

2. Barnie T. Dyat
Regional Forester (signature)

8/30/16
Date

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

Line Items	Units	Unit Cost	NFS Lands		Other \$	# of units	Other Lands		Non Fed \$	All Total \$
			# of Units	BAER \$			Fed \$	# of Units		
A. Land Treatments										
Decommissioning	ea	\$22,920	1	\$22,920	\$0		\$0		\$0	\$22,920
Hwy 173 fencing	ea	\$80,630	1	\$80,630	\$0		\$0		\$0	\$80,630
2N17X/2N33 OHV pre	ea	\$23,868	1	\$23,868	\$0		\$0		\$0	\$23,868
Weed surveys and res	ea	\$18,210	1	\$18,210	\$0		\$0		\$0	\$18,210
Guzzler inspection	ea	\$500	1	\$500	\$0		\$0		\$0	\$500
<i>Insert new items above this line</i>										
Subtotal Land Treatments				\$146,128	\$0		\$0		\$0	\$146,128
B. Channel Treatments										
					\$0		\$0		\$0	\$0
<i>Insert new items above this line</i>										
Subtotal Channel Treat.					\$0		\$0		\$0	\$0
C. Road and Trails										
Road Package	lump	\$33,878	1	\$33,878	\$0		\$0		\$0	\$33,878
Trails Package	lump	\$38,450	1	\$38,450	\$0		\$0		\$0	\$38,450
<i>Insert new items above this line</i>										
Subtotal Road & Trails				\$72,328	\$0		\$0		\$0	\$72,328
D. Protection/Safety										
	ea	\$0	1	\$0	\$0		\$0		\$0	\$0
					\$0		\$0		\$0	\$0
					\$0		\$0		\$0	\$0
					\$0		\$0		\$0	\$0
<i>Insert new items above this line</i>										
Subtotal Structures					\$0		\$0		\$0	\$0
E. BAER Evaluation										
Assessment Team	lump	\$50,000	1	\$50,000			\$0		\$0	\$0
<i>Insert new items above this line</i>										
Subtotal Evaluation					\$0		\$0		\$0	\$0
F. Monitoring										
Storm response	ea	\$6,050	1	\$6,050			\$0		\$0	\$6,050
Decom./fence treatme	ea	\$13,000	1	\$13,000	\$0		\$0		\$0	\$13,000
<i>Insert new items above this line</i>										
Subtotal Monitoring				\$19,050	\$0		\$0		\$0	\$19,050
G. Totals				\$237,506	\$0		\$0		\$0	\$237,506

Appendix A: Monitoring Plan

Pilot Fire Fence Effectiveness Monitoring

The 2500-8 report requests funds to monitor the effectiveness of fencing. The fencing is to restrict access to known critical heritage resource sites that could be degraded from looting or vehicle traffic, diminishing the site integrity.

1. Monitoring Questions

- a. Are the fences restricting vehicle access in to the burned area?
- b. Have the fences been cut or tampered with since it was constructed or previously maintained?
- c. Are there specific locations where the fences are being cut?
- d. Are there signs of looting? Are specific areas being targeted?

2. Measurable Indicators

- a. Number of times fence is repaired
- b. Loss of artifacts from the site
- c. Vehicle traffic signs

3. Data Collection Techniques

- a. Photo documentation of site
- b. Inspection Checklist (attached)
- c. Cars parked in parking area
- d. Use of standardized heritage resource form for looting

4. Analysis, evaluation, and reporting techniques

Due to the high resource values at risk the monitoring findings will be evaluated weekly. If the monitoring shows the treatment to be ineffective at restricting vehicle access and looting, an interim report will be submitted. Emergency funding for enforcement protection or other appropriate treatment may be required based on the monitoring findings. (Physical detection monitors)

5. Monitoring report timeframes

The report will be evaluated weekly and if the treatment is effective, fence inspection checklist findings will be compiled monthly and summarized by the following:

- a. Number of fence breaks
- b. Number of times vehicle entry
- c. Location of fence breaks
- d. Destination of vehicle access
- e. Looting characteristics
- f. Use of parking area

Fence Inspection Checklist

Date: _____

Inspector _____

Time: _____

Describe locations reviewed during inspection: _____

Was the fence cut? _____. If so at what location
(GPS) _____

Were there additional fence cuts? (GPS) _____

Were there signs of vehicle entry to the area? _____

Photo taken of vehicle tracks _____

Photo taken of fence break _____

Heritage site review findings: Signs of looting or vehicle traffic at any sites
____ Yes ____ No?

If so identify by GPS the location _____

Describe signs of looting _____

Was fence repaired? ____ Yes ____ No? If yes what was the approximate cost?

Were any new trail starts mulched/rehabilitated? ____ Yes ____ No? If yes, what was
the approximate cost? _____

Other comments:

