Category B Legacy Site Inventory For the Westside Fire Recovery Project, Klamath National Forest

June 24, 2015

All system roads and most non-system roads in the project area were surveyed between 1999 and 2010 in the Klamath National Forest Road Sediment Source Inventory (USFS, 2012). Legacy sediment sites were defined as meeting all of the following conditions:

a. Is discharging or has the potential to discharge sediment to waters of the state in violation of applicable water quality requirements;
b. Was caused or affected by human activity; and
c. May feasibly and reasonably respond to prevention and minimization management activities.

A total of 423 legacy sites were identified in the project area. Of these, 125 sites are located at stream crossings with undersized culverts not capable of passing the 100-year flow. Stream diversion potential was also found at 125 crossings. Another 135 sites have both undersized culverts and stream diversion potential. There are 38 "big cost" stream crossings that have the highest risk ratings, large fills, and the biggest cost to repair. In addition, 175 legacy sites are being treated as part of the Burned Area Emergency Response (BAER). Most of the BAER treatments are road drainage dips with only a few culvert upgrades. A summary of the road inventory sites by watershed is shown in Table 1 and a more detailed inventory for Elk Creek in Tables 2 and 3. Maps of inventoried sites and BAER treatments are attached. Legacy sediment site inventories have not been completed for non-road sediment sources such as abandoned mines, historic hydraulic mining, past harvest units, or dredge tailings. The exception is Elk Creek where both a road and non-road inventory was completed as part of the watershed restoration plan. In some watersheds these non-road legacy sediment sites could be a substantial source of additional stream sediment and reduced stream shade.

Table 1. Road-related legacy sites in the Westside Fire Recovery Project area by 6th field watershed. Data from the KNF road sediment source inventory (USFS, 2012). Legacy sites in Whites Gulch and Elk Creek include some sites outside of the project boundary.

HUC	6th Field HUC Watershed Name	TMDL	Legacy sites still needing repairs	Sites repaired by BAER	Sites to be Repaired in Elk and Whites Restoration Plans
180102060904	Dutch Creek-Beaver Creek	Klamath River	31	7	0
180102061004	Horse Creek	Klamath River	1	3	0
180102060902	Hungry Creek-Beaver Creek	Klamath River	5	0	0
180102061005	Kohl Creek-Klamath River	Klamath River	8	3	0
180102061002	Little Humbug Creek-Klamath River	Klamath River	8	0	0
180102061003	McKinney Creek-Klamath River	Klamath River	18	0	0
180102060903	West Fork Beaver Creek	Klamath River	3	0	0
180102061103	Bittenbender Creek-Klamath River	Klamath River	56	11	0
180102090203	China Creek-Klamath River	Klamath River	46	13	0
180102090302	East Fork Elk Creek	Klamath River	45	11	65
180102061101	Grider Creek	Klamath River	28	25	0
180102090303	Lower Elk Creek	Klamath River	9	4	85
180102080604	Tompkins Creek-Scott River	Scott River	70	16	0
180102080606	Scott Bar-Scott River	Scott River	4	6	0
180102100103	East Fork South Fork Salmon River	Salmon River	4	1	0
180102100204	North Russian Creek	Salmon River	3	0	0
180102100203	South Russian Creek	Salmon River	11	26	0
180102100207	Whites Gulch-N.F. Salmon River	Salmon River	69	49	203
180102100205	Yellow Dog Creek-N.F. Salmon River	Salmon River	4	0	0
		Total	423	175	353

