How the Lolo Post Burn EIS addresses the Beschta et al. (1995) Post Fire Principles and Recommendations

In March, 1995, Dr. Robert Beschta, Oregon State University, and other research scientists produced a commentary entitled: "Wildfire and Salvage Logging, Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-Fire Treatments on Federal Lands in the West." This document was prefaced with a discussion of the interrelationships between the natural disturbance cycle and the impacts of past land management, and the need to examine and "focus on the pattern and consequences of current and proposed human manipulation and disturbances of all types at the landscape level." Beschta et al. (1995) concluded with a summary of principles for fire management and salvage logging.

Interest groups have successfully used this commentary to oppose post fire projects. Excerpts from a statement by Dale Bosworth, Chief, USDA Forest Service to the Subcommittee on Forests and Forest Health, Committee on Resources, U.S. House of Representatives, Washington, D.C., June 12, 2002, on NEPA process gridlock shows the controversy associated with this report.

> I can't think of a better example to illustrate this (gridlock) than the so-called "Beschta Report," a commentary authored in 1995 by eight university and government scientists. Many members of the Subcommittee may not be familiar with this report.
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> The authors prepared the paper at the request of the Pacific Rivers Council. It offers 21 "principles and recommendations" regarding a wide range of topics. The topics include: erosion, soil impacts, noxious weeds, sensitive areas, effects of road building, reseeding, and fire management policies. The paper generally recommends against any active management of post-fire areas other than removal of existing roads. The paper has never been published in any scientific or professional journal, nor has it been subject to any formal peer review.
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> None-the-less, interest groups have filed numerous lawsuits challenging post-fire recovery projects in part on the grounds that the associated NEPA documents fail to adequately document the agency's consideration of the "Beschta Report." I have been told that information on how to use the report to write comments on proposed projects and appeals of project decision documents is available on more than 100 Web sites. To date, there have been judicial opinions on the "Beschta Report" in six cases.
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> In four of these cases, the Courts have concluded that project decisions violated NEPA because the associated NEPA documents did not adequately document the agency's consideration of Beschta. In two other recent cases, Federal District Courts have ruled in favor of the Forest Service. In one case, Native Ecosystem Council v. U.S. Forest Service (D. Mont.) (Maudlow-Toston, Helena NF), the Court found that the EIS complied with NEPA even though the plaintiffs strenuously argued that failure to adequately consider the "Beschta Report" violated NEPA. In the other case, Center for Biological Diversity v. Andre (D. N.M.) (Corner Mountain Fire Salvage, Gila NF), the Court found that EA adequately considered the issues in the "Beschta Report," even though the EA did not reference the "Beschta Report."

Hitting .333 is very good in baseball. It's not much of an average in natural resource case law. As a result of these 4 decisions, land managers wishing to reduce the risk that their decision will be reversed in Federal Court should feel compelled to thoroughly document their consideration of the "Beschta Report" even though the underlying land management issues are already addressed. This includes documenting why some elements of the "Beschta Report" are not relevant to the specific proposed project.

The judicial opinions against the agency have inspired some interest groups to demand that the agency consider numerous other papers and articles that they assert are relevant to the some proposed actions. Sometimes the list of references exceeds 100 articles and papers. To minimize the risk of adverse judicial opinions, land managers are advised to fully document within the body of the NEPA document their detailed consideration of each and every paper or article.

So, when critics assert that the Forest Service is its own worst enemy by spending so much time preparing large NEPA documents, I ask that you remember the "Beschta Report" - an unpublished document of questionable science proposed for an advocacy group that has never been peer-reviewed – but whose consideration now must be documented in several if not all judicial districts in order to build a defensible NEPA document.

It's a powerful example of the incentive for land managers to fill, or overstuff, NEPA documents with excessive amounts of information – even if the information is of questionable relevance and does not illuminate the reasons for the decision – all in an effort to protect their decisions from charges they failed to adequately consider some piece of information. As a result of these efforts to increase the legal defensibility of decisions, project analysis and documentation processes are very time consuming and costly, but the additional documentation contributes little to the quality of public involvement or land management.

The following report shows each of the Beschta report's post-fire principles and recommendations in italics. The response of the Post Burn ID team is shown below the comment.

Allow natural recovery and recognize the temporal scales involved with ecosystem evolution. Human intervention should not be permitted unless and until it is determined that natural recovery processes are not occurring.

Human intervention on the post-fire landscape may substantially or completely delay recovery, remove the elements of recovery, or accentuate the damage. These impacts include soil compaction and erosion, loss of habitat for cavity nesting species, loss of structurally and functionally important large woody debris.

Natural recovery is not free from adverse impacts. There was no logging and little human intervention in Yellowstone National Park after the 1988 fires but Minshall et al. (1998) found that sheet erosion, gully formation and mass movement of material occurred in the burned watersheds in Yellowstone during the summer of 1989, and debris torrents occurred after heavy rains. Franke (2000) also reported that a rainstorm in August 1989 caused three major mudslides and a dozen smaller ones which carried large volumes of silt, sand and stones into the Gibbon River, and that suspended sediment increased in streams in burned watersheds throughout the park following runoff from both snowmelt and rain in 1989 and 1990.

