

United States
Department of
Agriculture

Forest
Service

Nez Perce NF

Reply To: 2520

Date:

Subject: Soil, Water and Riparian Monitoring
North Fork Face Timber Sale

To: District Ranger, Salmon River Ranger District

Enclosed is a report on soil, water and riparian conditions in the North Fork Face Timber Sale. Thanks to the Salmon River district for being first and bravest to invite and participate in these first forest monitoring efforts.

Soils

Unit 2 was selected randomly from among the tractor harvested units for intensive sampling. It was clearcut this summer from late June through early July under initially moist soil moisture conditions, becoming dry. Site prep has not been done. Designated skid trails were prescribed in the EA. Woodcutters have been over some of the ground with pickups.

Soil damage in this unit occurred over an average of 33% of this unit. Because of the high variability in measurements, this number was not statistically different from the 20% threshold described in the Forest Plan (II-22). Almost all of the damage can be attributed to compaction associated with the extensive network of skid trails. About one-third of the unit showed impacts from skidding equipment. Some of the skid trails were compacted. Additional compacted sites were measured on ground that did not look disturbed.

This extent of skid trails compares to a maximum of 36% reported for uncontrolled skidding by Dyrness in 1965. Preplanned skid trails generally should be expected to reduce the area in skid trails to less than 10-12 percent. Since terrain was mostly gently sloping and not dissected on this unit, it is unlikely that this 10-12 percent figure need have been exceeded.

Salmon River has a good record using burning for site prep instead of dozer piling. Effective designated skid trails and prescribed burning can do a lot to keep soil damage within forest plan standards.

Broadcast burning is the prescribed site prep for this unit. It is not expected this treatment to result in significant additional damage. The site is mostly a grand fir/wild ginger habitat type. Rotten wood in the soil appears to play an important role in regeneration sites and it was noted that soil wood was heavily colonized by roots. Adequate amounts of large woody material need to remain after burning to maintain site productivity.

No location map

T 27N R 3E Sec 21 or Sec 20

Slope 10-25%

Not sure of Aspect/Elevation/LT

1988 North Fork Face T.S. D-1

Cable units appeared to be in good shape. Monitoring after site prep would provide more information on these areas. Line corridors that become erosion channels would be easier to identify. These could be waterbarred like firelines where necessary, or have slash securely emplaced across them.

Water

To evaluate implementation of water quality mitigation measures, the review team focused on the newly constructed segment of Road #398. This road was built using most of the mitigation measures commonly associated with 60 to 80% sediment mitigation. The desired mitigation level was 80%. Our review indicated that the specified measures were mostly implemented. It was estimated that about 70% mitigation effectiveness was achieved. The reasons for not fully achieving the desired level are described below. Also included are recommendations for changes which would likely result in meeting the prescribed level.

Seeding and fertilization showed variable results. Fillslopes and portions of the running surface revegetated well. Generally, the cutslopes showed a poor take. This was apparently due to the steep backslope and infertile materials. This is not unexpected on cutslopes, as similar results have been shown in research studies on the Forest. It is expected that revegetation on the cuts will improve over time. A partial reseeding and fertilization is recommended to achieve improved mitigation effectiveness

Slash filter windrows were placed along the fillslope of the road. These appeared to be functioning as designed.

Plans called for spot rock placement on the road surface. This was done, but was only partially effective in preventing rutting of the road. Moderate ruts had formed on some unsurfaced road segments due to use during wet conditions. Either full surfacing or better control of traffic during wet periods would have helped increase the effectiveness of the surfacing and drainage control mitigation measures.

Erosion rills were present on one pitch which was about 250 feet long with a 14% grade. Additional drainage control (waterbars or dips) were needed on this pitch. The team noted one location where ditch material had been deposited near a first order stream resulting in delivery of a minor amount of sediment to the stream. The problem appears to have been related to maintenance rather than road design.

There was an unstable cutslope noted on the road near the top of Unit #9. This problem had been previously noticed, and it was indicated that plans to stabilize the slope are underway.

A nonsystem road extension beyond the end of Road #398 in Unit #5 was inspected. This road was less than 1/4 mile long, located on sideslopes of about 70%, and had a vertical cutslope of about 8 to 10 feet high.

Although no sediment delivery was noted from this road to date, it was agreed by most participants that it should have been added to the system road package. It was noted that the purchaser had requested additional nonsystem road in this unit, but was denied. It was also noted that contract modifications were made to Units 3 and 4 to minimize road construction on steep slopes there.

The review team went through a checklist to determine compliance with the water quality provisions in the Idaho Forest Practices Act. The results of this effort were written up in a separate report by the district. It was found that most rules were followed and some were exceeded. There were ten instances noted, which by strict interpretation, did not meet the rules. In two of these, a slight amount of slash or sediment reached live streams.

