Owens River Fire
September 2016

USDA-FOREST SERVICE
(6/06)

FS-2500-8

Date of Report:

9/24/2016

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: Owens River

B. Fire Number: CA- INF-001415

C. State: CA

D. County: Mono

E. Region: R5

F. Forest: Inyo

G. District: Mono Lake

H. Fire Incident Job Code: P5KQW16

I. Date Fire Started: 9/17/2016

J. Date Fire Contained: unknown at this time

K. Suppression Cost: 4m

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 16.6
2. Fireline seeded (miles): 2 miles approximately
3. Other (identify):

M. Watershed Number: McLaughlin Creek-Owens River(180901020103), Deadman Creek Watershed (180901020201), Dry Creek Watershed (180901020202)

N. Total Acres Burned: 5,460
NFS Acres(4450) Other Federal ( ) State () Private (897), LADWP (13)

O. Vegetation Types: Jeffrey Pine, Sage brush , bitterbrush, aspen, meadow grasses

P. Dominant Soils The following soil map units comprise approximately 80% of the burned area in the Owens River Fire.

Soil Map Unit	Soil Name	Acres	% of Fire Area	Soil Texture	Rock Content	Hydrologic Soil Group
138	Vitrandic Xerorthents 30-60% slopes	1459.7	27%	Gravelly loamy sand	25	A
204	Nanamkin - Corbett association 30-60% slope	766.6	14%	Gravelly sandy loam	25	D
114	Haypress family 30-60% slopes	625.4	11%	Gravelly loamy sand	25	A
372	Powment-Nanamkin-outcrop association 30-60% slope	442.4	8%	Unweathered bedrock	50	B
163	Yellowhills - Brantel complex 2-5% slopes	439.3	8%	Gravelly loamy sand	25	A
328	Wrango family 0-15% slopes	315.7	6%	Gravelly loamy coarse sand	25	A
186	Washoe family 30-60% slopes	184.9	3%	Sandy loam	7.5	C
137	Vitrandic Xerorthents 0-30% slopes	169.8	3%	Very gravelly coarse sand	47	A

Q. Geologic Types: Bishop Tuff, Quartz latite of Bald Mountain, Colluvium and alluvium

R. Miles of Stream Channels by Order or Class:
Perennial 6.2 Intermittent: 13.3 Ephemeral: 8.5 miles Ditch/canal: 0.9

S. Transportation System

Trails: N/A miles Roads: 23.7 miles(NFS – level 2) 2.8 miles (County), 1 mile (PVT.)

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 87 V. Low 1376 (low) 3860 (moderate) 137 (high)

B. Water-Repellent Soil: 2,625 (acres)

Hydrophobic soil conditions were very common ~~under~~ in moderate and high soil burn severity areas. Nearly every tested location showed some level of, and often strong, hydrophobicity. In high burn areas, the water repellant layer started between ½ and 1 inch deep, and was continuous to a depth of ~2.5 - 3 inches. Deep, strong hydrophobic layers were found in both sagebrush and Jeffery pine vegetation types. In moderate burn areas, the water repellant layer was not as thick, and was closer to the surface, starting around 1cm, and rarely continued deeper than 1 inch. More than 60% of moderate and high burn areas are expected to be hydrophobic. In low and very low/unburned areas, natural water repellency dominated (i.e., not fire-induced). Some fire-related increases likely occurred, but may only be ~15% above the natural condition. Thus, overall hydrophobic conditions are expected to exist in approximately 48% of the fire area, or ~2,625 acres.

C. Soil Erosion Hazard Rating (acres): see below

The fire resulted in an increase in acres of soils with a high erosion hazard rating, as shown in the table below.

Erosion Hazard Rating	Post Fire	
	Acres	Percent %
Low	1432.4	26%
Moderate	1633.9	30%
High	2394.5	44%

D. Erosion Potential:

Within the steeper portions of the fire, erosion and sediment potential are assumed to be similar, especially in moderate and high severity burned areas. Most water-caused erosion on steep slopes will be delivered to rills or channels as sediment. ERMiT was used to predict sediment production, and is further discussed in section

Portions of the fire have flat and moderate slopes, where erosion and sediment rates are less similar. Hillslope erosion was not modeled separately from sediment potential, but the EHR method (section C, above) and ERMiT (Section E) can inform about the risk of erosion on more gentle slopes. For the very flat "sagebrush flats" above the Owens River, both ERMiT and the EHR method predict very little loss of soil or sediment, indicating a low risk of water erosion. However, in the Northwest portion of the fire, where there are moderate slopes under Jeffrey pine & sagebrush, the EHR is often predicted to be high, but ERMiT results still show low sediment production. Thus, the moderately burned slopes in this area may be susceptible to surface erosion due to low ground cover, and strong water repellency, but the inputs to stream sedimentation could be mitigated by short hillslope length and gentle toe slopes, where sediment drops out.

