Watershed Report
Mt. Ashland LSR Habitat Restoration Project
Addendum
January 14, 2008

This document is an addendum to the Mt. Ashland LSR Habitat Restoration Project Watershed Report. This addendum documents Cumulative Watershed Effects (CWE) stemming from the Preferred Alternative. Only impacts from the Preferred Alternative concerning the Equivalent Road Acre (ERA) and USLE portions of the Klamath CWE model are reported in this document. The GEO changes are reported in the addendum to the project geology report and the USLE is also discussed in the soil report.

Table 1 below, shows the alternative actions comparison.

Table 1. Comparison of Alternatives.

	Alt. 2	**Alt.4**	**Alt. 5**	**Preferred Alternative**
Acres Treated	3875	3354	3781	3601
Cable	1602	1528	1471	1610
Helicopter	1071	861	1245	935
Tractor	387	220	335	579
Com. Grd. Base	555	541	494	403
Mech. Harv.	219	187	195	50
Fuels Treatment	4706	4185	4612	5765
Road Segments	21	16	9	8
Miles	6.8	4.9	2.3	1.7
Clearing	28.5	20.1	9.5	7.1
Landings	39	34	31	43
Clearing	25	22.5	21	22

The fuels treatment under the Preferred Alternative reflects an additional 1297 acres of underburning, to accomplish needed fuels reduction. The increase in the number of landings is needed to accommodate an increase in tractor and skyline yarding. Skyline harvest will utilize a swing boom yarding system. Swing boom yarders need smaller landings, approximately a ¼ acre in size or smaller.

The Preferred Alternative also yields a decrease in road construction miles and road clearing acres, with 8 segments totaling 1.7 miles.

Cumulative Watershed Effects

Table 2 below, reflects the changes the ERA risk ratio associated with the Preferred Alternative by 7th field watersheds in the analysis area. The figures include all Timber Harvest Plans submitted to the California Division of Forestry, as of 12 December 2007.

Table 2. ERA Model Results

7th-field Drainage	ERA No Action	ERA No Action w/Wildfire	Alt 2	Alt. 4	Alt. 5	Preferred Alternative
Hdwters Cottonwood	0.26	0.26	0.33	0.33	0.33	0.32
Beaver-Grouse	0.53	0.80	0.78	0.74	0.76	0.79
Deer-Beaver	0.69	0.71	0.83	0.83	0.83	0.86
Hungry	0.78	0.78	0.78	0.78	0.78	0.78
Long John	0.38	0.60	0.76	0.70	0.74	0.76
Upper Cow	0.32	0.32	0.35	0.35	0.35	0.33
5th-field Drainage	**ERA No Action**	**ERA No Action w/Wildfire**	**Alt 2**	**Alt. 4**	**Alt. 5**	**Preferred Alternative**
Beaver Creek	0.76	0.82	0.86	0.85	0.86	.85

The Table 3 below reflects the changes the USLE risk ratio associated with the Preferred Alternative by 7th field watersheds in the analysis area.

Table 3. USLE Model Results

7th-field Drainage	USLE No Action	USLE No Action w/Wildfire	Alt 2	Alt. 4	Alt. 5	Preferred Alternative
Hdwters Cottonwood	0.41	0.43	0.42	0.42	0.42	0.42
Beaver-Grouse	0.94	**2.63**	0.98	0.99	0.99	1.03
Deer-Beaver	0.94	**1.07**	0.96	0.96	0.95	1.02
Hungry	1.34	1.34	1.34	1.35	1.35	1.34
Long John	0.88	**2.03**	0.97	0.97	0.96	0.98
Upper Cow	0.66	0.70	0.67	0.67	0.66	0.66
5th-field Drainage	**USLE No Action**	**USLE No Action w/Wildfire**	**Alt 2**	**Alt. 4**	**Alt. 5**	**Preferred Alternative**
Beaver Creek	1.17	1.46	1.18	1.18	1.18	1.19

No Action with Wildfire

The "No Action w/Wildfire" column models a wildfire with no alternative actions. With wildfire, there is slight elevation in project 7th Field watershed ERA risk ratios in which the wildfire was modeled to occur (Grouse and Long John). The increase in risk shown in Deer-Beaver reflect the Timber Harvest Plans (THP's) submitted by private industry landholders since publication of the draft EIS. This was done using the Klamath CWE

model. The project watershed report utilized a WEPP (Watershed Erosion Probability Program) model to simulate the erosion impacts of a wildfire. The project soils report addresses the increase in erosion resulting from a wildfire.

The tables above indicate that under the No Action with Wildfire scenario there could be a slight elevation of risk in the disturbance portion (ERA) of the CWE model. The soil loss (USLE) table indicates an increase in risk in all affected watersheds. An escaped wildfire would cause loss of soil and canopy cover; and create hydrophobic soil conditions, all factors in erosion and sedimentation.

Monitoring of wildfires on the Klamath National Forest since 1977 indicates a typical wildfire would burn approximately 9% with a high burn severity, 22% with a moderate severity, and 69% would be low severity. An exception to this occurred in July, 2002. The Stanza fire on the Happy Camp Ranger District burned with only 2% High severity, although climatic and burn parameters were higher than in previously studied fires. The reduction was due to dedicated under burning and fuels reduction several years prior. Hydrophobic soil condition on the Stanza fire, were less than 0.8% of fire area. The other fires in the study, with similar soil and lithologic types, had hydrophobic soil conditions ranging from 13 to 22% (Boyer, Daniels, Snavely, 2002).

