



**USDA Forest Service Watershed Condition Framework
FY2011 TRANSITION WATERSHED RESTORATION ACTION PLAN
Orleans Ranger District**

1. Summary

- a. **Watershed Name and HUC:** Bluff Creek. 6th Field HUC - 180102090804.

General Location: Located on the western boundary of the Orleans Ranger District, Bluff Creek is a tributary to the Klamath River. The mouth of Bluff creek is just a few miles upstream from the town of Weitchpec and approximately 10 miles downstream from the town of Orleans.

Total Watershed Area: 47,430 acres **NFS area within watershed:** 98%.

- b. **Watershed Characterization:**

General Physiography: The landscape of the Bluff Creek watershed is typical of the Klamath Mountains Province, with deep canyons, steep slopes, relatively high energy streams, and widespread mass-wasting. The stream network is primarily dendritic (branching). Extensive deep-seated landslide deposits overlie approximately 30% of the analysis area. Much of the steeper terrane has been formed by shallow landsliding in the inner gorges of canyons over thousands of years. Mass wasting, mostly debris slides, appears to be most active within Galice metasediments, South Fork Mountain schist, and serpentinite. The mouth of Bluff Creek was the site of dramatic geomorphic change during the 1964 flood. These changes included the complete relocation of the mouth of Bluff Creek and extensive channel and valley wall erosion that continues to impact the watershed today.

- **Land Use:** Bluff Creek is as a designated key watershed and late-successional reserve (LSR 304). Management objectives are to protect and enhance conditions of late-successional and old-growth forest ecosystems and recovering/maintaining habitat for at-risk stocks of anadromous salmonids and resident fish species through watershed restoration activities.
- **General Overview of Concerns:** The key concerns influencing long-term watershed health in the Bluff Creek watershed are channel shape and function as a result of mass wasting and loss of instream LWD in the main channel. Proliferation of the POC root diseases threatens the recovery of channel stability, instream LWD recruitment and critical riparian shade. Fire condition class, historic logging practices, exotic/invasive species, terrestrial invasive species and their rate of spread are a lesser but important risk to watershed health. The Klamath River (from the Oregon Border to the mouth) is a listed by the Regional Water Quality Control Board as water quality impaired (temperature, nutrients and DO). Due to the “tributary rule”, Bluff Creek is included on the TMDL list despite having excellent water quality. The list below briefly describes watershed concerns that we *have* the ability to affect.
 - * Road Density – Complete road decommissioning work (16 miles);
 - *Mass Wasting – Additional road stormproofing would limit/minimize potential for road-related mass wasting. 63% of mass wasting in Bluff Creek is attributed to natural processes and not management related.
 - *Instream LWD/Channel Shape and Function – Increase protection of streamside POC and other large diameter conifers.
 - *Aquatic Exotic or Invasive Species (POC root disease) - Increase public awareness. Improve travel way conditions to slow the spread of the disease (diversion dips, asphalt patching and paving, and road-side sanitation). Install additional seasonal closure gates. Schedule annual/bi-annual detection surveys.
 - * Fire Condition Class – Re-introduce regular maintenance fires on the landscape where feasible.

- * Historic Logging Practices – Promote overall stand health and vigor through thinning overstocked plantations.
- * Terrestrial invasive species (noxious weeds) – Complete road decommissioning work to minimize potential for spread. Maintain clean areas by conduction regular surveys. Treat isolated populations. Increase educations of employees, public visitors and Contractors/Cooperators.

Important Ecological Values: The mouth of Bluff Creek is designated as a Geologic Special Interest Area (SIA). Bluff Creek received this designation because it was the site of dramatic geomorphic change during the 1964 flood. These changes included the complete relocation of the mouth of Bluff Creek and extensive channel and valley wall erosion that continues to impact the watershed today.

Bluff Creek contains one of the largest remaining stands of Port Orford cedar (POC) in California. POC is a significant riparian component and is also found on dryer upslope positions. The POC root fungus *Phytophthora lateralis* has been detected in the vicinity of Fish Lake, Blue Lake, Serpentine Creek and most recently in the vicinity of Louse Camp.

Bluff Creek provides critical thermal refugia for migrating juvenile and adult salmonids. Stream temperatures at the mouth of Bluff creek are typically 8-10° F lower during the summer months than in the mainstem Klamath. Bluff Creek provides about 19 miles of anadromous fish bearing streams supporting fall chinook salmon, winter coho salmon, steelhead trout, and resident trout.

- **Current Condition Class:** Functioning at Risk.
- **Target Condition Class:** Functioning Properly.

e. Key Watershed Issues

1) Attributes/Indicators within FS control to affect

ATTRIBUTES /INDICATOR	REASON FOR RATING
4.3 Exotic or invasive species.	Port Orford cedar root disease is present in 2 subwatersheds (Upper and Lower Bluff). Infection site in Upper Bluff is just about at the most northern end of the range of POC in this watershed. Loss of POC threatens long-term channel function, stability and critical riparian shade.
3.2 LWD	Lacking in LWD in some areas associated with logging activities prior to establishment of Riparian Reserves. Manage plantations to promote development of late seral stage characteristics. Loss of POC threatens long-term LWD recruitment.
3.3 Channel Shape and Function	Bluff creek is still recovering from 1955 and 1964 floods. Many inner gorge landslides continue to impact fish habitat.
4.3 Aquatic Exotic/Invasive Sp.	Non native fish species in Fish Lake.