Wind erosion in the Eastern Sierra is a major erosional process. Wind erosion mobilizes ash and fine sediment and deposits them in swales and drainages. Large plumes of ash and soil in the air were observed during the BAER assessment, before the fire was contained. This material is highly mobile and available for transport during storm events, and can lead to large losses of soil until vegetative cover is restored.

E. Sediment Potential:

The Erosion Risk Management Tool (ERMiT), was used to model both pre and post fire sedimentation. In areas with moderate and high burn severity, erosion potential was generally increased above natural conditions. Sedimentation was modeled with 2, 5, and 10 year runoff events. 2-year results are not displayed in the tables because the model showed that nearly all hillslopes would likely have very little erosion and sedimentation in a 2-year runoff event. The 2-year runoff event was modeled to produce only ~0.2 inches of runoff (ERMiT Results, rainfall), which led to a fire-wide sedimentation rate of 0.01 tons per acre, or only 155 tons of sediment from the whole fire.

The tables show ERMiT results for both the Owens River Fire and the Clark Fire (August 2016). Both fires will contribute sediment to the Owens River via Clark Canyon, so the pourpoint results for those two watersheds include sediment from both fires.

Post-Fire ERMiT Results - Sediment produced from a 5-year and 10-year runoff event.

Area	20% probability of exceedance (5 Year)				10% probability of exceedance (10 Year)			
	Tons/ Acre	Tons	Cubic Yards	Times Increase	Tons/ Acre	Tons	Cubic Yards	Times Increase
Owens River Fire	0.44	5,821.0	4,074.7	86.5	1.55	18,680.7	13,076.4	45.3
Clark Fire	0.68	1,052.6	736.82	43.7	2.37	3,627.0	2,538.9	35.9
Owens River (Above weir)	0.57	5,545.9	3,882.1	101.0	1.93	18,985.1	13,289.5	49.4
Alpers Canyon	0.48	1,045.0	731.5	580.6	1.79	4,313.8	3,019.6	56.5
Clark Canyon	0.64	2,545.6	1,781.9	107.9	2.13	8,735.4	6,114.7	54.1

Pre-fire ERMiT Results – Sediment produced from a 5-year and 10-year runoff event.

Area	Pre-Fire (unburned) 20% (5 Year)			Pre-Fire (Unburned) 10% (10 Year)		
	Tons/Acre	Tons	Cubic Yards	Tons/Acre	Tons	Cubic Yards
Owens River Fire	0.01	67.3	47.1	0.04	412.2	288.54
Clark Fire	0.01	24.1	16.9	0.06	100.9	70.63
Owens River (Above weir)	0.006	54.9	38.4	0.04	384.4	269.08
Alpers Canyon	0.002	1.8	1.3	.03	76.3	53.41
Clark Canyon	0.007	23.6	16.5	.04	161.5	113.05

ERMiT allows users to predict the probability of a given amount of sediment delivery to the base of a hillslope following variable burns on forest, rangeland, and chaparral conditions in each of five years following wildfire. The ERMiT model can be accessed at http://forest.moscowfsl.wsu.edu/fswepp/

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Dry ravel was observed 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 increases after a fire because the vegetation that was holding the soil in place on the hillside is removed. Dry ravel in steep in-gorge areas can "super charge" sediment loading in stream channel, greatly increasing the amount of available sediments for transport.

Wind erosion in the Eastern Sierra is a major erosional process. Wind erosion mobilizes ash and fine sediment and deposits them in swalls and drainages. This was observed during the BAER assessment. This material is highly mobile and avaiable for transport during storm events.
Conclusions:

- There is a high probability that rates of soil erosion and sediment delivery to stream channels will be significantly higher in moderate and high soil burn severity areas, .
- High intensity, short duration summer thundershowers are storm events of concern. Additionally, longer duration medium intensity storms over the winter months are like to generate erosion and flooding within and downstream from the burned area.
- In addition to fire, existing ground disturbance (roads) influence soil erosion and watershed response to precipitation events within the burned area.

Soil Burn Severity and ancilliary characteristics:

Forested: Burned forested areas were mapped as ranging from low to high soil burn severity. Extensive removal of forest floor ground cover occurred in moderate and high soil burn severity areas. Soil heating effects were noticable in high severity areas. Generally, soil heating effects were low in moderate and low burn severity areas. We observed pine needles under pumice surface in many areas, which is likely do to soil creep burying existing needles and duff. Needle cast is likely to occur in the low and moderate soil burn severity polygons and recovery of slope stability and watershed hydrologic response will be accelerated where this occurs.

Shrub: Most of the shrub vegetation within the burned area was mapped as low or moderate soil burn severity. Although there was a relatively high level of bare ground before the fire in the shrublands, removal of ground cover was often high post-fire and it is expected that erosion and sediment delivery to stream channels from these slopes will be high. Vegetative recovery is likely to occur through sprouting of shrubs and establishment of grasses and herbaceous vegetation. Recovery of watershed hydrologic response depends on many factors and is likely to take at least 3-5 years.