There have been two years of natural recovery for most of the project area. Only about 1400 acres or about 3 percent of the acres within the fire perimeters have been planted with tree seedlings. Thus, about 97 percent of the burned area has been allowed to recover naturally for two years. The planted areas are mainly young plantations that burned at high severity that had little seed source and intense competition from shrub species on site. Over 13,000 acres burned at high to moderate/high severity which means that about 10 percent of the high and moderate/high severity burn acres have been planted.

Acres of Seeding and Planting

	Acres
Acres Planted with tree seedlings (as of 6/2002)	1400
Acres seeded with tree seeds	105
Acres of high severity burn seeded with winter wheat and annual rye for temporary soil stabilization	3703
Total acres in the burn perimeters	38,700

Monitoring during the 2001 field season indicated about 2240 acres of high and moderate/high severity burns might need to be planted, that would total about 7 percent of the area within the fire perimeters

It is quite possible for human actions to delay recovery and cause damage such as soil compaction, erosion, and loss of snags and down woody debris in post fire landscapes or even in unburned areas during timber harvest. Human intervention does not always cause adverse impacts. To the contrary, several studies (Burroughs, E.R. 1990, Burroughs, E.R., Jr. and J.G. King 1989, Forest and Harding 2001) have shown that human intervention can reduce erosion and the severity of impacts following fires. Proper harvesting and rehabilitation techniques cam mitigate soil loss and erosion associated with post fire logging (Simon et al. 1994). More specifically, the Lolo National Forest has found that straw mulch caused a 32-47 percent reduction in erosion, and filter windrows retained 87 to 99 percent of the erodable material (4-26). The Post Burn ID team has also proposed some activities that have a short-term impact but result in a long-term gain. For example, replacing an undersized culvert with a properly sized culvert or a bridge puts sediment in the stream during construction but the long term impact is improved fish passage and reduced probability of the structure failing.

The Post Burn ID team acknowledged the potential for adverse impacts and established design criteria at the very start of the project to address those issues. Design criteria are sideboards or constraints placed on activities in order to protect resources. For example, a design criterion of “no harvesting activities would occur within 300 feet of perennial fish bearing streams” means that no logging was proposed or considered in those buffer areas (2-16). The team agreed that the minimum buffers given in INFISH would be met and no logging was proposed in those areas. Mitigation measures are additional guidelines and actions that are developed along with the project to reduce adverse impacts or improve conditions. In the Post Burn FEIS, the design criteria and mitigation measures for soils, watershed and wildlife address Beschta’s concerns about soil compaction, erosion, and loss of snags and down woody debris. The FEIS lists over 50 design criteria and mitigation measures for soils, watershed, snags and down woody debris. Those items are listed below. This does not include the watershed restoration projects designed to improve adverse conditions that existed before the fires such as impacts from mining and jammer roads.

Design Criteria and Mitigation Measures

Design Criteria for Soils

Implement soil stabilization measures; including contour felling, mulching, planting, and seeding on areas of high burn severity or disturbance where long-term productivity has been affected.

Minimize ground based timber harvest and salvage on severely burned or sensitive soils unless the effects of those activities could be mitigated with timing or other means.

Minimize ground based timber harvest and salvage on LSI Units 15JB, 30MA, 30QA, 64MA, and 64QA unless the effects of those activities could be mitigated with timing or other means.

Limit tractor logging to slopes of 35 percent or less. In high soil burn severities, limit tractor logging to slopes of 30 percent or less.

Avoid developing major log landings on slopes greater than six percent. Utilize existing roads and disturbed areas for landings where possible.

Minimize developing landings on areas with high soil burn severity unless the effects of those activities could be mitigated with timing or other means.

Avoid re-disturbing areas where post burn suppression and BAER rehabilitation activities have occurred unless those activities were not sufficient to restore or protect the soil resource. Rehabilitate disturbed areas that were previously rehabilitated as soon as possible.
Prohibit timber harvest and other ground disturbing activities (except for restoration activities) in areas with 15 percent or more of the area in a detrimental soil disturbance condition until past conditions have been mitigated to below 15 percent.

Prohibit timber harvest and other ground disturbing activities (except for restoration activities) in areas of high and mosaic soil burn severities where cumulative detrimental soil disturbance exceeds 10 percent.

In harvested stands provide for Course Woody Debris levels that protect soils from future high intensity fires and from loss of soil productivity.

Design Criteria for Water Quality and Native Fisheries

Riparian Habitat Conservation Areas (RHCAs)

If Riparian Vegetation Extends further than the defined Riparian Habitat Conservation Area (RHCA) buffer width, the RHCA would be extended to include all riparian vegetation.

No Activities would occur within RHCAs except for activities intended to improve riparian conditions including but not limited to: road reconstruction and BMPs, road closures, road decommissioning, culvert removals, soil stabilization, stream rehabilitation, and riparian planting.

Landings (e.g. for helicopter operations) could be constructed within RHCAs only if no other alternatives are available within identified economic and resource constraints, and impacts could be mitigated.

No Harvesting Activities would occur within 300 feet of Perennial Fish Bearing Streams.

No Harvesting Activities would occur within 150 of Perennial Non-Fish Bearing Streams.

No Harvesting Activities would occur within 50 feet of Intermittent Streams.