6.1 Open Road Density	Currently rated impaired. Implementation of remaining road deco work will reduce rating to Fair (1-2.4mi/mi2).
6.4 Mass Wasting	Most roads are located on landforms susceptible to mass wasting. Road-related failures can be minimized through stormproofing.
8.1 Fire Condition Class	Fire condition class is 3 (impaired) due to decades of fire suppression. Probability of stand replacing fire is low-moderate.
11.1 Terrestrial Invasive Species and Rate of Spread	Rating due to high road density in watershed. Roads are the primary vector for weeds. Complete road decommissioning work and treat know infestation sites and keep up on maintenance to achieve a good (1) functioning properly.

2) Attributes/Indicators that require other parties to address

ATTRIBUTES /INDICATOR	REASON FOR RATING
Impaired Waters	Klamath River TMDL (2010)

2. Watershed Characteristics and Conditions

a. General Context/Overview of the Watershed

The climate in Bluff Creek is influenced by the ridge which comprises the western boundary of the watershed. This ridgeline blocks fog and cool, moist ocean conditions and forms the dividing line between coastal and interior climates. Summer temperatures average in the 80's, temperatures often are over 100°F. Winter temperatures average 20-40 °F. Snow accumulates above 3000'. Storm fronts occur primarily between October and May. The drainage receives a mean annual precipitation of 97 inches. Mean discharge is estimated at 388 cfs and mean annual peak flow is 4,480 cfs. The mainstem of Bluff Creek is approximately 25 miles in length. Major tributaries include; North and East Forks Bluff Creek, Notice Creek, Deer Lick Creek, Dans Creek, Fish Creek, BigFoot Creek , Bee Creek, Serpentine Creek, Red Mountain Creek and Slide Creek. The topography of Bluff Creek is narrow and deeply entrenched. Mainstem stream gradient averages about 2% and the floodplain is relatively confined throughout the watershed. Much of the mainstem channel is categorized as low gradient riffle morphology. Prior to the 1964 flood Bluff Creek supported Chinook, Coho and Steelhead. A barrier at river mile .25 blocked upstream migration for Chinook and Coho salmon. The barrier was removed due to high flows in 1983, but it is suspected that these wild stocks have not fully recolonized the upper reaches of Bluff Creek. Bluff Creek provides cool water habitat for anadromous fish when the Klamath River reaches lethal stream temperatures during the summer months (rarely exceeds 68° F).

b. Watershed Conditions

The need for restoration in Bluff Creek is based upon fisheries habitat and riparian corridor conditions. Bluff Creek is still recovering from the 1964 flood event, which caused widespread landsliding that largely impacted fish habitat and streamside vegetation. Because much of the sediment delivered to Bluff Creek will take decades to return to pre-64 conditions, there is a need to protect/maintain the watershed from further

degradation where feasible. Road and stream crossing treatments, POC root disease prevention and strategic fuel manipulations/treatments are actions that we can take to maintain current conditions and promote watershed health.

Water Quality: Bluff Creek has excellent water quality and is considered temperature refugia for threatened and endangered fisheries migrating up the Klamath River during critical periods in the summer months. The Klamath TMDL stresses the need to implement activities to maintain and protect stream temperatures. Factors that have the potential to negatively influence stream temperature include loss of stream shade due to POC infection, mass wasting due to roads, and wildfires.

In-Channel Habitat: The quality of fish habitat has been compromised due to excessive fine sediment loading in pools, riffles and runs associated with historic mass wasting. Increased amounts of sediment have impacted both spawning and rearing habitats. Much of the habitat is described as low gradient riffles. Landslides, flood events, lack of large wood in the active channel and past land management practices have contributed to the low habitat diversity in Bluff Creek.

Riparian Conditions: Generally speaking, riparian conditions throughout the watershed are in good condition. However, riparian corridors along the mainstem channel are considered to be in a degraded state due to historic flood events. Mass wasting is the dominant erosional process and most active landslides occur along the inner gorges of Bluff Creek. These processes have had a negative impact on adjacent riparian areas and reduced the large conifer component of the riparian areas. Opportunities exist to restore the riparian diversity and accelerate better riparian stand structure in older plantations where historic logging activities. Port Orford cedar is an important overstory component in riparian corridors and the abundance and distribution of this species is threatened by the introduction of Port Orford cedar root disease.

Upland/hillslope: Most of the watershed is comprised of dense conifer stands of tan-oak series where Douglas-fir is the primary vegetation type. Fire Return Interval Departure (FRID) is considered to be strongly departed from historic range. Current condition is attributed to the elimination of cultural burning practices and an increase of aggressive fire suppression actions

3. Restoration Goals, Objectives, and Opportunities

a. Goal Identification and Desired Condition.

The desired condition for Bluff Creek watershed is to establish a basin that supports a healthy and diverse aquatic and riparian ecosystem that is resilient to large scale disturbance (i.e. wildfire and flood events). This desired condition will be achieved through implementation of the following goals:

- POC root disease rate of spread will be minimized.
- Potential for road-related failures will be reduced through decommissioning and stormproofing.
- Rate of spread of terrestrial invasive species will be controlled.
- Managed and natural stands will contain a distribution of forest age and structural classes that are more resilient to wildfire, thereby maintaining beneficial uses and good water quality throughout the watershed.

b. Objectives

- i. Alignment with National, Regional, or Forest Priorities — The Bluff Creek Watershed Restoration Action Plan is in line with the National and Regional priorities to maintain and restore healthy watersheds. The Bluff Creek Watershed Restoration Action Plan is also in alignment with the Northwest Forest Plan direction and Six Rivers LRMP relative to the need to maintain and improve fisheries habitat and water quality within Key Watersheds.