Preferred Alternative

It must be noted that the CWE model overstates some disturbance impacts. For instance, in some areas scheduled for skyline yarding, the cable reach will not extend to the mapped unit boundary. If it is not economically feasible to helicopter yard the lower portions of those units, that area will remain undisturbed. In most cases, areas scheduled for underburning, will in reality have up to 25% of the area in an unburned pockets, rather than the modeled clean burn of all areas.

Under the Preferred Alternative, road actions, i.e. decommissioning and stormproofing, as well as new construction, give a net decrease of -21.1 ERA's.

Project actions under the Preferred Alternative will not raise the risk in any of the 7th field watersheds beyond the inference point of 1.0.

At the 5th Field watershed scale the Preferred Alternative would raise the risk to 0.85, primarily as a result of the private lands THP's, aforementioned. A wildfire could raise the risk at the 5th Field scale to 0.82. The reason that the wildfire scenario risk ratio is less than the preferred alternative is because there is a recovery factor built into the ERA portion of the model for all disturbance types, except roads. An escaped wildfire low intensity burns have a total recovery in about 2 years. The model may have recovered portions of the modeled fire before other input disturbances (THP's, and alternative, actions were calculated.

Both the Preferred Alternative and the no action with wildfire scenario are below the inference point of 1.0. The project actions, particularly underburning, will not take place

in one year. Commercial harvest, associated fuels treatment, and additional underburning would take place over a 7 to 10 year period. This allows some degree of recovery to occur during the life of the project.

Project Design Measures

- No spur roads will cross riparian reserves.
- Skid roads may cross ephemeral (no indication of intermittent and seasonal flow) draws. Clean out of the swale will occur when this occurs.
- Cable and helicopter yarding will utilize whole-tree yarding to minimize project related fuels.
- Opening in harvest units will be limited to a ¼ acre in size.

Direct Effects of the Preferred Alternative

Direct Effects are those that occur at the same time and place as the proposed action. Hydrologic direct effects may include changes to runoff regimes, stream canopy shade, and in-stream turbidity caused by runoff or in-channel work during decommissioning. Direct effects relating to slope stability and surface erosion may consist of disturbances to the soil layer. Direct effects of timber harvest can include disturbance of the soil and physical removal of trees, reducing stand density, binding root strength, decreasing evapo-transpiration potential, and creating openings which may increase snow pack buildup.

Stream Shade

The potential to reduce stream canopy shade from harvesting is negligible to non-existent, because there is no commercial thinning in riparian reserves adjacent to flowing or standing water. The effect of under burning on stream shade is negligible to non-existent because fire will be low intensity, backing into streamside areas from ignition points higher on the hillslopes.

Disturbance

Ground disturbance through mechanical harvest, particularly tractor yarding can be critical. Use of masticators and mechanical harvesters will lessen ground pressure on the project area soils. Compliance with LRMP soil cover guidelines designed to minimize potential effects will serve to protect the watershed beneficial uses.

Indirect Effects

Indirect effects are those impacts which may result after completion of project actions. Hydrologic indirect effects may include increased sedimentation from surface erosion. Road use also creates suspended sediment during wet weather, and from dust settling during dry periods. Indirect effects relating to slope stability may occur from road fill failures, and loss of binding root strength after tree removal.

Other indirect effects may include accelerated vigor in trees following thinning of competing vegetation, and reduction of wildfire rates of spread in thinned and underburned areas.

Surface Erosion
As shown above there is a negligible surface erosion increase throughout the project area. This could cause some minor short-term increases in turbidity following short-duration, high intensity precipitation events. Riparian Reserves associated with streamcourses would not be entered (with the possible exception of Hazard Tree felling), so they would provide an effective sediment filter zone for streams. Stream protection buffers have been evaluated relative to various ground disturbing activities, including logging practices, in a number of sources. Corbett and Lynch (1985) recommended buffers of 20-30 m for controlling sediment. FEMAT (1993) citing these same studies, concluded that buffers of approximately one site potential tree were probably adequate to control sediment from overland flow (Spence 1996, Page 219, 228, 229).

Suspended sediment from road use will be controlled and mitigated by wet weather operation guidelines and dry-season dust abatement measures. Project design measures effectively address potential water quality impacts potential associated with log haul and construction of temporary roads.

Landing construction could elevate local surface erosion but sediment delivery to streams would be minimal because of size and location of landings outside of Riparian Reserves. Riparian buffers would filter sediment and landing runoff would not enter road drainage systems. The action alternative is designed to be low risk to watershed condition and function compared to risks resulting from high intensity wildfire.

Surface Runoff
The rate of surface runoff would be slightly increased by landings, compacted areas, and by reduction of surface organic cover. Private, domestic water quality would not be affected by project activities because they are not hydrologically linked. Known domestic water intakes are springs and 1st Order channels outside the influence of project activities.

Application of Project Design Measures, BMP's, and LRMP Standard and Guidelines will ensure the project proposal complies with the Clean Water Act, the Porter-Cologne Water Quality Control Act, applicable water quality control plans, and the Regional Board waiver (Order No. R1-20044-00015).

/s/ William Snavely
Hydrologist
Klamath National Forest

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