No Harvesting Activities would occur within 150 feet of Ponds, Lakes, or Wetlands > 1 Acre in Size.

No Harvesting Activities would occur within 50 feet of Seasonally Flowing Streams, Intermittent Streams, Landslide Prone Areas, or Wetlands < 1 Acre in Size in Non-Priority Watersheds.

No Harvesting Activities would occur within 100 feet of Seasonally Flowing Streams, Intermittent Streams, Landslide Prone Areas, or Wetlands < 1 Acre in Size in Priority Watersheds (Trout Creek and Ninemile Creek).

No fuel storage or equipment refueling would occur within RHCAs or Streamside Management Zones (SMZs)

New Road Development

Road development needed for vegetation management or watershed restoration would be limited to Temporary Roads. No Long-Term Specified Roads would be constructed.

New road development would be minimized and restricted to gentle side slopes, ridge tops and high elevation areas. Roads would not be constructed in RHCAs.

All temporary roads would be obliterated, recontoured, seeded and covered within one season of use.

Road Decommissioning, Reconstruction, and Closures

Best Management Practices (BMPs) would be applied to all roads used for accessing treatment areas in addition to roads identified for reconstruction or travel restrictions.

Harvesting Activities

All Harvest Activities would follow prescribed BMPs.

Fuels Treatment Activities

No firelines would be constructed within RHCAs.

No prescribed fire ignition would occur within RHCAs.

Fire could be allowed to back into riparian areas that have not previously burned and where severity could be minimized.

Prohibit slash disposal or burning of slash within RHCAs or in other areas where these activities could have detrimental impacts upon water quality.

Design Criteria for Wildlife

Big Game

Maintain or increase elk security through use of road decommissioning, road closures and travel restrictions.

Open road densities would be decreased in order to meet security needs.

Black Backed Woodpecker

No harvesting activities would occur where nest locations had been identified.

Protect 80% of potential black backed woodpecker habitat identified at the Forest level.

Lynx

No harvest treatments would occur within lynx foraging habitat.

Open road densities would be decreased in order to meet security needs.

Old Growth Dependent Species

No live old growth trees, as defined by R1 Old Growth Criteria, would be harvested or cut. All live old growth trees would be retained for biodiversity, legacy, and habitat.

At least 8 percent old growth would be retained in each of the Ecosystem Management Areas (EMAs).

Soils Mitigation Measures	
SOILS-M-1	Best Management Practices (BMPs) for Forestry and Streamside Management Zone Law would be applied to all harvest, road, and trail activities.
SOILS-M-2	Where activities occur on mosaic or high severity burned areas, a field review would be conducted by a qualified soils specialist prior to implementing activities to identify potential avoidance areas. When avoidance would not be possible, erosion control measures including straw bales, wattles, silt fences, etc. would be installed before ground disturbing activities. Erosion control measures would be left in place for one growing season or until no evidence of pedestaling, rills, or surface soil movement was evident. On mosaic or high severity burned areas require winter logging on all tractor yarded harvest units where possible.
SOILS-M-3	Coarse Woody Debris would be kept on site to meet objectives for long term soil productivity as specified within "The Woody Debris Resource on the Lolo National Forest", 1996.. The guide recommends retention of 5-10 tons per acre of woody debris larger than 3 inches diameter on habitat type groups 2 and 3 (VRU2): 12 to 33 tons per acre on habitat type group 4 (VRU3); and 12 to 25 tons per acre on habitat type group 5 (VRU4).
SOILS-M-4	Ground based activities would be restricted to a dry operating season generally between June 15 and September 15 Ground based winter activities will follow identified BMP direction for actvitiies during snow cover and/or frozen ground conditions. On LSI Units 15JB, 30MA, 30QA, 64MA, and 64QA ground based activities would be suspended if snow cover and depth of frozen soils are not able to protect the soil from visual evidence of compaction, puddling, and displacement (2509.18.2 WO Amendment 2509.18-91-1). Operations outside of the specified conditions may only occur on a case-by-case basis following consultation with a qualified soils specialist.
SOILS-M-5	Landings of 1 acre or more would be located on slopes less than 6 percent, where soil mass movement is low and surface soil coarse fragment cover is 15 percent or less.
SOILS-M-6	As soon as possible following the completion of harvest operations, not to exceed one year , landings would be recontoured to the orginal surface contour, ripped, and grass seeded and fertilized.. Coarse woody debris would be spread on site to provide for long term soil productivity as specified within "The Woody Debris Resource on the Lolo National Forest", 1996.