Grass, Bare Ground and Rock Outcrop: Grass, bare ground and rock outcrop areas within the burn were mapped as unburned or low burn severity. Soil heating in these areas was very low and minimally affected by the fire, and therefore recovery of watershed response is expected to occur rapidly.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	3-5
B. Design Chance of Success, (percent):	80
C. Equivalent Design Recurrence Interval, (years):	5
D. Design Storm Duration, (hours):	2.0
E. Design Storm Magnitude, (inches):	91
F. Design Flow, (cubic feet / second/ square mile):	20.86
G. Estimated Reduction in Infiltration, (percent):	76
H. Adjusted Design Flow, (cfs per square mile):	46.77 See below for additonal info

PART V - SUMMARY OF ANALYSIS

Introduction:
The Owens River Fire started the afternoon of September 17, 2016 from unknown causes, in Clark Canyon on the Mono Lake Ranger District. The fire burned approximately 5,460 acres .

The soil burn severity (SBS) map shows approximately 74% burned at high and moderate soil burn severity. The rest of the fire was either unburned, or had very low or low soil burn severity. The northern part of the fire burned in a mosiac of very low and unburned. It is very important to understand the difference between *fire intensity* and *burn severity*, and *soil burn severity* as defined for watershed condition evaluation in Burned Area Emergency Response BAER analyses. Fire intensity or burn severity as defined by fire, fuels, or vegetation specialists may consider such parameters as flame height, rate of spread, fuel loading, thermal potential, canopy consumption, tree mortality, etc. For BAER analyses, mapping is not simply vegetation mortality or above-ground effects of the fire – soil burn severity considers additional surface and below-ground factors that relate to soil hydrologic function, runoff and erosion potential, and vegetative recovery. Areas of high and moderate soil burn severity are present throughout the fire. Areas of high and moderate soil burn severity (especially high) are considered "flood source" areas and can produce accelerated runoff and sedimentation affecting roads, water quality, and downstream infrastructure.

Based on historic precipitation patterns, it can be expected that late season monsoon rains or frontal storms in late September – mid October are the first runoff producing events following the Owens River Fire. Generally after the first rains there is drying period until mid-November. The risk of flooding and erosional events will increase as a result of the fire, creating hazardous conditions within and downstream of the burned area. These hazardous conditions may be worsened in the case of a rain-on-snow event, where long-duration rainstorms falling on a shallow snowpack can produce very high

peak flows.

The fire was divided into sub-watersheds with "pourpoints" established at the bottom of burned watersheds, or where values at risk were located. Watershed runoff response is referenced to these points.

Soils/Erosion Response

Erosion Response: Soils in the fire area typically have a coarse sandy texture and have relatively non-cohesive structures, especially in pumiceous soils. They also have relatively rapid surface infiltration rates, leading to low surface erosion response in low-intensity storms. Before the fire, most of the forest areas had protective ground cover in the form of litter, duff or ground vegetation. Shrub dominated areas had ground cover mainly within the "dripline" of the shrubs, with bare ground between the shrubs and grasses. In areas of moderate and high burn severity, it is highly likely that increased rates of soil erosion and sediment delivery to stream channels will occur for two or three years after the fire, particularly on steep slopes that contained shrubs and are slow to recover. Many of the moderate burn severity areas in Jeffrey Pine stands will have large amounts of needle cast this fall which will help mitigate post-fire erosion.

The ERMiT modeled erosion rates showed very little sediment being produced in a 2-year storm event. However, larger storms, with more than 0.4 – 0.5 inches per hour of runoff could lead to significant sediment production. Hydrophobicity was very widespread in the moderate and high burn areas, so if surface runoff initiates, the uncohesive soils could produce large quantities of sediment. For a 5-year storm, sediment increases range from ~40X to over 500X (more commonly 100X) increases in sediment above natural conditions. Portions of the sagebrush-covered slopes above Clark Canyon experienced higher than typical burn severity, and have up to several inches of ash. The upper reaches of this watershed burned in the Clark Fire earlier in 2016. This creates a concern for increased bulking of water and ash in the Clark Canyon drainage and the downstream stretch of the Owens River.

