Juncrock Timber Sale
Draft Environmental Impact Statement

Appendix G

Soils

Soil Condition Monitoring on the Barlow Ranger District of the Mt. Hood National Forest 1999

The Barlow Ranger District conducts annual monitoring surveys to assess the degree and severity of ground disturbance that has occurred as a result of ground-based logging practices. Termed "soil condition monitoring," the practice is used to determine the areal extent of detrimental soil conditions in specified timber sale units. The data collected are used to evaluate the success of staying within maximum allowable thresholds, as established by standards and guidelines contained in the Mt. Hood National Forest (MHNF) Land and Resource Management Plan (LRMP; MHNF, 1990).

During the 1999 field season, the Barlow Ranger District hired the independent environmental consulting firm Shapiro and Associates, Inc. (SHAPIRO) to conduct the monitoring. SHAPIRO used a standard methodology for conducting soil condition monitoring designated the MHNF and known as "The Flying W." Using this methodology, SHAPIRO monitored soil conditions on 10 timber sale units between May and October.

Three timber sale units underlain with soil types with clay loam textures, which typically become hard and dry by mid- to late summer, were monitored in the spring and early summer while soils were moist and friable. The remaining seven units were monitored at various times throughout the course of the summer. Six of the units were monitored to evaluate existing conditions before harvest entries currently being planned for the near future. Consequently, the effects of not-so-recent previous harvest entries on soil conditions were assessed to aid in planning efforts. The remaining four units were monitored after logging had occurred to assess soil conditions resulting from recent harvest activity (Table 1).

Table 1. Units Monitored During the 1999 Field Season on the Barlow Ranger District

Sale or Planning Area Name	Unit or Stand No.	Estimated Extent of Detrimental Soil Condition (Percent Area)	Pre- or Post- Recent Harvest Entry
Diablo	2	13	post-logging
Diablo	4	19	post-logging
Douglas Cabin	12500218	3	pre-logging
Douglas Cabin	12500308	2	pre-logging
Bear Knoll	145	>1	pre-logging
Bear Knoll	169	1	pre-logging
Junc Rock	8	3	pre-logging
Jordon	NA	7	pre-logging
Fish Log	NA	3	post-logging
Mt. Defiance	NA	1	post-logging

Standard and Guideline #FW-022 in the MHNF's LRMP states that no more than 15% of an activity area should contain detrimental soil impacts (MHNF, 1990). Of the ten units monitored in this study, one, Diablo unit #4, is estimated to exceed the 15% threshold. The remaining nine units are estimated to meet Standard and Guideline FW-022. Diablo unit #2 is estimated to be near or at the threshold. In both cases, estimated detrimental soil impacts detected in the Diablo units are cumulative, resulting from both past and recent harvest entries. An effort was made to differentiate impacts associated with the recent entry from those associated with past entries. It was estimated that 3% and 15% of the total area in a detrimental condition could be attributed to the recent harvest entry in Diablo units #2 and #4, respectively.

In the case of the Fish Log unit, skid trails were subsoiled following harvest. Consequently, it is inferred that this action markedly reduced the amount of detrimental compaction that would have been detected otherwise. Further observations suggest that the parallel skid trail system may also have contributed to a minimal degree of detrimental compaction.

Detrimental soil conditions in the units monitored before future planned harvest entries were generally quite low. Interpretation of field observations suggests that most of these stands had experienced some degree of "high grading," or select harvest. Consequently, overall ground disturbance was minimal, and a degree of recovery is inferred to have occurred since impacts were realized. The Jordan unit, however, had been subject to more repeated entries than the others and displayed the greatest extent of detrimental soil disturbance of the "pre-logging" units.

In addition to the soil condition monitoring, bulk density sampling was conducted to correlate the qualitative shovel probe determinations of low, moderate, and heavy soil compaction to actual bulk density measurements in a given soil type. This was conducted in the Jordan unit in early October to determine if qualitative shovel probe determinations of "heavy" could be considered detrimental compaction, defined in the LRMP as a 15% increase above natural bulk density.

Six core samples were extracted for each qualitative rating. Sites determined to be heavily compacted by a shovel probe included an old landing and skid trail with little or no vegetation growing on them. Sites determined to be moderately compacted by a shovel probe included an old skid trail with vegetation partially concealing its surface. Sites with little or no detectable compaction included undisturbed ground and places where it appeared that a machine may have passed over once or twice.

It is concluded from the data that bulk density of the heavy ground was indeed in excess of 15% of the natural for this soil type. Natural bulk densities averaged about 1.3 grams per cubic centimeter (g/cu cm), indicative of the clay content of the soil type sampled. Usually, forested soils in the Pacific Northwest exhibit natural bulk densities of about 1.0 g/cu cm. The average bulk density of the heavy ground approximated 2.0 g/cu cm. That represents an increase above

the sampled natural bulk density of nearly 36%. In contrast, the average bulk density of the sampled moderate ground was about 13% above the sampled natural or low densities. The moderate ground nearly meets the definition of detrimental soil compaction. Thus, it is concluded that the shovel probe method was effective at detecting detrimentally compacted soils in the Jordan unit.