	The guide recommends retention of 5-10 tons per acre of woody debris larger than 3 inches diameter on habitat type groups 2 and 3 (VRU2); 12 to 33 tons per acre on habitat type group 4 (VRU3); and 12 to 25 tons per acre on habitat type group 5 (VRU4). Following burning, burn piles would be scattered across the landing, ripped, seeded, and fertilized similar to the remainder of the area.
SOILS-M-7	Tractor yarding would be limited to those areas with slopes less than 35 percent, this may include some areas with lengths less than 150 feet with slopes greater than 35 percent.
SOILS-M-8	Tractor yarding on high soil burn severity areas would be limited to those areas with slopes less than 30 percent. This may include some areas with lengths of less than 100 feet with slopes greater than 30%.
SOILS-M-9	In skyline yarding operations, the leading end of the log would be suspended.
SOILS-M-10	Where there is visual evidence of compaction on skid trails, they would be scarified to a depth of 4 inches. Skid trails would be water barred, slash would be scattered across their surfaces, and where appropriate, seeded .
SOILS-M-11	Where the road prism is unvegetated, road decommissioning would include recontouring to match the natural slope gradient or ripping to a minimum depth of 6 to 18 inches and seeding with Lolo approved grass species. . Coarse woody debris would be spread on site to provide for long term soil productivity as specified within "The Woody Debris Resource on the Lolo National Forest", 1996. The guide recommends retention of 5-10 tons per acre of woody debris larger than 3 inches diameter on habitat type groups 2 and 3 (VRU2); 12 to 33 tons per acre on habitat type group 4 (VRU3); and 12 to 25 tons per acre on habitat type group 5 (VRU4). Weed free mulch would be applied to exposed soils within 25 feet of reclaimed stream crossings.
SOILS-M-12	Erosion control measures such as straw bales, wattles, silt fences, hydromulching, etc. would be in place before and during ground disturbing activities. Erosion control measures would remain in place and functional for a minimum period of one growing season.
SOILS-M-13	Where hydrophobic conditions exist in areas of mosaic or high soil burn severity in harvest units or sensitive soil rehabilitation areas, and where practical, soils would be scarified to a depth of 4 inches. Coarse woody debris would be spread on site to provide for long term soil productivity as specified within "The Woody Debris Resource on the Lolo National Forest", 1996. The guide recommends retention of 5-10 tons per acre of woody debris larger than 3 inches diameter on habitat type groups 2 and 3 (VRU2); 12 to 33 tons per acre on habitat type group 4 (VRU3); and 12 to 25 tons per acre on habitat type group 5 (VRU4). . Where scarification is not practical, and on slopes greater than 30 percent, or where slumping is occurring, soils would be seeded and mulched if the live effective ground cover is not at least 60 percent of the sites natural capability after the second growing season following the fires.

Water, Hydro, Fish and Aquatic Resources	
HYDRO-M-1	Montana Best Management Practices for Forestry would be met as a minimum, including provisions of the Streamside Management Zone Law. All activities would comply with Lolo National Forest Best Management Practices. MT DNRC approval would be requested if variances to Montana BMPs were needed.
HYDRO-M-2	Montana Streamside Protection Act (SPA) 124 Permits would be obtained for any activity that would disturb stream channels. U.S. Army Corps of Engineers 404/401 Permits would be obtained for any activities involving stream channels and wetlands.
HYDRO-M-3	Boundaries of wetlands and RHCAs would be flagged to exclude ground-based equipment and other activities.
HYDRO-M-4	Erosion control measures would be inspected and maintained on a recurrent basis until the site was stabilized to ensure their effectiveness. Additional inspections and maintenance would occur following high rainfall events and prior to fall and spring runoff to ensure their effectiveness.
HYDRO-M-6	When variances would be granted for use of helicopter landings within the RHCA, the following measures would be required: 1) Erosion control measures including both a slash filter windrow and silt fence would be installed between the landing site and stream. Silt fences would be maintained for the duration of landing operations and a least one growing season following rehabilitation of the landing. 2) Log landing and decking operations would be kept as far away from the stream as possible. (e.g. in Trout Creek area operations would be confined to the area nearest FR 250). 3) Landing rehabilitation activities would include scarification to a depth of 12 inches, placement of 8-12 tons/acre of Coarse Woody Debris, mulching of the site, seeding with an approved grass mix, and planting of approved tree and brush species. 4) No slash burning operations would be permitted within the RHCA. All waste would be removed to an approved burn site or chipped and hauled to an approved waste site. 5) Clearing of and use of Landing and decking areas would be kept to the minimum size possible to meet safety regulations for log landing. 6) Fueling or servicing of the helicopter would be prohibited within RHCA landings.
HYDRO-M-7	If debris or slash were to enter a stream, it would be removed by hand immediately whenever there is a potential for blockage of the stream or crossing structure, or if the stream has the ability to transport such material.
HYDRO-M-8	On temporary roads, sediment-buffering devices would be installed below all fill slopes within 300 feet of streams or drainage crossings where appropriate.
HYDRO-M-9	All temporary roads would be obliterated, re-contoured, seeded, and cover added within one season of completion of use.
HYDRO-M-10	Slash filter windrows would be placed on relief culvert outlets that are within 300 feet of a waterway.
HYDRO-M-11	Cross drain spacing would be approximately 500 feet for road grades between 0 and 3 percent, and approximately 300 feet or less for grades between 3 and 10 percent.