Watershed Response:

The fire occurred mostly within the McLaughlin Creek-Owens River HUC -12 watershed. Owens River is a perennial stream sustained by springs and snowmelt and a major source of domestic water for the City of Los Angeles, and has many beneficial uses associated with it. The following sub-watersheds within the fire area were delineated and hydrologic modeling was conducted during the BAER assessment: Clark Canyon, including the burned area of the Clark Fire of August 2016, Alpers Canyon and the Owens River from the East Portal upstream to the headwaters, and the Owens River from below the East Portal weir including the burn area of the Owens River and Clark Fire combined. Alpers Canyon and Clark Canyon watersheds will have the most profound watershed response related to the fire. Hydrologic modeling of the watersheds have an expected increase in the Q5 discharge as compared to pre-fire conditions. The majority of the Clark Canyon watershed burned in the past two months during the Clark and Owens River Fires, although only 46% of the watershed burned high and moderate. Clark Canyon watershed is expected to have a 91% increase of Q5 post-fire discharge with a 2 hour, 0.9 inch storm (319 cubic feet /second). There is also an expected increase of sediment (based on sediment models) from the watershed of 1,781 cubic yards from the same 5 year storm. Post fire

discharge increases in Alpers Canyon should be lower, with a modeled 39% increase, but sediment increases may be high, modeled at 731 cubic yards from a 5 year storm event.

Because of the lower gradient slopes and valleys in Clark Canyon and especially in the lower end of Alpers Canyon where the floodplain is broad, well-vegetated and has low gradient, it is expected post-fire increased flows and sediment yields will be moderately mitigated as flow can spread outward and sediment can drop out and settle at the toe of slopes. However, flow and sediment increases are more likely in Clark Canyon as little to no buffering vegetation remains, as almost all of the vegetation in the lower watershed and channel was consumed. It is still likely the Owens River will receive moderate increases of flow and sediment/ash that could adversely impact the river during these events, and increase sediment levels in pools and slow flowing reaches of the river, particularly within the immediate reach below Clark Canyon. Sedimentation and discharge is expected to have only minor increases upstream of Clark Canyon on the Owens River, due to the mitigating effects of lower Alpers Canyon floodplains and mostly vegetated riparian channel sections above the Alpers Ranch property. Less sedimentation is expected along the Owens River upstream of Alpers Canyon as there is a smaller amount of burned watershed and riparian vegetation is only partially burned (approximately 50%) along the river.

See Table 2 for the results of the hydrologic modeling.

Table 1 displays the amount of burn severity and acres burned throughout the fire area

Watershed	Total Acres	Very Low/Unburned Acres	Low Severity Acres	Moderate Severity Acres	High Severity Acres
Clark Canyon (both fires)	4,856	2011	593	2014	238
Alpers Canyon (both fires)	1548	516	223	772	37
Owens River at Weir (both fires	53,156	47,191	1323	4349	293

Table 2. Hydrologic modeling for select watershed in the Clark Fire.

Owens River Fire BAER - Inyo NF

**Design Flow for 5 year storm (South Lahontan/Colorado Desert Region)

Pour Point Analysis Watersheds	Drainage Acres	Drainage Area (mi2)	Pre-Fire Peak Flow in cubic feet per second (cfs) Q2	Q5	Q10	Q25	Soil Burn Severity (acres) Unburned	Low	Moderate	High	In Cubic Feet per Second (cfs) Pre fire Q5	Q from unburned	Q from low	Q from moderate	Q from High	Post fire Total Q5	Change in Q5 Flow
Clark Cyn Watershed (Clark and Owens Fire combined)	4855	7.59	29	157	[illegible]	1124	2011	593	1014	233	157	59	10	175	55	[illegible]	[illegible]
Alpers Canyon Watershed	3559	5.56	35	145	[illegible]	662	2557	123	772	37	145	101	9	73	10	193	[illegible]
Upper Owens River above East Portal Weir	55155	86.05	96	561	1415	3771	47091	1333	4349	293	561	498	14	115	[illegible]	645	[illegible]
Upper Owens River (all Fire area + Alpers, Clark and other tribs only)	11727	18.32	45	251	553	1755	5431	1407	4535	295	251	[illegible]	[illegible]	234	44	452	73
										Pre-Fire Q	1133			Total Post Fire Flow		1519	45

From: Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006
By Anthony J. Gotvald, Nancy A. Barth, Andrea G. Veilleux, and Charles Parrett, 2012

*Change in flow is the increase in flow resulting from the reduction in soil [illegible] after a fire based on a paper by Terry Henry
Acres of unburned and low soil burn severity are modeled at Q5, acres of moderate soil burn severity are modeled at Q10 and areas of high soil are modeled at Q25. A weighted average is then calculated to arrive at post fire Q5

*Spreadsheet prepared by David McComb US Forest Service

** The Design storm is based on a 5 year return interval storm [illegible] inches of precipitation in a 0.5 hour duration

Water Quality

The largest impact to water quality and aquatic habitat will likely occur to the Owens River below the confluence of Clark Canyon if the 5 year design storm occurs. Clark Canyon has a somewhat defined channel in the lower reaches below the Clark Fire area and coupled with the large areas of moderate and high burning is capable of channeling and transporting sediment and water to the Owens River. Sedimentation and ash in the reach below Clark Canyon on the Owens River could be severe for the immediate reach downstream (estimated at 1 mile or greater) within the first year after the fire if large storms occur in the Clark Canyon watershed. This may have the potential to kill resident fish in the river if concentrations of ash and sediment are high, as temporary events of lower dissolved oxygen levels in the water may result. Instream aquatic habitat could be adversely impacted as fine sediments increases in pools and response reaches. An irrigation ditch crosses Clark Canyon channel directly above the confluence with Owens River. The ditch will likely capture or intercept flows and sediment from Clark Canyon if a large storm event occurs. The ditch may breach and overflow if this occurs and could cause additional sedimentation to Owens River as the ditch banks will erode and release additional sediment.