Written By:__/s/ John Dodd_____Date:__08/11/2003__

References:

Todd Reinwald, SHAPIRO and Associates, 1999 Soil Monitoring Report for Barlow Ranger District.

Mt. Hood National Forest. 1990. Land and Resource Management Plan, Mt. Hood National Forest. U.S. Forest Service, Pacific Northwest Region, U.S. Department of Agriculture. Gresham, OR.

ARP

The Aggregate Recovery Percentage model (ARP) is used by the Mt. Hood National Forest to help monitor a watersheds health. The ARP model is intended for forested lands, and is used to only indicate a general state of recovery. This model helps identify the existing and post treatment percentage of canopy cover in a watershed, which indirectly influences timing of water runoff especially rain-on-snow events during winter months. Canopy cover percent thresholds have been identify for each watershed and can be found in the Mt. Hood National Forest Land Resource Management Plan (LRMP) 1990. These thresholds help predict when a watershed can withstand a rain-on-snow event from having watershed scale damage occur during rain-on-snow events. To determine the thresholds for watersheds located in the eastern edge of the cascades (including Clear Creek) the Mt. Hood National Forest uses fire regimes for the vegetation types found in the watershed. The model predicts this risk solely on the basis of the state of hydrologic recover of vegetation and does not account for variation in climatic, geographic, or other environmental factors. The LRMP uses a minimum desired threshold of 65% based on the fire regime of vegetation found in the Clear Creek watershed. The watershed impact area should not exceed 35%.

An analysis of the White River watershed during the 1995 WRWA showed that the ARP was 70.5%. For this planning activity on 1999, the ARP for the Upper White River watershed was calculated at 82% and 76% for the Clear Creek 6th field watershed. No additional timber harvest has occurred in the Clear Creek 6th field watershed since the ARP model was last calculated, but several other timber-planning areas are present in the watershed.

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Introduction

This section assesses the consistency of the Juncrock Planning Area project (planning area) with the Aquatic Conservation Strategy (ACS) at the White River fifth field watershed scale. Beaver Creek fifth field watershed or its two six field subwatersheds (Upper and Middle Beaver Creek subwatersheds), which, are located in the planning area will have minimum analysis done because of the lack of valuable information of existing conditions at both the fifth and sixth field watershed scale. Beaver Creek watershed is almost entirely located on Confederated Tribes of Warm Springs lands. Refer to the Aquatic Biological Evaluation for a detailed description of the planning area.

Alternative I: Consistency/Inconsistency with ACS Objectives

This section, will describe how the **No Action** alternative is either consistent/inconsistent with the nine ACS objectives.

1. **Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.**

Selection of the **No Action** alternative would maintain the distribution, diversity, and complexity of the watershed and landscape-scale features for habitat elements: off-channel habitat and refugia, as well as channel conditions/dynamics/floodplain connectivity. Historically, the planning area is considered to be in a natural mixed severity fire regime, with a return interval of 5 to 100 + years. Stand replacing fires are possible given the right conditions. Riparian reserve stands would be maintained in the range of natural conditions (RNC) with different pathogens, such as mistletoe, stem decay, insects, and over stocking, occurring. The action is consistent with this ACS objective.

2. Maintain and restore spatial and temporal connectivity within and between watersheds.

Even with timber harvesting taken place in the White River watershed from both Hilynx planning area and Path timber sale. Spatial and temporal connectivity would be maintained and restored over time in and between watersheds from the **No Action** alternative. Overall, water temperatures would be expected to slightly decrease over time as tree plantations grow in the watersheds riparian areas. Canopy closures in some mature riparian stands would be expected to temporarily decrease from trees naturally dying. Over time, changes in canopy closure would be maintained in the RNC. The action is consistent with this ACS objective.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Physical integrity of all the natural streamcourses would be maintained in the watershed from the **No Action** alternative. Over time as trees fall into the floodplain and stream channel they would help create and maintain pool habitats, as well as sort stream channel substrates and maintain streambank conditions, width/depth ratio, and floodplain connectivity. The bank and bottom configuration of the Clear Creek Irrigation ditch would be compromised as a water transmission corridor. Potential mass berm failures from trees blowing down from the ditch berm itself, or into ditch berm, which could increase water velocity on the berm causing a mass failure. Water piping caused by root systems of trees and shrubs growing in the ditch berm can cause a mass berm failure if not continually monitored. The action is not consistent with this ACS objective.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.

Water quality for supporting healthy riparian, aquatic, and wetland ecosystems would be maintained from the **No Action** alternative. Water temperature would slightly decrease over time from increased shade in the riparian reserve plantations. The action is consistent with this ACS objective.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.

In some areas of the fifth field watershed the sediment regime is not in the RNC. This is partly due to multiple irrigation diversions located throughout the watershed and road densities being above Forest standards. Watershed conditions for road density would remain at its existing condition of 5.13 miles per square mile in the planning area. That is 2.63 miles per square mile over the Forest standard of 2.5 miles per square mile. Existing sediment regime would be maintained under the **No Action** alternative at the watershed scale. The action is consistent with this ACS objective.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.