Wildlife Mitigation Measures	
WLF-M-1	Proposed harvest stands in potential black-backed woodpecker habitat would be surveyed again each spring before harvesting begins. If black-backed woodpecker nests were located, then the nest tree would remain and a reserve patch would be marked around the nest tree. Clumps of reserve trees would be left in all regeneration stands. The clump around the nest tree could be used as one of the reserve clumps. The size and number of reserve trees and clumps would be designated for each stand in the harvest prescription.
WLF-M-2	There would be no activities behind closed gates during hunting season. When activities were proposed, the wildlife biologist would be consulted on a case by case basis to determine the effects of these activities.
WLF-M-3	There would be no activities on big game winter range from December 1 through May 15. When activities were proposed, the wildlife biologist would be consulted on a case by case basis to determine the effects of these activities.
WLF-M-4	The Lolo National Forest Plan Dead and Down Woody Debris Habitat Component Guidelines (United States Forest Service 1997) would be followed where they are applicable. Additional guidelines would be implemented for salvage and intermediate harvest in smaller diameter burned stands. The primary guideline for snag retention would be to keep as many of the large snags that existed before the fires as possible while still providing for human safety. Some of the burned stands are small diameter lodgepole pine that reburned following the 1910 fire. These stands had few large snags before the fire and because of the small average diameter in the stand, there are no additional large snags. Because of lack of large snags, clumps of snags will be retained in harvest units instead. The specific snag and woody debris guidelines are listed in the prescription for each stand.
WLF-M-5	Live trees in harvest units that meet Region 1 Old Growth Criteria would be retained. The harvest prescription would provide detailed descriptions for each stand.

Protect Soils. No management activity should be undertaken which does not protect soil integrity.

Post burn management activities that accelerate erosion or create soil compaction must be prohibited.

The Post Burn FEIS not only has extensive measures for soil protection, it also has projects designed solely for the restoration and recovery of watersheds. These activities include soil stabilization, mine reclamation and road decommissioning. See the table below for a complete list of activities (2-22,23).

Restoration and recovery of Watersheds Activities	Quantity
Soil Stabilization	1262 acres
Riparian Planting	38 acres
Dam Rehabilitation with Stream Restoration	1 dam
Mine Reclamation with Stream Restoration	4 mines
Trail Stabilization	1 mile
Road Reconstruction/BMPs	163 miles
Culvert Removals and Replacements with Stream Restoration	108 culverts
Road Closures and Decommissioning	223 miles
Gravel Source Development and Reclamation	1 site
Restoration and Recovery of the Land Activity	**Quantity**
Area Travel Management Restrictions	34613 acres
Road Seasonal (Gated) Travel Management Restrictions	14 miles

The FEIS lists over 50 design criteria and mitigation measures for soils and watershed. Those items are listed in the previous section.

Preserve capabilities of species to naturally regenerate.

From an ecological perspective, there is frequently no need for artificial regeneration.

Natural regeneration is occurring on most of the burned area. The areas that have been planted were surveyed and found to have little or no natural regeneration and no nearby seed source. Artificial regeneration is quite limited. Only about 1400 acres have been planted with seedlings and these were high and moderate/high severity burns. All our planting stock is from local seed sources. Roughly 15 years of genetic research has gone in to ensuring that seedlings that are best adapted for the site are planted.

Do not take actions, which impede natural recovery of disturbed systems.

Areas that have experienced the effects of a severe burn and are likely to exhibit high erosion should not be subjected to additional management activities likely to contribute to yet more sedimentation. Efforts should focus on reducing erosion and sedimentation from existing human-caused disturbance, e.g., roads, grazing, salvage logging.

We believe that management activities can reduce erosion in severely burned areas. Several studies (Burroughs, E.R. 1990, Burroughs, E.R., Jr. and J.G. King 1989, Forest and Harding 2001) have shown that human intervention can reduce erosion and the severity of impacts following fires.

Reducing erosion and sedimentation

Following a fire, there is both extensive natural erosion and erosion from human caused disturbance. For example, in Ninemile Creek the sediment model predicts a baseline sediment yield of 395% over natural in 2001. The long-term sediment yield from alternative 5 would be 105% over natural.

None of the alternatives propose any new system road construction. There are proposals for some short temporary roads. Overall, the project has a net reduction in road miles. Each alternative includes proposals to close or decommission aver 200 miles of roads with BMP's to be applied to an additional 279 miles of roads. All of the activities proposed for the restoration and recovery of watersheds and the land are carried through all of the alternatives. See the activities listed below.

Restoration and recovery of Watersheds Activities	Quantity
Soil Stabilization	1262 acres
Riparian Planting	38 acres
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Restoration and Recovery of the Land Activity	Quantity
Area Travel Management Restrictions	34613 acres
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Grazing

The two grazing allotments that overlap the fire perimeters are on hold until the area has recovered from the fires. These allotments are for about 25 cows each for about 2 months per year.

Salvage logging should be prohibited in sensitive areas.

Logging of sensitive areas is often associated with accelerated erosion and soil compaction (Marston and Haire 1990). Salvage logging by any method must be prohibited on sensitive sites including: severely burned areas, on erosive sites, on fragile soils, in roadless area, in riparian area, on steep slopes or any site where accelerated erosion is possible.

Marston and Haire (1990) used a rainfall simulator to measure runoff and soil loss in plots representing a range of soil, fire intensity and logging conditions. Water repellent soils were common, producing high rates of runoff and soil loss. Soil loss was highest on sites, which had been logged before the 1998 fires and then burned, and this was attributed to the higher fuel load on the forest floor. This study is not very applicable to the Post Burn EIS because water repellent soils are not common in these fires and logging activities avoid those areas. Marston and Haire (1990) state that soil loss was highest on sites logged before the fires. No harvest activities are planned in areas that were logged before the fires. Some of the previously logged stands may be planted if natural regeneration does not occupy the site within five years.

