Kay Creek, Clearwater District

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EXAMPLE: REGION 6 SOIL MONITORING METHODOLOGY
Mark Sommer/Nez Perce National Forest
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Purpose:1) To compare effects of harvest and site preparation activities on soil condition in reference to Forest Plan soil standards, which specify that a minimum of 80 percent of an activity area shall not be detrimentally compacted, displaced, or puddled upon completion of activities.

2) To compare two different methods of slash disposal (bulldozer versus grapple mounted on excavator).

Study area: The Kay Creek Watershed on the Clearwater Ranger District, Nez Perce National Forest. Soil is ash influenced loess over deeply weathered metasediments. Habitat type is grand fir/wild ginger - Pacific yew phase.

Methods: Procedures were adapted from: Howes, S; Hazard, J; Geist, J. M. 1983. Guidelines for Sampling Some Physical Conditions of Surface Soils. R6-RWM-146-1983. 34 pages.

A harvest unit ("activity area") was selected and its acreage determined. Based on the acreage and variability within the harvest unit, we chose nine sample points and predetermined a distance which would be between these points.

Rather than using Howes et al. recommendation of using a systematic grid for locating sample points, we started at a fixed point (e.g. culvert) and using a random azimuth proceeded to our first sample point the predetermined distance. After finishing with a sample point we proceeded to the next sample point along the same random azimuth and the same predetermined distance. When the distance/azimuth combination took us out of the harvest unit boundary a new random azimuth was chosen to direct us back into the unit. We did not cover the same ground twice, and we attempted to represent the whole harvest unit.

This method is quicker in the field but introduces some bias in sample point selection.

At each sample point a 100 foot transect was laid out along a random azimuth. Along the 100 foot transect, horizontal distances occupied by different condition classes were recorded. The condition classes included soil displacement, compaction, deposition, puddling, erosion, undisturbed and other. Only obviously compacted areas such as skid trails and landings are put in that category. Displaced soil refers to any site with more than

Soil bulk density samples were taken at five foot intervals along the transect, using a soil core sampler. The samples were placed into bags which were coded to indicate location, treatment, transect and sample numbers, and condition class. The samples were oven dried and weighed to obtain soil bulk density. Bulk density was corrected for rock gragment content.

Samples from an area not affected by harvest were needed for controls. We believed there would be much less variability in bulk density in the control areas so we cut sampling intensity to 3-4 transects with bulk density sample points every 10-20 feet. Areas from which controls are taken should have the same soil, habitat type, aspect and slope, and previous disturbance regime (e.g. if the harvest unit was grazed before logging, the control should also have been subject to grazing). In retrospect, the number and distribution of transects across the undisturbed landscape should be similar to that on the harvest unit, with fewer samples per transect.

Unit 28 — Units 307, 318, 304, 312, 306 — Unit 219

T31N R6E Sec 32 SE1/4, Sec 33 (thru out) Sec 28 SW1/4 NW1/4

Units 211-210 T32N R6E Sec 5 NE1/4

Results: Dozer piling damaged 34.9 % of the unit and grapple piling damaged 26.9 % of the unit, both of which were above the 20 % Forest threshold. Grapple piling damaged statistically less soil than dozer piling at about the P=0.30 level. Because the grapple piling was done to avoid disturbing residual Pacific yew trees, which required a lot of moving around, it is expected that soil damage from grapple piling on conventional harvest units would be significantly lower than on the dozer piled units. Additional transects would also improve our ability to compare the two treatments.

Unit	Elev	Aspect	Slope	HT	LT
2211	5000-5500	W-NW	30	Abla Abgr	31GHS
210	6000-5600	W			
208	5000-5400	NW	30	Abla-Abgr	22AHS, 31D48, 32ABB
318	5000-5200	NW			
307	4800-5000	N	20	Thpl Abgr	22441
306	4500-4800	NE			
305	4800	N		Thpl Abgr	24C41
312	4400-4600	NE	18-55+%		
219	4800-4500	NE			