- ii. Alignment with State or local goals - Bluff Creek is on the EPA 303d listed of impaired watersheds (sediment and temperature). Sediment reductions from road treatments and upland treatments to reduce risks to riparian areas, shade, stream temperature and channel structure will help meet the goals of the TMDL.

c. Opportunities

- i. Partnership Involvement – Continue utilizing existing Partnerships (Karuk Tribe, Mid Klamath Watershed Center).

- ii. Outcomes/Output

- Performance Measure Accomplishment

Performance Measure and Accomplishment	Acres/Miles
S&W-RSRC -IMP	112 deco acres + 40 miles stormproofing (1 mi = 2 acres) = 80 acres. Total Acres – 192 Acres.
S&Water-RSRC - MTCE	3500 acres of treatments w/in RR.
For-Veg-Imp	11,831 acres + 51 POC acres = 11,882 acres.
FP-Fuels-All	11,831 acres
Geo-Hazards-MGD	1
HBT-ENH-STRM	5 miles
HBT-ENH-TERR	11,831 fuels acres + (16 mi. x 5) = 80 deco acres = 11,911 Total Acres.
INVPLT-NXWD-FED-AC	5 acres
RD-DECOM	16 Miles
RD-PC-MAINT	12.5 Miles
RD-HC-MAINT	27 Miles

- Socioeconomic Considerations: Road decommissioning projects employ 8-10 Karuk Tribal Members for approximately 5 months a year.

d. **Specific Project Activities (Essential Projects)**

a. **Essential Project #1 – Port Orford Cedar Root Disease Sanitation Evaluation**

- **Attribute/Indicator Addressed:** 4-3 Exotic and Invasive Species.

- **Project Descriptions:**

- **POC Treatment 1- Evaluate Road Segments**

- Inspecting POC Stands for POC Sanitation Treatment Effectiveness. This Treatment is really the evaluation of road segments and design ahead of the NEPA and implementation phases of roadside POC Sanitation treatments. There are 21 miles that require evaluation and design. Estimated time to complete this work includes creation of detailed road logs showing road drainage by position, the location of stream crossings, and detailed mapping of POC within specified distances of the road.

- Estimated Production Rate of the mapping effort: 1 mile per day. 21 days.

- 2 GS-9 Foresters @285/day = \$11,970

- Specialist Review Left Side Planning: Hydrology, Roads Engineer, Fisheries, logging systems. 5 days each @ 315/day= \$6,300.

- **Partners Involvement:** None
- **Timeline:** Starting in 2012 and continuing for 1 years
- **Estimated costs and associated Budget Line Item:** \$38,270. Pest Management.

- **Project Descriptions Continued**

- **POC Treatment 2- POC Roadside Sanitation Treatment**

- The sanitation treatment extends 50' below the road and 25' above the road. This equates to six acres treatment below the road and three acres above the road for each mile sanitized. Each stream crossing adds an additional 0.4 to 0.6 acres to the treatment, depending on the width of the actual stream channel. Sanitation treatment entails cutting target POC trees, removal of logs, handpiling slash, and burning handpiles. There will also be annual maintenance that will include baiting with POC seedlings and removal of any POC seeding in after treatment.

- Treatment costs will be highly variable depending on the size and quantity of POC that need to be removed, the size of the material being removed, and the difficulty of removal.

- Estimated costs;*

- Planning (EA) = \$200,000

- Tree Removal & Decking = \$400/acre * 9 acres = \$3,600/mile

- Cut & Handpile Slash= \$450/ acre * 9 acres = \$4,050 / mile

- Burn Piled Material = \$75/ acre * 9 acres = \$675/mile

- Total Treatment Costs = \$7,725 / mile. Total treatment on 21 miles could total \$162,225.

Annual monitoring and maintenance would be variable, consisting of staff time to walk and verify that no POC has seeded into the openings and occasional treatments with a crew to cut and remove any new POC seedlings into the treatment area.

- **Partners Involvement:** None at this time but local Indian Tribes and non profits may be interested in contributing funding.
- **Timeline:** Starting in 2012 and continuing for 3 years
- **Estimated costs and associated Budget Line Item:** \$363,000. Pest Management, Vegetation Improvement.

POC Treatment 3 - POC Sanitation Treatment at Infected Sites. This sanitation treatment is identified for three locations. Two at Fish Lake and one at the 12N10 infection site above Louse Camp. A total of 42 acres could be proposed for treatment. Planning Cost = \$200,000. Treatment costs are estimated as similar to the roadside sanitation. Estimate is \$925/acre. Total estimated cost is \$925/acre * 42 acres = \$38,000.

- **Partners Involvement:** None at this time but local Indian Tribes and non profits may be interested in contributing funding.
- **Timeline:** Starting in 2012 and continuing for 3 years
- **Estimated costs and associated Budget Line Item:** \$238,000. Pest Management.

POC Treatment 4 – Fish and Red Mountain Lakes Non-Motorized Trail Tread Hardening. Surfacing of 3.8 miles of non-motorized trail tread surfacing using an aggregate stabilizer (which sets up like concrete) to reduce the potential for spreading of POC root disease. Planning (CE) cost = \$ 95,000

Cost estimated at \$38,000/mile for 10' trail tread x 3.8 miles = \$144,400. Contract preparation and administration = \$5,000. Total estimated project cost = \$244,400.

- **Partners Involvement:** None at this time.
- **Timeline:** Starting in 2012 and continuing for 1 years
- **Estimated costs and associated Budget Line Item:** \$244,400. CMTL, CMLG.

