EIS proj file
Scoping comments

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Subject: Burned Area EIS Comments

03/14/01 08:43 PM

Hi Stu. Attached are my comments on the Burned Area EIS, submitted from me as a private citizen. I hope it will be useful in guiding the IDT toward developing this project to be protective of the sensitive soils and watersheds burned last year. I did send a signed hard copy of this letter to Craig Bobzien at Darby RS; I thought maybe you could use an electronic version too, as it may eliminate the need of retyping portions of it for writing the responses. It ended-up being four pages long....I guess I had a lot on my mind. Thanks, Ken McBride

EIS_burned area.wpd

Craig Bobzien
District Ranger
Darby/Sula Ranger District

Dear Craig,

These are my comments related to the EIS being prepared for restoration and other treatments of lands burned on the Bitterroot NF last year. Although I am the Forest soil scientist for the Bitterroot NF, I am

submitting these comments as a private citizen. This letter was written on my own personal time, as separate from my official job capacity.

I do support a modest degree of harvest of dead trees, but I also have concerns that if this is not done with a very light touch on the land, the risks of substantial levels of detrimental soil and watershed damage likely will increase greatly. This is a special concern because the combination of extensive existing soil and watershed damage plus the effects of the recent fires have left our soils and watersheds in an extremely sensitive condition.

Background and Existing Conditions

Much of the land being proposed for salvage harvest occurs in the low to middle elevation ponderosa pine and Douglas-fir forest. These forests are associated with warm, droughty soil conditions. Most of the area that burned occurs on soils developed from Idaho Batholith granitic rocks. The soils are shallow to deep and have low inherent vegetation productivity. They are low in soil organic matter and nutrients. In addition, these soils are very erosive and prone to landslides; the steeper the slope, the greater these hazards become. Such soils and habitat types are also prone to weed invasion, a serious concern in the Bitterroot Valley. In short, these soils are inherently sensitive and have low resiliency regarding recovery from disturbance.

Impacts to soils and watersheds from past logging are becoming increasingly evident as I continue to monitor the health of these lands. Past logging practices were abusive to the land. Most of these areas were ground-based yarded using dozers and rubber-tired skidders. In the 1950's through approximately the middle 1980's, this equipment operated on very steep slopes, commonly up to 50% slopes. On these steep, unstable slopes much soil displacement resulted, deep displacement was not uncommon. To make matters worse, the dozers were used to pile logging slash for fuels treatment and site preparation. While blading the slash into piles, much of the valuable surface layer of soil was also bladed into the piles and burned. This topsoil is the storehouse for soil organic matter, nutrients, and soil water available for plants and soil organisms. The past logging compacted soils to detrimental levels over large percentages of the harvested areas and this compaction commonly extends to depths of about 8 to10 inches, the biologically active horizons of the soil.

I have been documenting these effects of previous logging on soils over the past several years as part of determination of existing soil conditions for proposed timber harvest. It is quite disheartening to keep digging my test pits and finding such high levels of soil damage. I think the extent of this damage can only be appreciated when a person goes out day after day, unit after unit, sale after sale and finds the same disturbed soil conditions. The effects are very obvious in the form of dense, cloddy soils that now have fine platy structure rather than the friable, granular to subangular blocky structure that occurs in similar undisturbed soils. Also evident is the lack of fine roots in these damaged soils, especially in the soil layers where most of the biological growth and activity occurs. I have done dozens upon dozens of infiltration tests on these damaged soils and on nearby, similar undisturbed soils. Nearly universally, the infiltration rate is from 2 to 10 or more times slower in the damaged soils. Similarly, the bulk density sampling I've done corroborates this change in soil condition; where infiltration rates are low and where soil structure appears physically altered, soil bulk density is well above natural levels. Spotted knapweed appears to do especially well on these areas of damaged

soils; weeds in general are more successful than native flora on disturbed soils. All of this points to a loss in soil productivity and soil hydrologic function. This kind of soil damage occurs on much of the area of these old units. Typically, from 30 to 60 percent of a logged unit will have soils that meet the Regional criteria for detrimentally damaged soil. This level of soil damage also has been documented on other National Forests in the Pacific Northwest by researchers and through Forest monitoring. It is real, it is definitely present, and it results in the need to avoid creating additional soil damage in future land management activities. In addition, when these harvest effects are considered along with the well documented negative watershed effects of the many miles of logging roads on this Forest, the concern for overall watershed health becomes obvious.