Table 2. Road-related legacy sites in Elk Creek. Data from detailed inventory in the draft Elk Creek Watershed Restoration Plan.		
Site ID (Road#-milepost)	Proposed Treatment	Site Description
15N01-0.28	diversion prevention + culvert upgrade	Culvert inlet damaged and crimped half closed; armored rolling dip was recently installed down road of site
15N01-1.45	repair/maintain existing infrastructure	Inlet buried
15N01-4.23	culvert upgrade	
15N01-4.32	culvert upgrade	
15N01-4.50	culvert upgrade	
15N01-4.70	diversion prevention	
15N01-4.89	culvert upgrade	
15N01-5.35	diversion prevention + culvert upgrade	inlet becoming obstructed; very large fill
15N02-0.49	diversion prevention + culvert upgrade	Plugged Inlet
15N02-1.03	Aquatic organism passage culvert	Possible aquatic passage barrier at high and low flow; channel 1.5X wider than culvert
15N02-1.13	diversion prevention	
15N02-1.46	repair/maintain existing infrastructure	needs riprap added to outlet
15N02-1.94	diversion prevention	This site is a cross drain not a channel with new dip less than 100' down road; broken downspout with large gully on fillslope
15N02-2.12	diversion prevention	This site is a cross drain not a channel with new dip less than 100' down road; culvert has a hole in culvert before drop inlet that conveys water; culvert is all aligned at an acute angle relative to ditch
15N02-2.50	retaining wall	Metal end section; narrow road with raw cut and fill slopes with evidence of sidcast directly into channel from cutslope slumps
15N02-2.94	culvert upgrade	Rustline 1/3 culvert diameter
15N02A-0.24	retaining wall	fill slope failure removed 1/4 of fill; road still passible; slide stabilizing
15N02A-0.64	retaining wall	cutslope slumps/earthflow deforms road bed for about 50'+; reconstruction is possible
15N05-1.17	diversion prevention	
15N06-5.26	diversion prevention	
15N06-5.37	culvert upgrade	
15N06-5.58	diversion prevention	
15N09-0.09	diversion prevention	Site has diversion potential; culvert more of a cross drain than a channel; very little flow
15N09-0.17	diversion prevention + culvert upgrade	Site does not get much flow; fill volume is relatively large
15N09-0.30	repair/maintain existing infrastructure	Cutslope slumps does not cause major impedment to road
15N09-0.45	diversion prevention + culvert upgrade	Site does not get much flow
15N10-0.02	diversion prevention	
15N10-0.15	diversion prevention	
15N37-0.03	diversion prevention	gully in road surface for approx. 200' of road
15N37-0.21	diversion prevention	shot gun outlet; road runoff does not drain into culvert due to lack of inboard ditch maintenance
15N43-0.82	culvert upgrade	
15N44-0.10	retaining wall	road prism/shoulder slump approx. 30-50' long is stabilizing
15N44-0.35	retaining wall	road prism/shoulder slump approx. 30-50' long is stabilizing

Table 2. continued		
15N44A-0.16	retaining wall	section of road with several road prism/shoulder slump approx. 100' long with 30' long cutslope failure in one location; road is stabilizing
15N53-0.05	diversion prevention	Not much of a channel; could use a dip if re-opened
15N75-0.98	diversion prevention + culvert upgrade	
15N75-1.30	diversion prevention	
15N75-1.36	diversion prevention + culvert upgrade	
15N75-1.67	diversion prevention + culvert upgrade	
15N75-1.75	Fill removal/reduction	
15N75-1.79	Fill removal/reduction	
15N75-1.93	diversion prevention + culvert upgrade	
15N75-2.11	diversion prevention	
15N75-2.30	diversion prevention	
15N75-2.45	Fill removal/reduction	
15N75-4.21	culvert upgrade	
15N75A-0.11	diversion prevention	
15N75A-0.14	retaining wall	
15N75A-0.63	Fill removal/reduction	
15N75A-0.75	Fill removal/reduction	
15N75A-0.81	Fill removal/reduction	
15N75A-1.20	Fill removal/reduction	
15N75A-1.40	culvert upgrade	
15N75A-1.42	culvert upgrade	
15N75A-1.62	culvert upgrade	
15N75A-1.64	Fill removal/reduction	
16N04-1.86	culvert upgrade	Culvert has high rustline and plugging
16N04-2.07	diversion prevention + culvert upgrade	Culvert has high rustline and plugging; add dip if possible; road has steep grade with long collection potential
16N04-2.18	diversion prevention	Long collection potential for such a steep grade
16N05-10.21	culvert upgrade	
16N05-10.35	diversion prevention	
16N05-10.64	culvert upgrade	
16N05-10.71	diversion prevention	
16N05-6.32	diversion prevention + culvert upgrade	
16N05-6.49	diversion prevention + culvert upgrade	
16N05-6.67	diversion prevention	
16N05-6.74	Fill removal/reduction	
16N05-6.88	Aquatic organism passage culvert	
16N05-6.94	Aquatic organism passage culvert	
16N05-7.42	Fill removal/reduction	
16N05-7.79	culvert upgrade	
16N05-8.13	Fill removal/reduction	
16N05-8.23	diversion prevention	
16N05-8.25	diversion prevention	
16N05-8.42	diversion prevention	
16N05-8.54	diversion prevention + culvert upgrade	
16N05-8.92	diversion prevention	