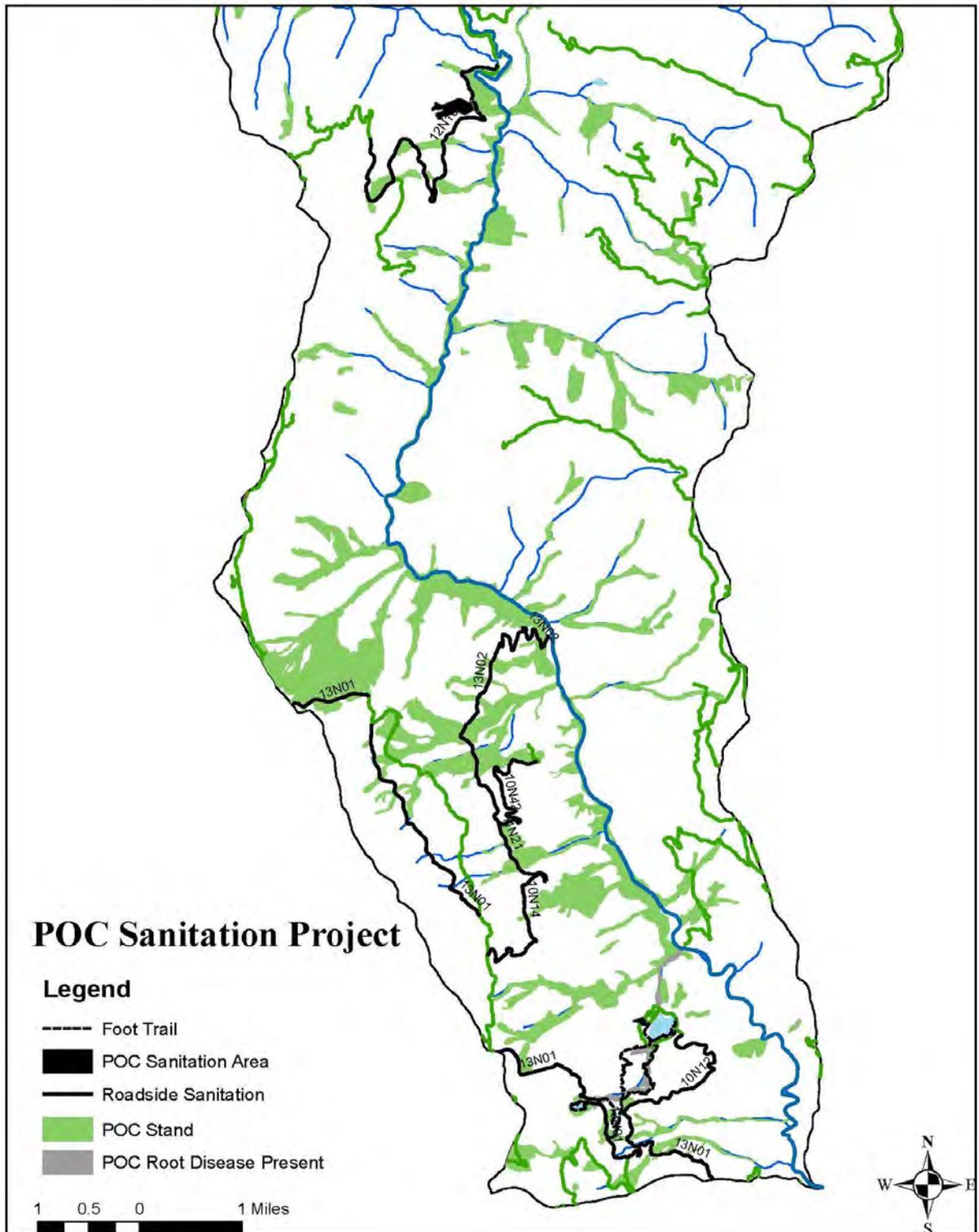


Figure 1 - Map Showing Location of Proposed Sanitation Treatments.

b. Essential Project #2 – Road Decommissioning

- **Attribute/ Indicator Addressed** – Road Density, Mass Wasting, Terrestrial Invasive Species.
- **Project Description:** Complete remaining decommissioning work (16 Miles) as outlined in the Orleans Transportation and Road Restoration Project. See Table 1.
- **Partners Involvement:** Karuk Tribe – 30%.
- **Timeline:** Starting in 2012 and continuing for 2 years
- **Estimated costs and associated Budget Line Item:** \$200,000. CMLG.

Table 1 – List of Roads to be Decommissioned

Road	Mileage	Road	Mileage
10N27.1	0.3	12N13B.1	0.25
10N27.2	0.2	12N13D	1.53
10N27B	0.6	12N13F	0.5
10N41B	.20	12N13G	0.35
11N21F	0	12N13J.1	0.8
11N40	2	12N17C	0.39
11N40.1	0.1	12N31B	0.69
12N03	0.84	12N31E.2	0.13
12N10.2	0.3	12N31G	0.3
12N10.5	0.05	12N42.1	1
12N10.6	0.1	13N01.3	0.05
12N10.8	0.2	13N01.4	0.07
12N10D	0.4	13N01.5	0.05
12N10E	0.18	13N01.6	1
12N10H	0.2	13N01.7	0.1
12N13A	0.9	13N01Q	0.25
12N13A.1	0.45	13N01T	0.45
12N13A.2	0.35	13N01V	0.25
13N21B	0.19	13N21C	0.6

c. Essential Project #3 – Road Stormproofing

- **Attribute/ Indicator Addressed** – Mass Wasting
- **Project Description:** Prevent future road-related mass wasting by replacing culverts (improve capacity) and constructing Rolling Dips (correct diversion potential). See Table 2.
- **Partners Involvement:** None at this time.