On a large portion of the lands proposed for harvest, the fires of 2000 burned uncharacteristically severe, outside their historic fire regime. On sites classified as severely burned the entire litter and duff layers have been consumed, exposing bare mineral soil to erosive forces. The tree and understory canopies have also been consumed, further adding to the lack of soil protection. Much of the existing coarse woody debris was burned-up; this combined with loss of the litter and duff layers have left these areas quite depleted of organic matter. Such conditions in the low to middle elevation, warm, dry ponderosa pine/Douglas fir lands are likely outside the historic range of conditions, at least over such vast acreages. In addition, the Burned Area Emergency Rehabilitation teams last fall documented the extensive occurrence of water repellent soils in the burned areas. Research has shown this hydrophobicity can greatly reduce the rate at which water enters the soil and therefore can contribute to substantial levels of overland flow, soil erosion, and debris torrents, as evidenced in the Overwhich post-fire events in the early 1990's on this Forest. The length of time soils remain hydrophobic is not well understood. Observations vary from one to a couple of years. I have observed soils that appeared to have lost their water repellency from slowly wetting, drizzling rains become highly water repellent after several days of drying out. Regarding evaluation of soil existing condition and development of mitigations, hydrophobicity is yet another factor that needs to be added to the cumulative effects to which the burned-over soils are subject. Soils in conditions just described are quite susceptible to both surface erosion and landslides such as debris avalanches and debris flows/torrents; this problem being exacerbated by damage caused by past management activities.

The areas identified as having burned with moderate severity typically have tree canopies that were killed but not consumed; the brown, dead needles remaining on site. Many of the areas I observed have had the litter and duff layers consumed, as well as most of the understory vegetation, similar to the severely burned sites. As the dead needles fall to the ground they help increase infiltration and reduce runoff and erosion compared to rates on severely burned areas. This also may help in lowering the risk of landslide, but that has not been demonstrated yet to my knowledge.

Not only are the soils now in a sensitive condition due to the cumulative effects of past management and this years fires, but watersheds in the managed portion of the Forest are likewise at increased risk from these same cumulative effects plus effects of an extensive road system.

Recommendations

Based on the sensitized condition of soils and watersheds in the areas proposed for logging, I recommend the following logging practices to minimize the potential for further soil and watershed damage.

- as much as possible, rely on helicopter yarding, as this method has a low impact on soil. Minimize the size of helicopter landings to that needed for safety, and operate heavy processing, loading, and hauling equipment on as small of an area of the landing as possible.

- on slopes over 25 percent, utilize skyline yarding with at least one end of the log suspended off the ground. Winter yarding has less potential for soil damage than yarding on unprotected soils during other times of the year. All portions of skyline corridors that are gouged by dragging logs on the slope should be waterbarred, seeded, and mulched since these scars can channel surface water downslope, creating rills and gullies.

- when using conventional rubber-tired skidders or conventional tracked yarders, restrict yarding to slopes less than 25 percent and skid only when the soil is solidly frozen from the surface to a depth of 4 inches and/or the snow after a couple passes is compacted to a thickness of 10 inches or more. This thickness of snow needs to be maintained on the skid trail during the entire skidding operation. A limited amount of monitoring of sites yarded under these conditions indicates good soil protection, but more monitoring is needed to verify this.

-if feller-bunchers are used, they should operate under the same winter conditions required for conventional ground-based skidding.

-limited monitoring by myself on this Forest has shown that skidding with a Thiokol skidder in combination with a sled-type carriage in which the front of the log is cradled so as to ride on top of the snow without digging in, has virtually no impact on the soil. It may be possible for this equipment to operate on less than 10 inches of compacted snow without causing soils damage; that would need to be field tested operationally. Thiokols can also work more safely on steep snow-covered slopes, and it may be possible to use this type of skidder on such slopes without causing soil damage. Even though Thiokols do not have the power of conventional skidders and can't skid as many logs in a single turn, based on consideration of economic, resource, and social concerns, they seem superior to conventional ground-based yarding to me. To address the economic concerns, I think the Forest Service should consider some creative ways of improving the economics of yarding with Thiokol-type equipment. Perhaps the Forest could purchase one or two using the extra money received for post-fire needs, since it may not be economical for private loggers to purchase and operate them. This equipment would also be useful for logging of green areas, especially in the urban interface where much previous soil damage exists and where it is difficult to meet the frozen soil/snow depth conditions needed for yarding with conventional skidders. The Bitterroot Forest has a difficult task in trying to salvage log and to treat fuels in the green forests while adequately protecting natural resources; I think Thiokol skidding is a valuable tool to help achieve this goal. The investment seems justifiable to me.

- do not allow the use of heavy equipment such as rubber-tired or tracked skidders, feller-bunchers, or log forwarders to operate on moderately or severely burned areas on unprotected soils, i.e. during periods when frozen soil or snow depth conditions discussed above are not present.