Table 2. continued		
16N05-9.02	diversion prevention	
16N05-9.05	diversion prevention + culvert upgrade	
16N05-9.18	diversion prevention	
16N05-9.29	Fill removal/reduction	
16N05-9.33	Fill removal/reduction	
16N05-9.46	Aquatic organism passage culvert	
16N05-9.62	Fill removal/reduction	
16N28-0.70	culvert upgrade	rustline 1/3 relatively shallow fill; upgrade culvert
16N39-0.86	culvert upgrade	
16N39-1.95	diversion prevention	
16N39-2.08	diversion prevention	
16N39-2.31	culvert upgrade	
16N39A-0.45	culvert upgrade	
16N39A-0.62	culvert upgrade	
16N41.1-0.13	diversion prevention + culvert upgrade	stream crossing failed with raw perched fills; west approach has steep raw fills perched for 50'
16N41.1-0.32	diversion prevention + culvert upgrade	stream crossing failed; site relatively stable with little to no fill remaining
16N41-0.47	diversion prevention + culvert upgrade	stream crossing has failed; 1/4 of fill remains with raws slopes; about 50' past crossing roadbed has steep raws fill slopes perched above channel
16N41-0.69	diversion prevention + culvert upgrade	stream crossing overtops due to no culvert; most of fill remains with some erosion on fill slopes; volume estimate seems low
16N41-0.86	diversion prevention + culvert upgrade	stream crossing failed with raw perched fill on both approaches
16N41-0.97	diversion prevention + culvert upgrade	stream crossing actively diverts during most runoff events; causes gully in road surface and fill slope at WIN site EFE007
16N41-1.20	diversion prevention + culvert upgrade	stream crossing overtops most of fill remains with about 1/4 of fill slope failed
16N41-1.25	diversion prevention + culvert upgrade	stream crossing with large fill (seems under estimated) overtops causing fill slope erosion
16N41-1.42	diversion prevention + culvert upgrade	stream crossing overtops due to no culvert; most of fill remians with some erosion on fill slopes
16N41-1.55	retaining wall	fill slope failure about half of fill remains; raw slopes
16N41-1.56	retaining wall	fill slope failure about half of fill remains; raw slopes
16N41-1.62	diversion prevention + culvert upgrade	stream crossing failed; with raws slopes; sites has much fill wasting in channel and SMZ; road contiunes directly up channel with road fill perched adjacent to channel for 100'
16N41-1.63	diversion prevention + culvert upgrade	stream crossing failed with raw perched fill on both approaches
16N41-1.75	diversion prevention + culvert upgrade	Channel crossing with out culvert likely log stringer; based on other sites this has potential to fail during future event
16N41-1.93	retaining wall	Roadbed slump has removed a portion of the fill down hill side
16N41-2.08	diversion prevention + culvert upgrade	Stream crossing partially blown out with small amount of fill and a culvert needed to reconstruct
16N41-2.16	diversion prevention + culvert upgrade	Stream crossing partially blown out with small amount of fill and a culvert needed to reconstruct
16N41-2.21	diversion prevention + culvert upgrade	Stream crossing is completely blow away with large amount of fill missing; expensive to reconstruct site
45N19-0.02	diversion prevention	
45N19-0.96	repair/maintain existing infrastructure	Inlet damaged
45N19-1.04	culvert upgrade	rustline 1/3 with large fill
45N19-1.31	culvert upgrade	Large 15' outlet drop; low gradient upstream
45N19-1.84	culvert upgrade	Culvert inlet has riser - likely BAER treatment from East fire; diversion potential

Table 2. continued		
45N19-1.92	diversion prevention + culvert upgrade	Highly undersized; needs new culvert and dip
45N19-2.46	culvert upgrade	Dip has been installed no more diversion potential; culvert highly undersized
45N19-4.88	repair/maintain existing infrastructure	Shot gun outlet; damaged inlet; shorten outlet and add rip-rap
45N19-4.95	culvert upgrade	Channel appears to bypass channel at high flow; very large fill
45N19-5.06	repair/maintain existing infrastructure	shotgun outlet
45N19-6.59	repair/maintain existing infrastructure	diversion prevention dip has been installed; shotgun culvert remains
45N19-7.10	culvert upgrade	diversion prevention dip has been installed; culvert is grossly undersized
45N19-7.71	culvert upgrade	diversion prevention dip has been installed; culvert is grossly undersized
45N19-7.73	diversion prevention + culvert upgrade	
45N19-8.09	repair/maintain existing infrastructure	shotgun culvert
45N19-8.42	repair/maintain existing infrastructure	shotgun culvert
45N31Y-0.78	repair/maintain existing infrastructure	GPS location missmapped, mile post appears accurate; Culvert inlet 1/2 plugged
45N31Y-0.79	repair/maintain existing infrastructure	GPS location missmapped, mile post appears accurate; culvert inlet completely buried causing water to pond in ditch
45N31Y-0.96	diversion prevention	GPS location missmapped, mile post appears accurate; large fill vol. yet culvert does not see much if any flow
45N85-0.91	diversion prevention	Slight diversion potential
45N86X-0.52	culvert upgrade	Culvert has a crimped inlet; not at grade; outer edge of roadbed has eroded away due to overtopping
45N86X-1.68	diversion prevention + culvert upgrade	log stringer crossing has about half of fill failed with large sediment wedge/debris flow deposit upstream; amount of sediment far exceeds volume extimate; channel has armoring but future headcutting into sediment deposits is possible
45N99-0.90	repair/maintain existing infrastructure	needs armoring on crossing
45N99-1.40	repair/maintain existing infrastructure	needs armoring on crossing