Alpers Canyon has a lower potential for transporting sediment and water due to the lower response expected from the watershed and the higher probability of mitigation because of the broad, vegetated

floodplains in the lower Alpers Canyon that will help water and sediment spread out and settle. The lower meadow has been greatly hydrologically altered with a large system of diversion ditches and diversions that could capture sediment and water, reducing adverse impacts to Owens River water quality as well.

With lesser intensity storms (i.e., 2 year event), there will still be episodes of turbidity to the Owens River but will be less severe and of shorter duration.

The risk for adverse effects to water quality to the Owens River is considered **High.**

Geology/geologic response:

Rock Fall: Post-fire rock fall was observed on Big Springs Road (2S04) and Alpers Canyon road (2S35). Rock fall will likely continue at an increased rate for several years following the fire due to loss of groundcover, and will increase temporarily during runoff events. The risk for rock fall occurrence as a result of the fire is considered to be **High** on the roads mentioned and likely other areas with steep cut slopes.

Debris Flow: Evidence of recent pre-fire debris flows within the burned area was observed in a drainage coming off of Bald Mountain into Clark Canyon crossing Road 1S47., From the Clark Fire, the east fork of Clark Canyon could experience mudflows, excavating the stored sediments found in the main channel and tributaries throughout the watershed, and cumulatively adding to debris flow potential in the Owens River Fire. The ephemeral stream channel within Clark Canyon is charged with sediment and rocks. An initial assessment indicates with the steep slopes and loss of groundcover, an above normal runoff event will mobilize material in the charged channel and could result in a mud flow. This flow could deposit material on 1S47C and 1S47, potentially flowing down the road, degrading the road bed and restricting access.

The risk for mud flow occurrence in East Fork Clark Canyon as a result of the fire is considered to be **High** two years following the fire and will decrease in year three.

A. Describe Critical Values/Resources and Threats:

*The risk matrix below, Exhibit 2 of Interim Directive No.: **2520-2010-1** was used to evaluate the Risk Level for each value identified during Assessment. Only values at risk that had a risk of Intermediate or above are discussed.*

Probability of Damage	Magnitude of Consequences		
	Major	Moderate	Minor

or Loss	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Threats to Life/safety and Property

National Forest Roads: There are approximately 23.7 miles of maintenance level 2 (ML 2) roads within the fire area. Approximately 19.5 miles of the roads go through moderate severity and .8 miles go through high burn severity. Moderate and high burn severity also occurred adjacent and above the roads. These roads are native surface on decomposed granite and ashy/pumiceous soils, and are very susceptible to erosion. Uncontrolled runoff can result in off-site damage and potential negative impacts to the transportation system. A secondary consequence of post-fire runoff to the transportation system could be increased adverse effects of storm water runoff and decreased control of storm water runoff, which could deliver high volumes of water and sediment onto adjacent hillslopes.

There is a need for culvert maintenance and cleaning and addressing roads with a high diversion potential from ephemeral creek crossings.

County Roads (3): Owens River Road, 2S04 (Big Springs Road) and road 2S162 on the back side of Bald Mountain maintained by mono County. Approximatlely 2.6 miles burned, all in moderate burn severity areas. The majority of that is on the Owens river road which is basically level throughout the fire area. The BAER team expects ash and sediment to dune on parts of the Owens River Road and the Big Springs Road and Owens River road can expect nuisance sediment. The BAER team leader went out with two representatives of the Mono County road department on September 29th to go over findings and areas of concern.

Emergency Determination:

Imminent hazards to the road system vary from nuisance sediment to sediment and debris overwhelming the road and incision on the stream crossing and low spots, leading to a partial or total loss of the road template.

Probability of Damage or Loss: **Likely**

Magnitude of consequences: **Moderate**

Risk Level: High

Private land Structures and irrigation infrastructure and access roads (Alpers and Arcularias ranches):

The BAER team completed an initial assessment of potential post-fire effects to Private land structures. The BAER Team leader went out with the NRCS and the caretaker of the Private lands on September 27th to go over initial findings. We agreed that the risk to homes and other structures is **very low,** as potential increase in peak flows in the Owens river and runoff from hillslopes do not pose a threat.

Roads to access fence lines and irrigation can experience ash and sediment during storm events. In addition irrigation ditches are likely to collect ash and sediment. We discussed the situation with the caretaker and he is going to take appropriate measures. There is an **intermediate** risk to roads and irrigation ditches.