- **Timeline:** Starting in __2012__ and continuing for __1__ years
- **Estimated costs and associated Budget Line Item:** \$365,000. CMRD, CMLG.

Table 2 - Priority Road Stormproofing List

Road	Mile Post	Condition	Repair	Cost	Priority
12N10	1.98	24" x 40' culvert in ephemeral Creek. Whole pipe has 50% sediment deposit, one spot near 100% plugged.	Replace with 36" x 40' cmp, riprap inlet with local rock.	\$5,000	High
12N10	3.3	60" x 60' culvert in perennial stream. 40% rust line in culvert, 20% inlet blockage, poor inlet and entrance geometry. Some water getting under pipe.	Replace with 72" x 60' culvert with MES, re-align culvert	\$60,000	High
12N10	3.6	18" x 80' culvert drains spring and ditch completely plugged with sediment	Replace with 24" x 80' culvert	\$15,000	High
12N10	4.6	60" x 60' culvert with snorkel in perennial stream. Poor inlet geometry, 40% rustline throughout, 80% @ inlet. Inlets regularly gets overtopped.	Replace with 72" x 60' culvert with MES and snorkel, re-align culvert.	\$80,000	High
12N10	5.4	36" x 100' culvert, inlet sticks way out of fill, 25% rustline	Cut back the inlet, excavate	\$1,000	Medium

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Road	Mile Post	Condition	Repair	Cost	Priority
			inlet basin and shape for culvert entry		
12N10	5.7	48" x 100' culvert with 25% rustline, lots of woody debris and logs above inlet	Remove debris above inlet area	\$3,000	Medium
10N06	2.05	Outlet shotgun, eroding fillslope	Place 5 CY riprap dissipater	\$250	Low
10N06	2.4	Long wet ditch	Install 18" x 40' culvert	\$3,000	Low
10N06	2.6	18" culvert rusted out and plugged	Replace with 24" x 40' culvert	\$4,000	Medium
10N06	2.95	18 inch culvert with 50% rustline, collects a lot of water from springs and upper road segments	Replace with 24" x 30' culvert with drop inlet and 5 CY riprap dissipater	\$5,500	Low
11N17	0.2	Ephemeral stream comes onto road, no culvert, road severely rutted	Install 24' x 60' culvert	\$5,000	High
11N17	0-0.3	Road is in high need of heavy maintenance, rolling dips failing, culverts plugged, ditches filled in, road heavily rutted	Heavy road maintenance to maintain drainage structures and road geometry	\$4,000	High
12N13	5.3	Wet ditch drains across road causing surface and fill slope erosion	Install 24" x 30' culvert with drop inlet and aggregate surfacing	\$5,750	medium
11N16	0.65	Spring and ditch water runs across road causing rutting	Install 24" x 30' culvert with drop	\$3,000	medium

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Road	Mile Post	Condition	Repair	Cost	Priority
		and fill slope erosion	inlet and aggregate surfacing		
11N16	0-3.0	Road is in high need of heavy maintenance, rolling dips failing, culverts plugged, ditches filled in, road rutted	Heavy road maintenance to maintain drainage structures and road geometry	\$9,000	medium
12N08	0.73	Low spot in road, poor drainage, muddy.	Outslope road and spot rock	\$2,000	low
12N08	0.78	Rutted road from water off hillside	Install rocked rolling dip	\$2,500	Low
10N14	1.5	Rutting in road	Install rocked rolling dip, remove outside berm	\$2,500	Low
11N21	0.4	30" x 60' culvert, very rusty and partially blocked inside (with outlet control) in perennial stream	Replace with 48" x 60' squash pipe, clean inlet and outlet area of woody debris	\$25,000	High
11N21	0.5	54" x 60' pipe with poor inlet geometry.	Place 20 cubic yards riprap to direct water into pipe better	\$1,500	Low
11N21	1.48	18" culvert with outlet 50% plugged	Clean outlet	\$250	Low
11N21	1.5	18" culvert, outlet 50% plugged, very rusty, inside partially blocked	Replace with 24" x 60' culvert	\$5,000	Medium
11N21	1.7	24" x 60' culvert plugged inside, relieves ditch and ravine	Replace with 36" x 60' squash pipe	\$6,000	Medium

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Orleans Ranger District, Six River NF