Logging methods

The impacts of logging vary greatly depending on the logging method, timing, weather conditions and duration. Klock (1975) found that skyline, helicopter and tractor skidding over snow caused less soil disturbance than tractor skidding over bare ground. The Post Burn DEIS emphasizes using these methods that cause less disturbance along with contract clauses that specify the timing and weather conditions required for operating in for each unit. Alternative 5 proposes 1353 acres of tractor logging verses 2077 acres of helicopter and 1415 acres of skyline logging. Only 28 percent of the harvesting would use ground-based equipment and most of that will be limited to operating in the winter on frozen ground, which greatly reduces soil disturbance.

Severely burned areas

The FEIS states that in alternative 5 as mapped, about 70 acres in six proposed cutting units would include some soils that burned at high severity. None of these units are proposed for tractor logging. The logging systems would be helicopter or skyline. Much of these areas will be avoided during layout. Contour felling may be done in these areas for erosion control. (4-7)

Design criteria and mitigation examples

- Minimize ground based timber harvest and salvage on severely burned or sensitive soils unless the effects of those activities could be mitigated with timing or other means.

Erosive sites, fragile soils, steep slopes, accelerated erosion

The existing conditions of soils are discussed in the DEIS on pages 3-23 to 3-45 and impacts of the alternatives on soils are discussed in the DEIS on pages 4-4 to 4-8. Areas of sensitive soils were identified in chapter 3 and restrictions were placed on various activities and recommendations were made for watershed improvement projects and BMP's (3-34, 37, 38, 41, 44).

Design criteria and mitigation examples

- Limit tractor logging to slopes of 35 percent or less. In high soil burn severities, limit tractor logging to slopes of 30 percent or less.

- Avoid developing major log landings on slopes greater than six percent. Utilize existing roads and disturbed areas for landings where possible.

- Minimize developing landings on areas with high soil burn severity unless the effects of those activities could be mitigated with timing or other means.

Roadless areas

There is no harvesting in any inventoried roadless area. About 19 percent of the project area is in inventoried roadless areas.

Riparian area

RHCA's (Riparian Habitat Conservation Areas) have been established for all proposed cutting units. Some RHCA's have been expanded beyond the required distances in INFISH in specific drainages of concern.

Design criteria and mitigation examples:

- If Riparian Vegetation Extends further than the defined Riparian Habitat Conservation Area (RHCA) buffer width, the RHCA would be extended to include all riparian vegetation.

- No Activities would occur within RHCAs except for activities intended to improve riparian conditions including but not limited to: road reconstruction and BMP's, road closures, road decommissioning, culvert removals, soil stabilization, stream rehabilitation, and riparian planting.

- Landings (e.g. for helicopter operations) could be constructed within RHCAs only if no other alternatives are available within identified economic and resource constraints, and impacts could be mitigated.

- No Harvesting Activities would occur within 300 feet of Perennial Fish Bearing Streams.

- No Harvesting Activities would occur within 150 of Perennial Non-Fish Bearing Streams.
- No Harvesting Activities would occur within 50 feet of Intermittent Streams.
- No Harvesting Activities would occur within 150 feet of Ponds, Lakes, or Wetlands > 1 Acre in Size.
- No Harvesting Activities would occur within 50 feet of Seasonally Flowing Streams, Intermittent Streams, Landslide Prone Areas, or Wetlands < 1 Acre in Size in Non-Priority Watersheds.
- No Harvesting Activities would occur within 100 feet of Seasonally Flowing Streams, Intermittent Streams, Landslide Prone Areas, or Wetlands < 1 Acre in Size in Priority Watersheds (Trout Creek and Ninemile Creek).
- No fuel storage or equipment refueling would occur within RHCAs or Streamside Management Zones (SMZs)

On portions of the post-fire landscape determined to be suitable for salvage logging, limitations aimed at maintaining species and natural recovery processes should apply.

Leave at least 50 percent of standing dead trees in each diameter class. Leave all trees greater than 20 inches dbh or older than 150 years. Generally, leave all live trees. Because of soil compaction and erosion concerns, conventional types of ground –based yarding systems (tractors and skidders) should be generally prohibited.

In alternative #5, all of the standing dead tress in all diameter classes, all trees greater than 20 inches and all live trees will be left on over 33,000 acres within the fire perimeters because no harvest activities are proposed for those areas.

The Lolo National Forest uses the Lolo National Forest Dead and Down Habitat Components and Guidelines (USFS 1997), and the Northern region snag management protocol (USFS 2000). These guidelines are much more specific to the habitat needs of snag dependent wildlife than a blanket recommendation of leaving 50 percent of the standing dead trees in each diameter class. For example, tree species are ranked by potential wildlife use so that ponderosa pine and larch would be chosen over alpine fir or lodgepole pine. These guidelines also include safety factors from “Risk assessment for identifying reserve trees” (IFIA et al. 1995) for meeting OSHA requirements.