Irrigation ditch that crosses Clark Canyon Creek north of the owens river

The BAER Team visited this ditch with the NRCS and the property caretaker on September 27th. The caretaker maintains the ditch to irrigate pastures and it is under special use permit with the Forest. The ditch is below steeply sloping areas that burned with moderate severity. Ash and sediment are likely to enter the ditch from wind erosion and storm events.

The ditch captures flows from Clark Canyon Creek which can help mitigate flood flows, ash and sediment from entering the Owens river. Currently the ditch is compromised at this location, increasing the potential for flood flows to enter the Owens River. The caretaker said he would fix the ditch and allow it to capture flood flows. The ditch is likely to fill with sediment for an unknown distance. The ditch will likely require increased maintenance for several years.There is a **high** risk to the ditch filling with sediment and needing maintenance.

Los Angeles Department of Water and Power weir structure

The LADWP weir structure on the Owens River below East Portal (where Mono Basin water enters the Owens River through a tunel) is at risk from increased ash and sediment. The weir is directly below the point where the almost entirely burned Clark Canyon watershed enters the river. Ash and sediment are likely to settle out at the weir, which will require extra maintenance. The BAER team calculated a 101 times increase in sediment at this location for a 5 – year storm event. There is a **high** risk that the entrance to the weir will experience increased sediment and require additional maintenance.

Threats to Natural and Cultural Resources

Off Highway Vehicles (OHV's) are a threat to natural recovery because they can cause invasion of noxious weed spreading into the fire area, and reduction in soil productivity from off-road incursion. Approximately nine (9) unauthorized routes were previoulsy blocked and disguised within the fire area. Approximatley nine (9) barriers burned, along with some of the horizontal and veritcal mulching that was placed to disguise these unauthorized routes. Many of these routes were recoverying with native vegetation re-colonizing on the old road bed, and are much more exposed post-fire.

OHV's can cause erosion, compaction and alter hydrologic function which precludes or reduces

vegetation re-establishment after a fire. OHV's can act as a vector for invasive species introduction when seeds are attached to tires and deposited on bare ground.

Vegetative recovery and soil productivity are at risk from OHV incursion along the the Forest system roads, especially where natural vegetative barriers burned. Suppression operations created dozer lines and pull offs off-road, creating highly visible areas of disturbance, including dozer lines on the flank of and coming off of Bald Mountain. These areas are currently being repaired as part of suppression repair. However, the disturbance will be highly visible for several years even after repair.

Emergency Determination:

Probability of damage or loss: Likely

Magnitude of Consequences: Moderate

Risk Level: High

Greater Sage-Grouse: (*Centrocercus urophasianus*): The eastern half of the fire consumed approximately 3550 acres of suitable sage-grouse habitat. The habitat was likely of marginal to medium quality due to several previous wildfires, dense/decadent brush and the presence of cheatgrass. The lack of concentrated grouse use, as evidenced by earlier telemetry studies tends to confirm this assumption. Approximately 31 miles of dozer and hand line were constructed within potentially suitable habitat. The fire burned at moderate/high intensity in the area, removing virtually all surface vegetation.

The USFWS proposed to list the Bi-State Distinct Population Segment (DPS) of sage-grouse as a threatened species in October, 2013. After thorough review, the USFWS determined that the DPS was not as imperiled as previously thought and that on-going conservation measures and commitments precluded the need for additional protection under the Endangered Species Act. Sage-grouse are currently a Forest Service sensitive species.

Emergency Determination:

Probability of damage or loss: Likely

Magnitude of Consequences: Moderate

Risk Level: High

Ecosystem Stability and Vegetation Recovery

Invasive weeds:

The Owens River Fire lacks comprehensive botanical survey data. Although 84 acres have been surveyed within the fire footprint since 2000, this accounts for less than 2% of the total area impacted

by the fire. Surveys were completed in 2000, 2005, 2008, 2009, 2011, and 2016. Three of the surveys were completed for travel management and follow roads located within the fire footprint. Road surveys are valuable for weed inventory since roads serve as weed vectors.

Weeds with known occurrences within the Owens River Fire are *Bromus tectorum* (cheatgrass) and *Salsola tragus* (Russian thistle). These occurrences are located along roads and on south-facing aspects in sagebrush scrub. Weeds are not known to occur along the Owens River Road from observations made during June, July, and September, 2016, by resources and botany staff. However, these were not formal surveys, and as the Owens River Road bisects Sage-Grouse habitat this remains an area of weed concern.

The fire burned primarily in Jeffrey pine (49.9%) and sagebrush/antelope bitterbrush scrub (48.9%). The remaining 1.2% consists of wet meadow, dry meadow, and aspen. Sagebrush is more susceptible to weed invasion than is Jeffrey pine. In general, lower elevation areas, areas with higher fire severity, and south-facing aspects are more vulnerable to invasion by nonnative plants. Elevations burned in the Owens River Fire range from 7000 feet in Long Valley to 9000 feet on Bald Mountain. 116 acres (2.6%) were mapped as high fire severity and 3101 acres (68.1%) as moderate fire severity.