Table 3. Non-road legacy sites in Elk Creek and road sites that were missed in the road inventory. Data from detailed inventory in the draft Elk Creek Watershed Restoration Plan.

SiteID	Type	Trend	Future Impacts Probability	Access	Cubic Yards	Cost Range	Comments	Treatment
EFE001	Landslide, Gully	remaining uniform	chronic	good	10-1000	5000-100000	Historic landslide with debris flow scar on hillslope approx. 1000 vertical ft. upslope has created gully/channel that conveys water; Full bench skid trail/roadbed above cutslope of 15N02 has fill remaining with raw slopes; inboard ditch on 15N02 routes sediment from this site directly into perennial stream less than 100 feet away; Treatment would remove excess fill and and armor cutslope; possible add dip or culvert at site and disconnect inboard ditch	fill removal
EFE002	landslide	remaining uniform	moderate	fair	10-1000	5000-10000	Road perched above channel with undercut fillslope failing into stream; 2/3 of fill remaining	retaining wall
EFE003	landslide	remaining uniform	moderate	fair	10-1000	5000-10000	road prism shoulder slumps into SMZ	retaining wall
EFE004	landslide	remaining uniform	moderate	fair	10-1000	5000-10000	road prism shoulder failed into channel	retaining wall
EFE005	landslide	remaining uniform	moderate	fair	>1000	5000-10000	cutslope failure and fillslope failures into SMZ and channel	retaining wall
EFE006	landslide	remaining uniform	moderate	fair to poor	>1000	5000-10000	long section of road has road shoulder slumps and cracks perched directly above stream - possibly due to stream diversion	retaining wall
EFE007	landslide	worsening	chronic	fair to poor	10-1000	<5000	Gully in road and fill slope from active stream diversion at RSSI site 16N41-097	rolling dip
EFE008	landing and sidecast	remaining uniform	moderate	good	>1000	5000-100000	Landing constructed above 45N31Y; fill slope cut to steep angle when road 45N31Y was re-opened after use; fill material was sidcasted over hillside with raws slopes and signs of past failures that likely delivered to channels below; raw oversteepened slopes remain above 45N31Y	fill removal
EFE009	landslide	worsening	moderate	good	10-1000	<5000	cutslopes above road are eroding/failing onto roadbed; in some locations runoff/failures have rmoved portion of road shoulder; material would need to be removed to re-open road; sediment delivery from this site is minor, but a mass failure could deliver	fill removal
EFE010	landslide	remaining uniform	moderate	good	10-1000	<5000	small fill slope slump on shoulder	fill removal
EFE011	stream channel	remaining uniform	moderate	good	10-1000	5000-100000	drafting site access road travels upstream adjacent to channel to access water hole in stream; Should outlet channel plug, stream would divert down access road but eventualy re-enter channel; fill material from access road would be eroded into stream during a diversion	fill removal
EFE012	gully	worsening	chronic	good/fair	10-1000	<5000	road captures surface runoff causing gully erosion in roadbed; waterbars further down road reducing further gully development, but are beginning to fail	rolling dip
EFE013	crossdrain	remaining uniform	chronic	good	<10	<5000	shot gun cross-drain culvert not in RSSI; evidence of fill failure and scour downstream; shorten culvert outlet and amor fill slope	maintenance
EFE014	stream channel	remaining uniform	chronic	good	<10	<5000	ephemeral stream crosses road without culvert at rolling dip some fill slope erosion occuring adjacent to riprap; add additional riprap on fill slope and coarser	maintenance

							roadbed material at dip	
EFE015	crossdrain	remaining uniform	chronic	good	<10	<5000	crossdrain culvert with shotgun outlet and erosion downslope; shorten outlet and add riprap at outlet	maintenance
EFE016	stream channel	remaining uniform	moderate	good	10-1000	5000-10000	18" culvert in steep headwall swale with long contributing ditch; large fill volume; diversion potential down inboard ditch	rolling dip