SOIL RESOURCE SPECIALIST REPORT

Kapka Butte Sno-Park Facility

Bend-Fort Rock Ranger District
Deschutes National Forest

ENVIRONMENTAL ASSESSMENT

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Preamble

This report and the analysis herein was initially prepared and conducted for the Kapka Butte Sno-Park *Draft* Environmental Assessment (EA). Since then however, some changes and refinements to the alternatives have been made for the EA, necessitating minor revisions to this report. Additionally, there has been a staff change since then, and a different analyst now occupies the soil scientist position on the District. Hence, revisions to the initial report have been made by the new analyst, who after concluding that the original analysis remains valid, only needed to make an amendment to address the refinements to the draft alternatives.

Project Description

The project area is located approximately 19 miles west of Bend, Oregon in T.18S., R.9E., Section 35, Willamette Meridian. The project area is located within management allocation area MA-9 (Scenic Views) as designated by the Deschutes National Forest Land and Resource Management Plan. It also lies within the boundaries covered by the Northwest Forest Plan.

The project would authorize the development of new sno-park facilities near Kapka Butte to provide more high-elevation parking for winter recreation opportunities along an established snowplowing route. The goal is to provide for a mix of vehicle parking, including vehicles towing trailers and some slots designed for smaller vehicles. The proposed actions include the construction of a parking facility and new system trails for both non-motorized and motorized users to provide more recreation activities at the Kapka Butte Sno-Park.

Project design would include appropriate Best Management Practices (BMPs), as described in General Water Quality Best Management Practices (Pacific Northwest region, 1988), and resource protection measures to control soil erosion during and following construction activities. The Forest Service would monitor and maintain developed recreation facilities to avoid or minimize erosion problems where surface runoff from disturbed sites may occur in adjacent delivery areas.

Management Direction

Management allocation area MA-9 and Northwest Forest Plan direction do not contain specific standards and guidelines for the soil resource in this area.

The Pacific Northwest Region developed soil quality standards and guidelines that limit detrimental soil disturbances associated with management activities (FSM 2520, R-6 Supplement No. 2500-98-1). This Regional guidance supplements the Deschutes Land and

Resource Management Plan (LRMP) standards and guidelines and provides policy for planning and implementing management practices which maintain or improve soil quality. It is consistent with LRMP interpretations for standards and guidelines SL-3 and SL-4 that limit the extent of detrimental soil conditions within activity areas. Standard and Guideline (SL-4) directs the use of rehabilitation measures when the cumulative impacts of management activities are expected to cause damage exceeding soil quality standards and guidelines on more than 20 percent of an activity area. Standard and Guideline (SL-5) limits the use of mechanical equipment in sensitive soil areas.

The primary objective of this management direction is to ensure that management activities are planned and conducted so that on-site loss of soil productivity is minimized on lands which are not officially dedicated to permanent facilities necessary to achieve other land management objectives. Soil quality standards and guidelines do not apply to intensively developed sites, such as recreation facilities and parking area proposed at the Kapka project site, because they could not be constructed to result in limited disturbance below specific thresholds. Soils dedicated to these proposed facilities such as parking lots and trail connectors remove some land from production and preclude other uses of the soil for as long as the facilities remain in use.

Scope of the Analysis

For this project proposal, the discussion of soil effects will be focused on the proposed locations of the new parking facility and trail routes needed to accommodate recreation use objectives. A qualitative assessment of potential soil impacts was conducted to ensure that acceptable soil productivity is maintained for the growth of desired vegetation on undeveloped portions of the Sno-Park area.

The analysis also considered the effectiveness and probable success of Best Management Practices (BMPs) to control surface erosion during and following construction activities.

Landscape Characteristics and Existing Condition of the Soil Resource

The landscape is characterized by gentle-to-moderately sloping glacial uplands, ground moraines, and uneven lava plains which lie below cinder cones and buttes. Slopes generally range from 0 to 30 percent with the exception of steeper side slopes (25 to 70 percent) associated with cinder cones, buttes, and the rough edges of lava flows. The site proposed for the new parking facility is located on nearly level to gentle slopes. Elevation ranges from about 5,600 feet on the glacial uplands to approximately 6,170 feet on top of Kapka Butte. Mean annual precipitation averages between 15 to 20 inches.

Dominant soils, as defined by the Deschutes Natioanl Forst Soil Resource Inventory (Larson 1976) are moderately deep (20 to 40 inches) to deep (greater than 40 inches) with moderate productivity potential for the growth of vegetation. Except for a few barren lava flows of minor extent, overlaying soils have developed from a moderately thick layer (20 to 40 inches) of airfall pumice and volcanic ash deposits. Soil surface layers consist of non-cohesive (loose), sandy-textured materials with very little structural development due to the young geologic age of these volcanic parent materials. The glaciated portions of the planning area have been influenced by glacial outwash flooding from the melting of historic mountain glaciers. These landforms contain glacial till as the major underlying parent material. Glacial deposits consist of sands and gravels that have been reworked by running water. The older glacial material dominates water transport and plant growth in these areas. Dominant soils are moderately deep (20 to 40 inches)

to deep (greater than 40 inches) with moderate productivity potential for the growth of vegetation. Representative soils on the proposed development sites are well suited for recreation development.