Riparian Areas

Riparian areas appear to have been adequately protected, but without riparian objectives and prescriptions. Site specific delineation and evaluation of riparian dependent resources, opportunities and needs might have identified areas where slope or channel stability or debris requirements could better have been met with individual prescriptions. Riparian area management is a rapidly developing field, and I expect most of our implemented projects to be a few years behind our state of knowledge.

In summary, from my perspective, it looked like the EA was adequate for its time, and that the soil and water protection measures specified were implemented, but keeping control of the skid trail system needs work. Please let us know what we can do to help in this or other areas of soil and water protection. Our riparian guide is printed and we will be scheduling district visits to introduce people to its use. Sale administrators and presale foresters will be critical to its successful application.

Thanks again for initiating the monitoring effort. These ID team reviews can help us all educate one another.

PAT GREEN
Forest Soil Scientist

NICK GERHARDT
Forest Hydrologist

Enclosures

cc: Pat Green

SOIL MONITORING SUMMARY
North Fork Face Timber Sale
Pat Green - November, 1988

— Evaluate the potential for soil displacement, compaction, peddling, mass wasting, and surface soil erosion for all ground disturbing activities. Yes. A brief reference to erodibility and mass wasting potential is made in the EA. The R1-R4 sediment model was used to evaluate erosion and sediment delivery.

— Environmental documentation and contract language address any soil issues raised in this evaluation through scheduling, location, treatment type, or other means. Designated skid trails are prescribed as a result of compactible soils (not an issue raised in the evaluation but true.) Contract clause C6.4 limits width of skid trails, prescribes >150 feet between skid trails and limits tractors to designated skid trails.

— A maximum of 20% of the activity area will be detrimentally impacted. Unit 2 was a randomly selected tractor harvest unit. 33% of the area was detrimentally impacted. See the attached report. Damage was primarily due to compaction because of unconfined skidding. Skyline units sustained much lower levels of damage.

— Maintain sufficient ground cover to minimize rill erosion and sloughing on road cut and fill slopes and sheet erosion on other activity areas. Road cuts and fills had been seeded and fertilized, but the seed catch was poor on road cuts and needs repeating. Firelines on steep slope may need waterbarring or seeding to control erosion.

— Timber sale contract includes specifications to control erosion from landings, temporary roads and skid trails.
Contract includes C6.6#, C6.601# and C6.622

— Erosion control language was implemented and effective. Waterbars were installed, scarification was done and seeding along skid trails. Looks to be effective on harvest units.

— Special contract language (C6.4) used to protect soil resource. Designated skid trails required, but not adequately implemented. Skidding tractors required to operate without blade. This was implemented. Full suspension of logs over protected streamcourses. Implemented.

SOIL MONITORING PROJECT REPORT
North Fork Face Timber Sale
Pat Green - November, 1988

Objectives:

To evaluate effects of timber harvest on the soil resource of a representative harvest unit in the sale area in accordance with forest plan standards.

Methods:

A tractor harvest unit (2) was selected randomly from those completed. Sampling methods generally follow those standard in Region 6. These methods are described in "Guidelines for Sampling some Physical Conditions of Surface Soils", R6-RWM-146-1983, by S. Howes, J. Hazard, and J.M. Geist. Nine linear transects were located at random points, at random azimuths. Unit 2 is about 40 acres in size.

Percent of each 100 foot transect falling into each of the following condition classes was noted: undisturbed, displaced, deposited, eroded, obviously compacted, puddled, and other. I called 'compacted' anything that showed obvious signs of skidding.

Actual levels of compaction were assessed by taking cores of soil from 0 to 6 inch depth at 5 foot increments along each transect. Each core was referenced to the condition class assigned to it. Twenty cores of undisturbed soil were taken in an unharvested area adjacent to the unit to define the average uncompacted soil condition.

Data Summarization:

Soil damage is the percent of the unit with surface soil displaced, puddled, eroded, and that part of the compacted, 'other', and undisturbed categories that had soils compacted to a bulk density of more than 20 percent above the average for the unharvested condition. Mean and variance for total soil damage and each damage category were computed as the average of all transects. A t-test was applied to total soil damage to see if damage exceeded the 20 percent standard referenced in the forest plan (II-22). This standard states that a minimum of 80 percent of an activity area shall not be detrimentally compacted, displaced, or puddled upon completion of activities.

Results:

On unit 2 total damage averaged 33 percent. But a t-test applied to this value indicated that the probability that soil damage does not exceed 20% is more than 5%. This means that we cannot say conclusively that the forest standard has been exceeded. These results are due to the large spatial variability in damage. I think additional transects would tend to confirm the high level of impacts. The average damage is clearly high and can be attributed mostly to compaction due to skidding.

One third of the unit was obviously skidded over. Some of this was actually compacted, some not. Over 20 percent of the area that appeared undisturbed, actually sustained compaction. (I deleted from calculations those areas with subsoil exposed due to tree tip up before harvest. These would have incorrectly implied compaction due to harvest.)