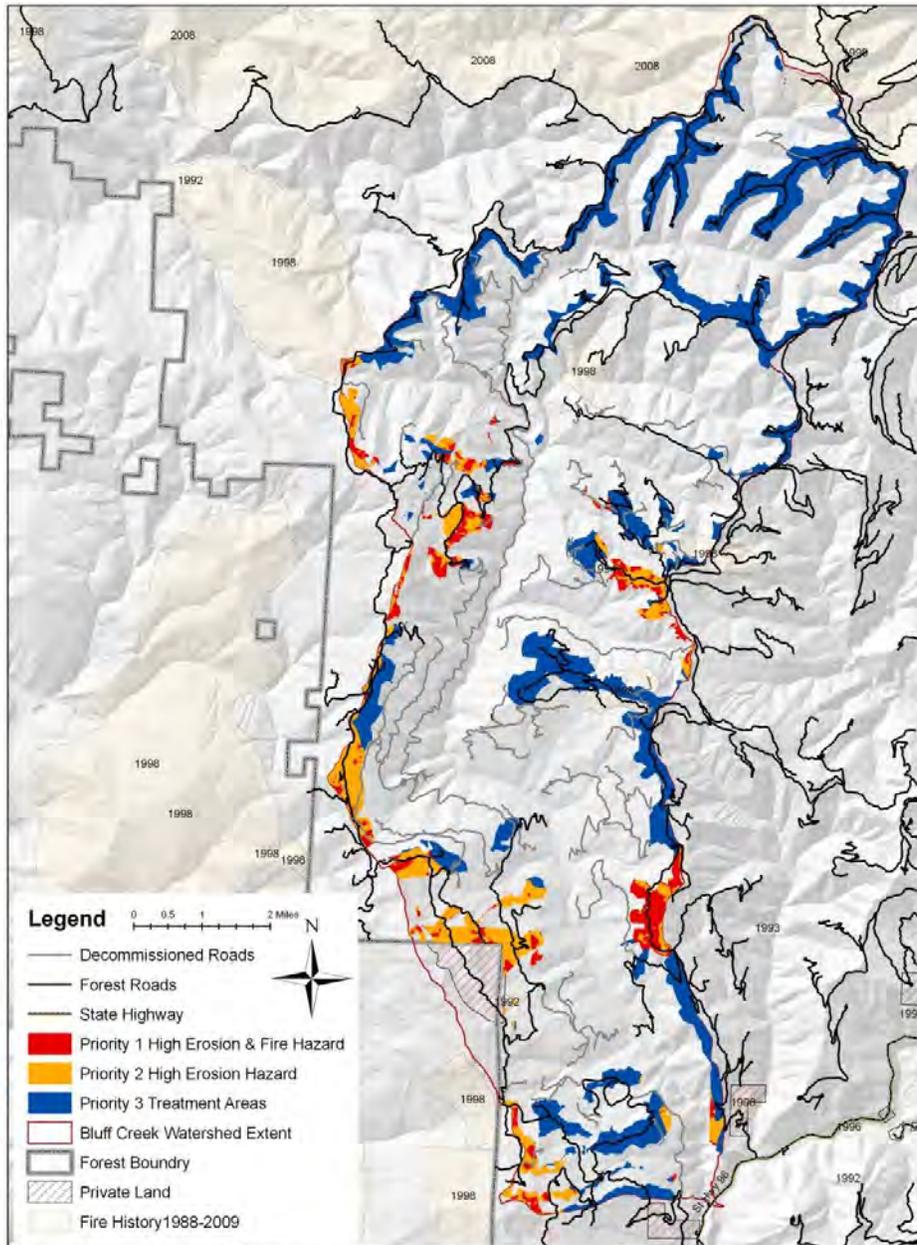
Road	Mile Post	Condition	Repair	Cost	Priority
11N21	1.75	48" x 60' culvert, 60% rust line, pipe severely beat up inside, very rocky location, perennial stream	Replace with 5' x 60' heavy gauge culvert with MES	\$30,000	High
11N21	1.8	24" x 60' culvert outlet plugged and some material inside, relieves ditch and ravine	Try to clean by flushing or replace	\$500	Medium
11N21	2	Long wet ditch relieves ravine and spring, no culvert	Install 20' x 60' culvert at 20% grade	\$10,000	Medium
13N02	0.26	24" x 60' culvert relieves wet ditch and ravine, lots of spring water in area, 100% plugged	Replace with 36" x 60' culvert	\$15,000	High
13N02	0.5	18' x 30' culvert inlet damaged and pipe 1/2 full of dirt, ditch relief	Replace with 24" x 60' culvert at steeper angle	\$5,000	Medium
13N02	0.73	18" x 60' culvert, very rusty, inlet damaged, 40% rust line, drains large spring area	Replace with 24" x 60' culvert with drop inlet	\$6,000	Medium
13N02C	1.2	Slide plugged ditch and water running down road	Remove 30 CY slide material, open ditch, buttress slide with 30 CY riprap	\$10,000	Medium
13N02D	0.44	Failed ditch, water running down road	Reopen ditch line	\$500	Low
13N01	0-12.5	Culvert inlet areas need maintenance, and one failed ditch	Perform deferred maintenance with backhoe	\$2,000	Low

Road	Mile Post	Condition	Repair	Cost	Priority
13N01	5.2	18" x 30' culvert separated and 50% full of dirt. Ditch and spring relief	Replace with 24" x 30' culvert, dig outlet ditch, digout 40" x 20' section of road and rebuild	\$10,000	Medium

d. Essential Project #4 – Priority Fuel Reduction Treatments

- **Attribute/ Indicator Addressed** – Fire Condition Class.
- **Project Description:** 6,954 acres of roadside corridor treatments consist of thinning of trees less than 8”dbh, cutting of understory vegetation, tree pruning, chipping, and mastication of brush, hand or grapple piling of fuel, covering and burning of piles. Fuel treatment corridors would reduce fuel loading along roads to allow fire suppression resources a defensive line from which to fight fires and decrease the potential for detrimental wildfire effects to the watershed. Priority treatment areas were further delineated by soil susceptibility to post fire erosion hazard and extreme fire hazard. See Figure 2.
- **Partners Involvement:** None at this time.
- **Timeline:** Starting in 2013 and continuing for 8 years
- **Estimated costs and associated Budget Line Item:** Planning (EA) - \$250,000. \$1,775/acre for hand cutting and piling and follow up treatments. Estimated total cost at \$12.6 Million. WFHF, NFTM.