Even more specifically, surveys for black-backed woodpeckers have been done each year following the fires in order to find where these birds are nesting and avoid those areas. This ensures that the specific nest trees are retained as opposed to a blanket recommendation of 50 percent retention. Existing conditions and recommendations for black-backed woodpecker habitat is discussed in the DEIS (3-169 to170 and 4-89 to 90).

The Lolo National Forest Dead and Down Habitat Components and Guidelines (1997) are quite similar to the Northern region snag management protocol (USFS 2000). The Lolo National Forest guidelines uses fire groups and the Region one guidelines uses VRU's (Vegetative Response Units) to divide the landscape for snag retention. In general, both recommend a few large snags in the lower elevation types and more snags (4-12 or 6 –12) at higher elevations. Both give some general recommendations for leaving more snags in post fire habitats.

In this project, the harvest contract will specify at least 8 to 12 snags per acre. Nearly all the ponderosa pine will be left on site because this species has lost most of its commercial value because of blue stain fungus. This will retain some of the largest diameter snags in the lower elevation stands. Some units will have snags marked according to the guidelines in the prescriptions. All material less than 9 inches dbh will also be left on site. Though this smaller material does not provide large snag habitat, it does provide down woody debris. (Wildlife report pp 100-101).

This proposal includes harvest of green trees. Depending on location, commercial thinning of lightly burned and unburned timber would be completed using tractor, skyline, or helicopter yarding methods. Under these treatments, smaller, suppressed, and closely spaced trees would be removed in order to reduce ladder fuels, reduce tree competition and the risk of bark beetle infestations, and to feature larger desired tree species of Douglas-fir, western larch, and ponderosa pine. Removing trees that are vulnerable to insect attack, green but damaged by the fire, postfire logging can reduce the probability that insect pest populations will build up and infest adjacent green stands (Amman and Ryan 1991). Trees that were under stress, or had died from the fires would be salvaged during commercial thinning operations if not needed as snags and coarse woody debris. (2-28)

Ground based yarding systems are proposed on a limited basis. Alternative 5 proposes 1353 acres of tractor logging verses 2077 acres of helicopter and 1415 acres of skyline logging. Only 28 percent of the harvesting would use ground-based equipment and most of that will be limited to operating in the winter on frozen ground, which greatly reduces soil disturbance. Klock (1975) found that tractor skidding over snow caused less soil disturbance than tractor skidding over bare ground.

Because of the wide range of chronic ecological effects associated with road building, the building of new roads in the burned landscape should be prohibited.

No new system road construction is proposed. The DEIS shows 1.7 miles of temporary road proposed in alternative 5. This alternative also proposes closing and decommissioning aver 200 miles of roads, and applying BMP's to nearly 300 miles of roads. This would produce an overall reduction in the number of road miles and reduce the adverse impacts of the remaining roads through BMP's. (2-68 to 69)

Active reseeding and replanting should be conducted only under limited conditions.

Introduction of non-native species or exotic genotypes of native species should be prohibited for all reseeding /replanting programs.

During the BAER (Burned Area Emergency Rehabilitation) work, all seed and straw had to be certified as weed free. Native grass seed was used for seeding some fireline until the supply ran out. About 3700 acres of high severity burn areas were seeded with winter wheat and annual rye for temporary soil stabilization immediately after the fires.

Natural regeneration is occurring on most of the burned area. The areas that have been planted were surveyed and found to have little or no natural regeneration and no nearby seed source. Artificial regeneration is quite limited. Only about 1400 acres have been planted with seedlings, these were high, and moderate/high severity burns. All our planting stock is from local seed sources. Roughly, 15 years of genetic research has gone in to ensuring that seedlings that are best adapted for the site are planted.

In concert with the MWMP, the Montana State Department of Land Resources and Environmental Sciences (MDLRES) has coordinated with the Lolo National Forest, Missoula and Mineral Counties, and private landowners to develop the Flat Creek and Ninemile Weed Management Areas, which include portions of the Post Burn Project. The FEIS also includes design criteria and mitigation measures for noxious weeds and invasive plant species, which are listed below.

Design Criteria for Noxious and Invasive Plant Species

Manage known weed populations through treatments including herbicide, mechanical, and prevention.

Minimize management activities in areas where weed populations do not presently exist unless the risk for introducing noxious weeds could be mitigated.

Manage motorized vehicle access in areas where existing weed populations may be spread into adjacent areas free of weeds.

Noxious Weed Mitigation Measures
All equipment that would be used off road would be washed prior to moving into the project area. All equipment would be inspected and approved before operations would begin.
Existing roads that would be used in conjunction with project activities would be mowed, or sprayed prior to equipment be moved into the area so that seed bearing noxious weeds are removed from the roadway.
Road clearing would be kept to a minimum to maintain shaded conditions along road rights-of-way.
Funding for noxious weed treatments on roads that are not within the timber sale boundary would be listed in priority based on the following criteria: 1. Treatment of roads scheduled for closures. 2. Main roads outside of the sale areas. 3. Areas adjacent to private landowners with active weed control programs.
Chemical treatments would be with the following herbicides, as approved for use in the Final Environmental Impact Statement for Noxious Weed Management on the Lolo National Forest (USDA Forest Service 1991), the Superior Ranger District Noxious Weed Herbicide Treatment Program Environmental Assessment (USDA Forest Service 1997), and the Lolo National Forest Big Game Winter Range and Burned Area Weed Management EIS (USDA Forest Service 2001): picloram (Tordon), 2,4-D, Glyphosate (Roundup or Rodeo), and dicamba. Herbicides would be applied as directed by the Lolo National Forest Plan Amendment 11, and product label requirements.
Road ditches leading into intermittent and perennial streams would be flagged as no-spray zones and would not be sprayed with a Picloram based herbicide.