Since designated skid trails were specified in the EA, percent of area in skid trails should have been less than 12 percent, and could have been less than 5 percent, using winching on favorable terrain.

DATA SUMMARY
Unit 2

Transect	Total Damage	Undisturbed	Displaced	Deposited	Obviously Compacted	Puddled	Eroded	Other
1	17.5	59	7	4	21	0	0	0
2	28.8	81	0	1	17	0	0	0
3	13.7	64	0	0	36	0	0	0
4	47	45	0	7	48	0	0	0
5	15.7	69	0	4	27	0	0	0
6	23.4	37	2	1	60	0	0	0
7	77.8	50	0	4	46	0	0	0
8	55	53	4	0	43	0	0	0
9	19.5	82	5	10	3	0	0	0
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Average	33.2	60	2	3	33	0	0	0
Variance	486	241	7	11.5	321	-	-	-
95% Conf. Interval	33 ₊₁₇	60 ₊₁₂	2 ₊₂	3 _{+2.6}	33 _{+13.8}	-	-	-

RIPARIAN MONITORING SUMMARY
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— Riparian Areas were delineated and evaluated prior to implementation.

Most perennial streams are designated protected stream courses. Several small wetlands (Unit 1) were missed in the identification process. The EA does not indicate any evaluation of riparian resource needs and opportunities, therefore no riparian objectives were developed.

— Trees well marked in number, distance from stream and size to meet riparian objectives.

Unit 5, a skyline unit, has an uncut buffer about 30-40 feet from the North Fork. This is probably adequate to meet shade and debris needs for this stream. Definite objectives would be preferable.

Unit 2 is adjacent to a first order tributary. In places a thin strip of uncut trees was left; in other places trees were cut to the stream edge. Woody debris is of moderate importance in this stream for sediment storage. Residual alder provide summer shade. The result is probably adequate.

— Directional felling was accomplished where specified. No trees appear to have been felled across the creek.

— Residual canopy cover meets level of fisheries habitat protection specified. Yes.

— Leave strips were of specified width. None specified in the EA.

— Skyline corridors no more wide than necessary. These looked very well controlled.

— Fuels prescription addressed riparian objectives. We don't know. It looked like the North Fork would be the fuel line which means that much of the leave strip might be consumed.

— Protected stream zones accurately delineated on Sale Area Maps and protected as defined in contract language. Generally, yes.

— Contract was designed to attain riparian objectives. Directional felling and prohibition of skidding within 50 feet of live streams was provided for. The latter clause was not always enforced.

— Operations were consistent with objectives and contract. Yes, inasmuch as any objectives were defined.

— Management practices do not cause blockage of water courses.

— Landings and skid trails located out of riparian zone. Quite well. A skid trail was constructed through a wet alder glade in Unit 2.

— Slash piles located more than 75 feet from Class I streams and above high water mark for Class II streams. Some introduced slash may be acceptable depending on debris needs and availability at the site. Yes. A little small, floatable, inappropriate debris was in the North Fork from Unit 5.

— Any introduced logging slash does not block stream course or increase channel instability. O.K.

— Logs were fully suspended when crossing streams. Yes.

— Debris from fireline construction was kept of riparian area. Not yet applicable.

— Management practices do not cause deposits of sediment that seriously and adversely affect water conditions and fish habitat.

80 percent sediment mitigation was prescribed in the EA and implemented, but probably not achieved. Road drainage was not as effective as it should be and vegetation of road cuts was poor. Use of the road in wet weather was reducing effectiveness of dips.

— Skid trails and landings well drained to control erosion and sedimentation. Water bars looked to be of adequate size and spacing.

— Burn intensity controlled to meet riparian objectives. Not yet accomplished.

— Fireline is properly placed and drained to minimize erosion and sedimentation. Not yet accomplished. Recommend inspection to see if waterbars are needed on steep portions of fireline.

— Riparian-area dependent resources have been given preferential treatment.

— Culverts designed and placed to freely allow fish passage. Probably not applicable.

— Affected riparian areas contain adequate cover and security for dependent species. Since riparian dependent resources have not been defined, nor riparian objectives articulated, this is difficult to estimate. The following monitoring criteria would normally be evaluated.

— Required stocking level met.

— Desired level of hardwood stocking attained.

— Variety of plant communities or seral stages of habitat types along stream reach attained (horizontal diversity).

— Variety of age/size/species at a site attained (vertical diversity)

— Adequate snags of most appropriate species marked and left.

— Thermal and security cover maintained if specified.

— Adequate shade for maintaining beneficial water temperatures for fish.

— Future large woody debris recruitment objectives have been met.

Woody debris, existing and recruitment, adequate for instream objectives, with good spatial distribution. If the leave strip at the base of Unit 5 can be protected from burning, woody debris needs for the North Fork can probably be met. Woody debris needs in small first order tributaries were not evaluated for the EA, and may not have been met in those units where small streams were cut over (Units 6 and 9).