Coarse Woody Debris Retention

On these highly sensitized lands, retention of coarse woody debris deserves special consideration. In addressing soil productivity/soil quality concerns I have in the past, in my official capacity of Forest soil scientist, recommended leaving 1.5 to 2 times the coarse woody debris on severely burned sites than what research by Graham and others have suggested as normal levels. However, these levels do not address the risks of accelerated erosion and landslides that now exist on many burned-over acres. It seems prudent to leave even more trees on these areas for several reasons. Standing dead as well as fallen trees still provide a substantial amount of shade to the ground layer. This shade helps to slow snow melt which reduces the risk of overland flow, soil erosion, and landslides. Fallen trees provide at least a small degree of erosion protection by acting as barriers to surface flow. They also provide a lot of water storage capacity as they rot. In addition, the shading provided by standing and fallen trees helps understory regeneration by lowering soil surface temperatures below lethal levels as well as reducing evaporative losses of soil moisture. The shade can also reduce risks of weed spread.

To provide adequate levels of shading for soil and watershed protection, as a starting point, I recommend leaving at least 50 percent of the trees onsite. The leave trees should be in a variety of size classes, but the prescription should emphasize leaving the larger trees where fuel accumulations are a legitimate concern, since these larger trees theoretically should provide less risk of flashy, hot wildfires. The discussions going on in the research community and this agency about reburn potential appear to be little based on proven science or historical accounts. The scant evidence can be used to support either side of the reburn theory. What is clear to me however, is that society and land managers need to recognize that the soil resource needs to be given major consideration when evaluating risks of reburn and land treatments that address this reburn issue. This is because soils are the basic resource supporting terrestrial and to a significant degree, aquatic ecosystems; healthy ecosystems are not possible without healthy soils. There is no rational justification in adding more soil damage to these lands by inappropriate logging methods in the name of minimizing reburn potential. Soil compaction and displacement are predictable and permanent consequences of abusive logging, whereas the reburn potential and effects are largely speculative, and they are short term compared to effects of soil damage. Many indicators of long-term ecosystem health point to the need to emphasize soil and watershed protection.

Soil Quality Standards

Another issue I feel needs to be addressed in the EIS and/or in Regional and Forest policy development is the changes made to the Regional Soil Quality Standards (SQS) last year. I am referring to the "clarification letter" the Regional Office sent to the Forests this past fall. This letter and subsequent Regional direction maintains that soil damage resulting from previous management activities should not be counted toward meeting the SQS. To me that ignores cumulative effects, and furthermore, it contradicts direction in the SQS that require that if prior activities have resulted in more than 15 percent detrimental soil conditions in a harvest unit, then following the planned project implementation the cumulative detrimental effects and restoration should not exceed the conditions prior to the planned activity. Also stated is that "at least 85 percent of an activity area must have soil that is in satisfactory condition", and "The cumulative effects of multiple site entries on compaction should also be considered since compacted soils

often recover slowly". I have been involved with the rest of the Northern Region soil scientists in developing the Regional SQS over the past twelve years, and I know we never intended any uncoupling of soil damage due to previous management from that proposed or having occurred from a current project. This idea is contrary to what our group has developed as evidenced in previous versions, final and drafts, of the SQS through the years. The detrimental soils effects indeed are cumulative regarding soil quality, watershed quality, and ecosystem health, regardless of what the clarification letter directs. In fact, based on NFMA requirements related to maintaining land productivity, I think it probably is illegal to not count all soil damage, old and new, when applying SQS. If not illegal, this surely is not good land stewardship; it represents a major step backwards in watershed and soil protection by weakening the SQS. This change in the Regional SQS should be reviewed by personnel knowledgeable in NFMA, NEPA, and cumulative effects issues as well as by a group of Regional soil and water specialists and researchers.

Watershed Assessment

My final point relates to assessing the condition of soils over areas larger than just the proposed treatment units. The Soil Quality Standards address just the proposed activity areas, but do not consider the watershed level. The effects of soil damage in units previously logged as well as current proposed logging units are cumulative in the watershed. Neither this Region nor the Bitterroot Forest has quantitative standards regarding acceptable levels of total soil damage at the watershed scale. The question of what percentage of the managed portion of a watershed can have detrimental conditions cumulatively from roads, logging, and grazing should be addressed in the EIS, and in the future by a panel of soil and water specialists from the Region, research, and academia. For now, using the same SQS value of 15 percent of the area as maximum allowable soil damage seems a likely starting point for discussion, since logically, the whole (i.e. the managed watershed) should not be allowed to be in any worse condition than the sum of the parts (i.e. the individual harvest units).

I appreciate this opportunity to let you and the ID Team know more about the current conditions of the soils of this Forest, the risks that are present, and of my concerns that the logging needs to be done with a very light touch on the land. Please keep in mind that our Forest soil resource truly is irreplaceable in the scope of human lifespans. It is key to healthy ecosystems. Thank you!

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