Priority Fuel Treatment Areas for Bluff Creek Watershed



Priority 3 fuel treatment areas (in dark blue) are defined using a stack of upper 1/3 slope, road buffer (1/4 mile), condition class (Fire Return Interval Departure-FRID), and community buffer (1/4 mile). All categories get 0 or 1, except for condition class which gets 3, 2, or 1. A grid score of 5 or above will show up as a high priority fuel treatment area.

Condition class is determined using Mean Fire Return Interval Departure (FRID). This is a condition class categorization using the following scale: 0 to 33% departure = 1 (within range of historical variability), 33 to 67% departure = 2 (moderate departure), and >66% departure = 3 (strongly departed from historic range).

Priority 2 areas are a prioritization within the priority 3 treatment areas are delineated using the Erosion Hazard Rating (EHR), a measure of soil erosion potential if canopy cover is reduced to 10% or less.

Priority 1 treatments are areas where priority 3 and 2 are coincident with areas of high fire hazard (flame length $\geq 6'$, rate of spread ≥ 22 per minute during 90th percentile weather).

Figure 2 - Priority 1-3 Treatment Area

e. **Essential Project #4A –Plantation Treatment Evaluation**

- **Attribute/ Indicator Addressed** – Fire Condition Class.
- **Project Description:** 4,877 acres of plantations overlap priority fuel treatment areas. Evaluate potential for equipment removal (biomass) of low thinning trees 8” to 12” dbh utilizing existing road system. See Figure 3.
- **Partners Involvement:** None.
- **Timeline:** Starting in 2012 and continuing for 1 years
- **Estimated costs and associated Budget Line Item:** \$50,000 WFHF, NFTM.

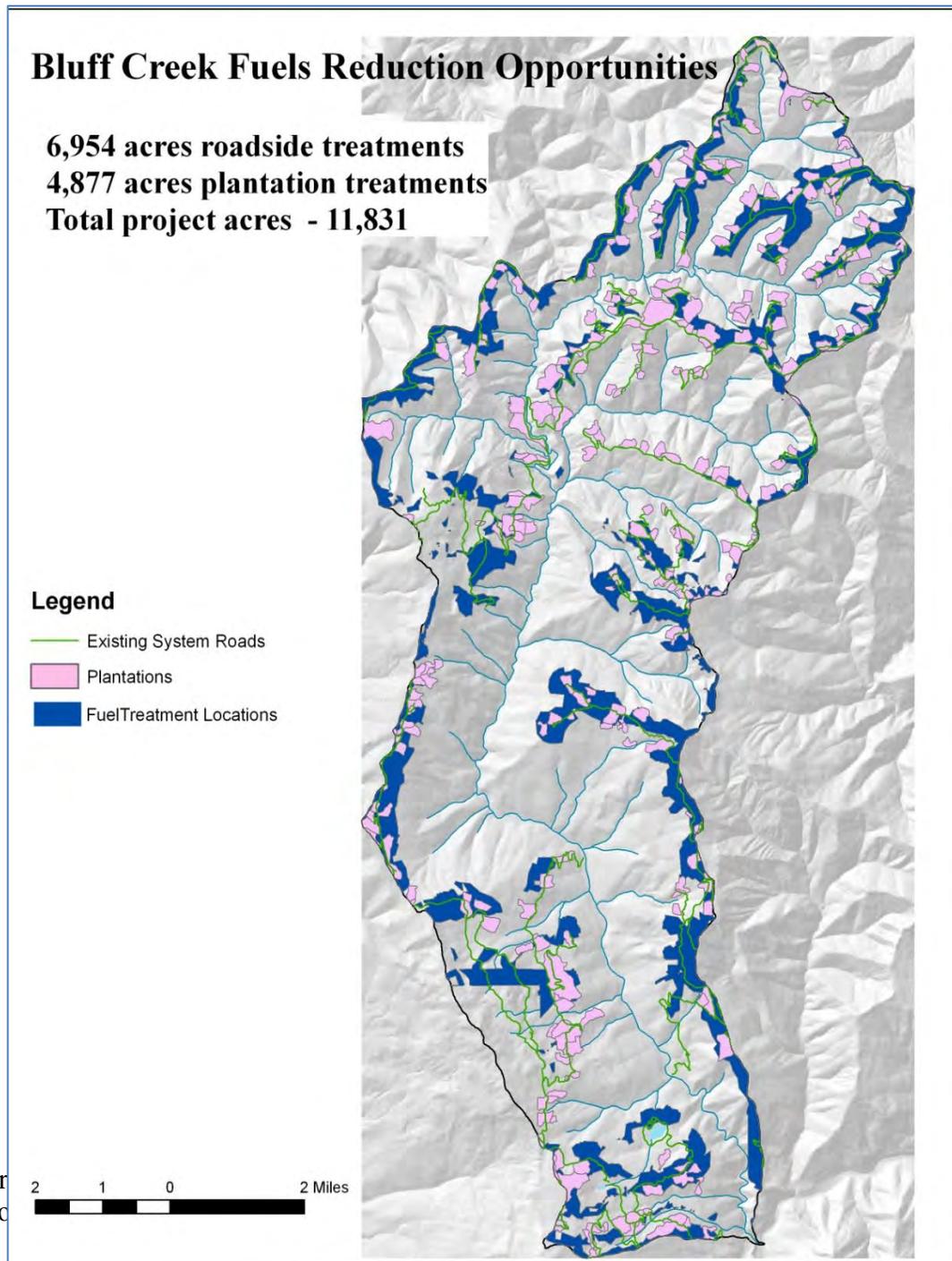


Figure 3 - Plantations Accessible from Existing Roads

f. **Essential Project #4B – Bluff Creek Watershed Analysis**

- **Attribute/ Indicator Addressed** – Fire condition class (required analysis prior to implementation of any fuels or silviculture projects).
- **Project Description:** Complete Bluff Creek WA. Estimated amount of specialist time is 40 days.
- **Partners Involvement:** None
- **Timeline:** Starting in __2012__ and continuing for __1__ years
- **Estimated costs and associated Budget Line Item:** \$130,000. NFWF, NFWW, NFTM, WFHF.