In-stream flows to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of nutrient, and wood routing would be maintained and restored over time from the **No Action** alternative. The action is consistent with this ACS objective.

7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.

Conditions of timing, variability, and duration of the floodplain inundation and water table elevation in meadows and wetlands would be maintained under the **No Action** alternative. The action is consistent with this ACS objective.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

The riparian areas and wetlands would maintain structural diversity over time even if there were a loss of plant specie diversity. Species composition and structural diversity of plant communities in riparian areas and wetlands are presently showing signs of decline and reduced resiliency due to general over stocking and disease from dwarf mistletoe in the Douglas fir. Adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris may be sufficient from the species, which replace the individual Douglas fir trees that die out in the riparian reserve stands. The action is consistent with this ACS objective.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

The **No Action** alternative would maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species. Natural recruitment of large woody debris to both the floodplain and stream channel would be expected over time, which would help maintain and restore pool frequency and distribute substrate, as well as maintain channel conditions of streambank, floodplain connectivity, and width/depth ratio. This action is consistent with this ACS objective.

Conclusion

Some elements of the ACS objectives would continue to be degraded at a site scale. The **No Action** alternative would either maintain or restore all ACS objectives except objective 3 at the watershed scale. The **No Action** alternative is partially consistent with the strategy of the Northwest Forest Plan.

Alternative II (Uneven Aged Approach), III (Even Aged Approach) and IV (Uneven Aged Approach Leaving Large Trees Larger Than 21 Inches DBH with Fewer New Roads): Consistency/Inconsistency with ACS Objectives

This section, will describe how the proposed alternatives II, III, and IV are either consistent/inconsistent with the nine ACS objectives.

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

Alternatives II, III, and IV would accomplish the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted by maintaining habitat elements of off channel habitat and refugia, as well as floodplain connectivity of the stream channels in the planning area. The watershed conditions under alternatives II, III, and IV for the riparian reserves would be maintained and restored over time by improving stand-stocking levels to a healthier condition and by decreasing disease pathogens. Alternative II, III, and IV are consistent with this ACS objective.

2. Maintain and restore spatial and temporal connectivity within and between watersheds.

Alternatives II, III, and IV would maintain connectivity through no-cut buffers along riparian reserves. Connectivity in the uplands would be maintained under alternatives II and IV while under alternative III it would be degraded. Thinning, snag creation, and down wood creation, would restore characteristics of wildlife travel corridors in the riparian reserves. Any increase to water temperature would be negligible from Alternatives II, III, or IV. Alternatives II, III, and IV are consistent with this ACS objective.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Banks, shorelines, and bottom configurations under alternatives II, III, and IV would be maintained for natural stream channels because of no-harvest buffers, located in the riparian reserves. Trees that are cut both in the riparian reserves and out side of the riparian reserves would be felled away from stream channels. Alternatives II, III, and IV are consistent with this ACS objective.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.

Shade canopy would not be affected in any natural stream channel. Water temperatures would be maintained in both natural stream channels and Clear Creek Irrigation ditch. Sediment delivery is not expected to increase over natural levels from Alternatives II, III, and IV. Water quality would be maintained. Alternatives II, III, and IV are consistent with this ACS objective.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.

Alternatives II, III, and IV would maintain and improve the sediment regime by reducing road mile densities in the planning area from 5.13 to 3.46 miles per square mile. Design features, no-cut stream buffers, and no equipment buffers would maintain the sediment regime in the riparian reserves. Sediment produced by ground disturbing activities under alternatives II, III, and IV are expected to be filtered before reaching stream channels by

the no-cut buffers. Sediment regime would be maintained at the watershed scale. Alternatives II, III, and IV are consistent with this ACS objective.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.

Sediment, nutrient, and wood routing would not be affected at the watershed scale. Alternatives II, III, and IV are consistent with this ACS objective.

7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.

Road segments to be closed or obliterated at the end of the project would increase drainage network function. No affects to floodplain inundation and water table elevations as it relates to meadows or wetlands are anticipated. Conditions would be maintained. Alternatives II, III, and IV are consistent with this ACS objective.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

All riparian reserve thinning is designed to encourage growth, reduce competition among trees thereby reducing risk of insect and disease infestation, and reduce fire hazard. Accelerated growth of trees in the reserves would create a future source of both terrestrial and instream LWD. Alternatives II, III, and IV are consistent with this ACS objective.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

The harvest/vegetation management activities under alternatives II, III, and IV would retain healthy trees. Tree canopy development, would increase future sources of terrestrial and instream large woody debris in both uplands and natural stream channels of both Clear Creek and Beaver Creek watersheds. Alternatives II, III, and IV are consistent with this ACS objective by maintaining habitat for riparian-dependent species.

<u>Conclusion</u>

Some elements of the ACS objectives would be temporarily degraded at a site scale. The ACS objectives at the watershed scale would be maintained or restored under alternatives II, III, and IV. Alternatives II, III, and IV are consistent with the ACS strategy of the Northwest Forest Plan.