The Owens River Road, a major east-west corridor for recreationists and locals, bisects the Owens River Fire. Many smaller Forest Service roads are located within the fire footprint, primarily within Jeffrey pine. Big Springs Road served as the fire line on the west side of the fire. This road receives use from recreationists accessing areas west and north of the fire. Big Springs Campground is located just west of the fire at the intersection of Big Springs and Owens River roads. Clark Canyon, a popular climbing area, is reached by Forest Service roads crossing the fire. Due to frequency of use, all are possible weed vectors.

Approximately 15.2 miles of dozer line was constructed and should be surveyed for weed infestations after germination next spring. While a weed washing station was available, it is possible that equipment used during initial attack may not have been cleaned, or that weeds located within the fire perimeter could have been spread during fire suppression activities. 1.4 miles of hand line should also be surveyed.

The south facing slopes of the adjacent 2001 McLaughlin Fire have undergone type conversion to a cheatgrass-dominated system. It is expected that the south aspects of Bald Mountain that burned during the Owens River Fire will undergo a similar conversion, especially as cheatgrass is already present on these hillsides.

Emergency Determination:

Probability of damage or loss: Very Likely

Magnitude of Consequences: Moderate

Risk Level: Very High

No TES or sensitive plant species are found in the fire area therefore additional analysis or treatments are not needed.

Cultural Resources:

No threat to cultural resources exists due to the fire, though some artifacts are more exposed throughout the fire area and post-fire erosion . Potential impacts to cultural resources will be evaluated during project implementation.

B. Emergency Treatment Objectives:

Threats to Life and Property

Protect route infrastructure by minimizing erosion of the road surface, provide for water control and reducing potential for roads to capture flows during runoff.

Threats to Critical Natural and Cultural Resources

Prevent OHV incursions from damaging critical values along Forest Roads and provide for native vegetative recovery.

Threats to Ecosystem Stability

Determine if new invasive species have been introduced due to suppression activities

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

Land **80** % Channel __ % Roads/Trails **80** % Protection/Safety **85** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	80	80	90
Channel			
Roads/Trails	80	90	95
Protection/Safety	85	95	100

E. Cost of No-Action (Including Loss): **$See VAR spreadsheet costs are justified**
F. Cost of Selected Alternative (Including Loss): $

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Todd Ellsworth

Email: tellsworth@fs.fed.us Phone: 760-937-2033

H. **Treatment Narrative:**

Land Treatments:

Invasive weed early detection and rapid response: At minimum, survey 15.2 miles of dozer line, 1.4 miles of hand line, 4 drop points, and approximately 13 miles of public roads including the following: Clark Canyon climbing area access roads (~3 miles), Owens River Valley road (~2 miles), Big Springs Road (~ 4 miles), public portions of Forest Service Road 2S32 (~0.5 mile), and all roads located within areas seeded and planted as part of the Owens River Fire Repair Plan in Sage-Grouse habitat in Long Valley (~3.5 miles).

Small infestations will be eradicated by hand pulling and disposing of plants in garbage bags taken off site. It may not be possible to reverse the long-term trend in cheatgrass expansion where it is already present in high densities unless new treatment options are discovered. Dense infestations of Russian thistle may be impossible to control without herbicide or other methods beyond hand pulling. A Forest-wide Weed EA is currently under development which would allow a broader range of treatment activities, including herbicide methods.

Weed Surveys and Rapid Response Costs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-11 botanist	Days	$355	8	$2840
1 GS-7 weed technician	Days	$196	8	$1568
Supplies	Each	$500	1	$500
Vehicle gas mileage	Miles	$0.50	880	$440
Total Cost				**$5348**

Placement of fiber rolls

The BAER team expects ash and sediment to reach the Owens river above the private Alpers and Arcularias ranchs. There are several locations that the private land owner is going to place straw wattles and other erosion control measures on private land to retard erosion. The land owner is going to buy wattles for the Forest Service to install above their ranches. Funding request is for labor only.

Fiber-Roll placement				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-5 Tech (3)	Days	$525	4	$2100
1 GS-9 Hydro. Tech	Days	$316	2	$632
Vehicle gas mileage	Miles	$0.50	300	$150
Total Cost				**$2,882**

Channel Treatments:

N/A

Roads and Trail Treatments:

Storm Proofing: Improve drainage on approximately 4.8 miles of level two roads by installing rolling dips, enhancing existing drainage features and removing the outside berm in several locations. The Forest also proposes to improve an ephemeral stream/road crossing where the risk of diversion down the road is high. The Forest will likely use a small backhoe already on the Forest to complete this work. Forest watershed specialists will work in conjunction with Heritage Resources during project layout to ensure heritage resources are protected.