g. **Essential Project #5 – Riparian Enhancement**

- **Attribute/ Indicator Addressed** – Riparian Vegetation, LWD, Mass Wasting
- **Project Description:** Utilize native plant materials to establish barren landslide slopes (70 acres @\$400/acre) and other open riparian communities throughout the watershed; thin and release riparian trees planted adjacent to Bluff Creek along decommissioned roads (15 acres @ 400/acre), CE (\$5,000).
- **Partners Involvement:** Karuk Tribe – 30%
- **Timeline:** Starting in __2014__ and continuing for __3__ years
- **Estimated costs and associated Budget Line Item:** \$39,000. NFWF, NFWW.

h. **Essential Projects #6 - Fisheries Habitat Enhancement**

- **Attribute/ Indicator Addressed** – LWD, Channel Shape and Function
- **Project Description:** Open existing log debris accumulations that exist within the East Fork of Bluff Creek, Notice Creek and other tributaries blocking steelhead access to spawning and rearing habitat. Log debris removal = \$32,000 Requires NEPA analysis-CE (\$3,000)
- **Partners Involvement:** Karuk Tribe, CDF&G, Karuk Tribe, Mid-Klamath Watershed Council.
- **Timeline:** Starting in __2013__ and continuing for __2__ years
- **Estimated costs and associated Budget Line Item:** \$35,000. NFWF.

i. **Essential Projects #7 - Fisheries Habitat Enhancement**

- **Attribute/ Indicator Addressed** –Channel Shape and Function
- **Project Description:** Enhance side-channel habitat at Wright’s Ranch, Dragon Bar and other locations to increase salmonid smolt production. Side channel enhancement = \$28,000, Planning CE \$5,000.
- **Partners Involvement:** Karuk Tribe, CDF&G, Karuk Tribe, Mid-Klamath Watershed Council.
- **Timeline:** Starting in __2013__ and continuing for __2__ years
- **Estimated costs and associated Budget Line Item** – \$33,000. NFWW, NFWF.

j. **Essential Projects #8 - Fish Screen**

- **Attribute/ Indicator Addressed** –Aquatic/Exotic Invasive species.
- **Project Description:** Fabricate and place new self-cleaning fish screens at the outflow of Fish Lake.
- **Partners Involvement:** California Department of Fish and Game - 50%.
- **Timeline:** Starting in __2013__ and continuing for __2__ years
- **Estimated costs and associated Budget Line Item** – \$83,000. NFWF.

k. **Essential Projects #9 - Invasive Plant Removal**

- **Attribute/ Indicator Addressed** –Aquatic/Exotic Invasive species.
- **Project Description:** Inventory (15 miles) and treatment (2 miles) of noxious weeds.
- **Partners Involvement:** Mid-Klamath Watershed Council – 15%
- **Timeline:** Starting in __2012__ and continuing for __2__ years
- **Estimated costs and associated Budget Line Item** – \$3,350. NFWF.

e. Costs:

	Planning	Design	Implementation	Project Monitoring
FS Contribution	\$894,000	\$61,970	\$13,587,905	\$13,125
Partner Contribution (both in kind and \$)			\$106,670	
Total	\$894,000	\$61,970	\$13,694,575	\$13,125

f. Timelines and Project Scheduling

FY	Task	FS Cost	Partner cost
2012	POC Root Disease Treatment Evaluations	\$38,270	
2012	POC Root Disease Roadside Sanitation	\$363,000	
2012	POC Root Disease Area Sanitation	\$238,000	
2012	Invasive Plant Removal	\$4,690	\$670
2012	Road Decommissioning	\$140,000	\$60,000
2012	Road Stormproofing	356,000	
2012	Plantation Treatment Evaluation	\$50,000	
2012	Bluff Creek Watershed Analysis	\$130,000	
2013	Roadside Fuel Reduction	\$12,565,350	
2013	Fisheries – Log Jam Removal	\$38,100	\$3,100
2013	Fisheries – Side Channel Enhancement	\$38,400	\$5,400
2013	Fish Screen Installation at Fish Lake	\$121,500	\$37,500
2013	Trail hardening (reduce risk of spreading POC root disease on well used non-motorized trails.	\$244,400	
2014	Riparian Enhancement	\$40,500	

g. Other Partners – n/a

4. Restoration Project Monitoring and Evaluation

- a. The forest will monitor:** BMPEP associated with fuels and road decommissioning treatments and will occur 2-5 years after project is completed. Invasive plant monitoring will be conducted for 3 years.
- b. Monitoring will be done in cooperation with:** Invasive plant treatments conducted in cooperation with Mid-Klamath Watershed Council. The Karuk Tribe may assist with monitoring of fisheries and riparian enhancement work for 3-5 years following treatment.

Action Plan Date: ___ September 30, 2011 _____

Reviewing Official and Title: _____

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