Structural post-fire restoration is generally discouraged.

Frequently, post-fire restoration efforts involve the installation of hard structures including sediment traps, fish habitat alteration, bank stabilization, hay bales, weirs, check dam and gabions. Sediment management should focus on reducing or eliminating anthropogenic sources prior to their initiation (e.g. improve stream crossings to prevent culvert failure).

Post fire restoration has changed and improved since 1995. No sediment traps, weirs, check dams or gabions have been constructed on these fires. Some straw bales were used temporarily during road and culvert upgrading projects. Some "bank stabilization" was done in conjunction with installing new, larger sized culverts and two bridges. Contour felling was used in some high severity burn areas with slopes greater than 70 percent. Contour felling mimics natural woody debris fall and does not require any long-term maintenance. Improvement projects for culverts started with the BAER (Burned Area Emergency Rehabilitation) and will continue with the Post Burn EIS. See the table below.

Culvert Projects

Actions	**Number**
Culverts replaced with larger culverts	6
Culverts replaced with bridges	2
Culverts scheduled for replacement	108
Culverts locations scheduled for changes	143

This project also proposes removing or modifying some hard structures that existed before the fires. One activity would remove part of a silted in, abandoned dam in order to provide fish passage. Other proposals involve rehabilitation in placer-mined streams.

Post-fire management will generally require reassessment of existing management.

For example, the condition of a transportation system (i.e. pre-existing roads and landings) should be reassessed after a fire. Additionally, post-fire livestock grazing should be altered or eliminated to allow natural recovery processes to occur.

Soon after the fires were over in 2000 the Burned Area Assessment team was formed in order to characterize the burned area, identify key issues, describe the current conditions, compare current and historic conditions and develop recommendation and priorities. The Burned Area Assessment was published in

March 2001. This report covered recreation, vegetation, fire, fuels, wildlife, watershed, soils, fisheries, transportation, economics and geology. This was the starting point for the Post Burn EIS team that was formed later that spring.

Part of the reassessment of conditions included public involvement. Following completion of the Burned Area Assessment and during development of the Proposed Action for the Post Burn Project (March-April 2001), the Forest re-initiated public involvement by conducting four "Pre-Scoping" meetings in communities near and most directly influenced by the fires. On June 15, 2001, the Lolo National Forest began the formal public involvement or "scoping" process by mailing general information packets containing a summary of the Proposed Action to 1361 individuals and organizations on the Forest's established mailing list. Public open houses were held on July 23rd and 24th to meet one-on-one with the public and solicit comments, and on September 25th and 27th field tours were held with the public and Environmental Advocacy Groups. All of the information gathered from the public was used to identify issues and develop alternatives.

Fieldwork was conducted for all resources. For example, approximately 758 miles (375 miles inside the Project Area boundary) of "jammer" roads have been mapped and inventoried spatially, and will be recorded in the INFRA tabular database.

The two grazing allotments that overlap the fire perimeters are on hold until the area has recovered from the fires.

Continued research efforts are needed to help address ecological and operational issues.

We agree. Quite a bit of research has been done on postfire activities since the1995 Beschta report. See McIver and Starr (2000) for Environmental Effects of Postfire Logging: Literature Review and Annotated Bibliography.

Within the Forest Service, only the research branch can conduct research, therefore research projects are beyond the scope of this EIS. The Rocky Mountain Experiment Station is presently working on RMRS-4155-4-2 Secondary plant succession and regeneration establishment following the wildfires of 2000 in Idaho and Montana. They have established study plots throughout the project area.

Monitoring is conducted at forest and district level. The Post Burn FEIS outlines detailed monitoring for each resource area and lists over 40 monitoring items (2-39 to 42).

Additional information must be provided to the public regarding natural fires and post-burn landscapes to provide balance to the "Smokey Bear" perspective of fires and forests.

During the final stages of the fires in 2000, nearly all of the elementary school students in Mineral County visited the St. Regis fire camp to learn about fire suppression and fire ecology.

Following the summer field season, the Forest provided a Public Field Tour of the fires on September 25th. During this tour, the general public, students, environmental advocacy groups, and timber industry representatives had an opportunity to visit with Interdisciplinary Team members "on the ground", to discuss the findings of the team's resource reviews, and to offer final suggestions for developing alternatives. A second field tour was held on September 27th with a member of one environmental advocacy group (2-3).

On September 25th, the Forest also conducted Post Burn field trips with Superior elementary school classes to provide a hands-on experience with fire disturbance and post fire restoration. The classroom experience helped local school- aged children better understand the natural role of fire and the effects that fire has on the forest (2-4).

Between May 18, 2001 and June 5, 2002, eleven classes were conducted for 5th and 6th graders on fire ecology. These classes accounted for aver 60 hours of classroom and field trip time (2-4).

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