Roads	Risk	Treatment	Cost
1S47, 1S47E, H, J; 2S06,2S06A, 2S35, 2S77, 2S148, A, B,; 2S176	High	Restore drainage function, remove outside berm in critical areas,	$4,600 (includes watershed layout)
Total Cost			**$4,600**

Note: The Forest Hydrology intern will assist in final layout and design and assist the backhoe operator during implementation. This position is already paid for.

Culvert cleaning and maintenance: Approxmately 9 culverts need cleanign and maintenance to ensure passage of expected sediment and debris during storm events.

Roads	Risk	Treatment	Cost
1S47 A, B; 2S06, A, B;	High	Restore culvert	$5,000 (includes

2S35		function by cleaning out and maintenance .	watershed layout and fire crew to clean out plugged culverts)
Total Cost			**$5,000**

Unauthorized Road disguising and block replacement: Replace blocks (9) and reapply mulch to disguise approximately eight (9) unauthorized roads. Strategic placement of carsonsite closed area signs will help keep motorized traffic on system routes.

Unauthorized road disguising, barriers and Carsonite signs				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-7 recreation. Tech	Days	$270	5	$1,350
1 GS-5 Recreation Tech	Days	$160	5	$800
Carsonsite closed area signs	Each	$30	6	$180
Barriers	Each	$100	9	$900
Vehicle gas mileage	Miles	$0.50	200	$100
Total Cost				**$3,330**

Protection/Safety Treatments:

OHV patrol: OHV incursion on unauthorized roads and along systems will be reduced by providing for increased OHV patrol in this area, especially on high use weekends this fall before the snow closes areas and next summer. The areas of flat,burned sagebrush are especially vulnerable to OHV incursion. Contacts with the public will emphasize the need to stay on existing roads and motorized trails to facilitate fire recovery. Strategic placement of carsonsite closed area signs will help keep motorized traffic on system routes.

OHV Patrol				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-5 OHV Tech	Days	$150	10	$1,500
1 GS-9 OHV Tech	Days	$285	2	$530
Vehicle gas mileage	Miles	$0.50	300	$150
Total Cost				**$2,180**

Hazard fencing and signage at old dump

Place a small fence around an exposed old dump site. There is a potential for visitors to explore the site and fall into the burned dump site. A fence approximately 30x30 ft needs to be placed to discourage visitors from entering the site. Several signs will also be placed around the site.

Dump Fence and Signage notification				
Item	**Unit**	**Unit Cost**	**# of Units**	**Cost**
1 GS-05 Tech	Days	$150	2	$300
1 GS-09 Hydro. Tech	Days	$316	2	$855
Materials	each	$500	1	$600
Vehicle gas mileage	miles	$.5	100	$50
Total Cost				**$1805**

I. **Monitoring Narrative:**

Forest personnel will conduct a Level 1 Effectiveness monitoring of the road treatments to check that treatments are present and functioning properly. The purpose is to ensure the action is meeting site-specific objectives or if there is a need for follow-up or re-treatment. Monitoring will be conducted after storm events. The report would include photographs and a recommendation on whether additional treatments are necessary. If the monitoring shows the treatment to be ineffective at stabilizing the road and there is extensive loss of road bed or infrastructure an interim report will be submitted. A several page monitoring report would be completed after the site visit.

PART VII - APPROVALS

1. Forest Supervisor (signature) — Date 10/4/16

2. for Regional Forester (signature) — Date 10/7/16

Part VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands			Other Lands				All
Line Items	Units	Unit Cost	# of Units	BAER $	Other $	# of units	Fed $	# of Units	Non Fed $	Total $
A. Land Treatments										
Weed detection	days	668	8	$5,344	$0		$0		$0	$5,344
Fiber Rolls	days	720	4	$2,880	$0		$0		$0	$2,880
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$8,224	$0		$0		$0	$8,224
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 proofing roads	Mi	958	4.8	$4,598	$0		$0		$0	$4,598
Disguising roads	each	366	9	$3,294	$0		$0		$0	$3,294
CleaningCulverts	each	625	8	$5,000	$0		$0		$0	$5,000
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$12,892	$0		$0		$0	$12,892
D. Protection/Safety										
OHV Patrol	day	218	10	$2,180	$0		$0		$0	$2,180
Dump Fence	day	902	2	$1,804	$0		$0		$0	$1,804
				$0	$0		$0		$0	$0
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$3,984	$0		$0		$0	$3,984
E. BAER Evaluation										
BAER Team	ea	10000	1	$10,000			$0		$0	$0
BAER implementation/coordination	day	450	4	$1,800						$800
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				$800	$0		$0		$0	$800
F. Monitoring										
Road	day	400	3	$1,200	$0		$0		$0	$1,200
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$1,200	$0		$0		$0	$1,200
G. Totals				$27,100	$0		$0		$0	$27,100
Previously approved										
Total for this request				$27,100						