These volcanic ash-influenced soils have sandy textures with high infiltration and percolation rates that account for low amounts of overland flow. Most of the water yielded from these lands is delivered to streams as deep seepage and subsurface flows. Surface erosion by water is generally not a concern because representative soils have low-to-moderate erosion hazards on gentle to moderately sloping landforms which are naturally stable. At the present time, soils are adequately protected by vegetation and organic litter layers to control erosion rates within tolerable limits. Dominant soil types are sufficiently resistant to erosion to permit limited and temporary exposure of bare soil. There are no perennial streams or other water bodies within the vicinity of planned development sites.

Based on criteria for identifying sensitive soils to management (Deschutes LRMP, Appendix 14, Objective 5), sensitive soils within the project area include soils on slopes greater than 30 percent gradient (Kapka Butte). There are no potentially wet soils with seasonally high water tables or soils with a high hazard for surface erosion.

Soils derived from volcanic ash and pumice deposits have naturally low bulk densities and low compaction potential. However, mechanical disturbances can still reduce soil porosity to levels that limit vegetative growth, especially where there is a lack of woody debris and surface organic matter to help cushion the weight distribution of ground-based equipment. The sandy-textured surface layers are also easily displaced by equipment operations, especially during dry moisture conditions. The maneuvering of equipment is most likely to cause soil displacement damage on the steeper landforms. In general, the sandy-textured soils are not susceptible to soil puddling (rutting) damage due to their lack of plasticity and cohesion.

The existing condition of the soil resource has mainly been influenced by the transportation system, developed recreation trails, and existing logging facilities which were used for past timber harvest and yarding activities. Roads and trails detrimentally disturb soil properties and convert the soil resource to a non-productive condition until they are no longer needed and disturbed sites are reclaimed back to a productive capacity. Most project-related impacts to soils occurred on and adjacent to intensively developed sites (e.g., roads, recreation facilities) and heavy use areas (e.g., log landings and primary skid trails) where mechanical disturbances removed vegetative cover, displaced organic surface layers, or compacted soil surface layers. Research studies and local soil monitoring have shown that soil compaction and soil displacement account for the majority of detrimental soil conditions resulting from ground-based logging operations (Page-Dumroese, 1993; Geist, 1989; Powers, 1999; USDA, Deschutes Soil Monitoring Reports). Much of the random disturbance between main skid trails and away from landings has decreased naturally over time. Frost heaving and freeze-thaw cycles have gradually restored soil porosity in areas with slight to moderately compacted layers near the ground surface. Other factors that have helped the recovery process include root penetration, rodent activity, wetting and drying cycles, and surface organic matter. The establishment of vegetative ground cover and the accumulation of litter and organic matter continue to improve areas of displaced surface soil.

Adequate amounts of coarse woody debris and surface organic matter currently exist to protect mineral soil from erosion and maintain the soils ability to retain moisture and provide both short and long-term nutrient supplies for the growth of vegetation.

Soil Productivity Issues or Concerns regarding the Proposed Actions

There were no scoping comments received from the public or other agencies regarding soil productivity issues associated with the development of new recreation facilities at the Kapka Butte Sno-Park area. There are no soil-related issues or extraordinary circumstances because the construction of a new parking area and trail segments preclude other uses of the soil for as long as these recreation facilities remain in use. None of the proposed activities would occur on landtypes that contain sensitive soils with a high hazard for surface erosion or potentially wet soils with high water tables that would require site-specific mitigation. Project design includes Best Management Practices (BMPs) to control surface runoff and soil erosion during and following ground disturbing activities.

Direct, Indirect, and Cumulative Effects

Direct effects occur at essentially the same time and place as the actions that cause soil disturbance, such as soil displacement and compaction caused by equipment operations. Indirect effects occur sometime after or some distance away from the initial disturbance, such as increased runoff and downslope erosion from previously compacted areas. Cumulative effects include all past, present, and reasonably foreseeable actions that cause soil disturbance within the same activity areas.

Alternative 1 – Direct and Indirect Effects

Under Alternative 1 (No Action), no additional land would be removed from production to develop a parking area and new trail routes. No trees or other vegetation would be cleared to accommodate recreation use objectives. The extent of exposed mineral soil would not increase from construction activities, so erosion control measures would not be necessary.

Surface erosion on existing roads and other management facilities would continue at current levels. Soil productivity would not change appreciably unless a stand-replacing wildfire causes intense ground-level heating long enough to detrimentally alter soil physical, chemical and biological properties.

Direct and Indirect Effects Common to Alternatives 2, 3 and 4

The action alternatives are essentially the same because the same types and locations of construction activities would occur on the same landtypes and existing soil conditions. The primary difference is the amount of surface area that would be dedicated to the development of new recreation facilities.

Alternative 2 would construct a new parking facility that would accommodate approximately 70 slots for trailers and 40 slots for non-trailer vehicles. In addition, approximately 7.8 miles of access connector trails and new trails would be developed to improve winter recreation opportunities. These new system trails include the following: Snowmobile link to existing trail #45 (0.2 mile), a Nordic ski trail between the Kapka and Vista sno-parks and existing trail system (0.6 miles), a snowshoe trail to the top of Kapka Butte (0.8 mile), and groomed non-motorized trails for use with dogs off leash (6.2 miles).

Alternative 3 would construct a smaller parking facility for 50 snowmobile trailer slots and no designated auto slots. Approximately 2.0 miles of new snowmobile trail would be developed to provide access to existing trail #45 and a 0.6 mile Nordic ski trail would connect Kapka to Vista sno-park and the existing Nordic trail system. It would also relocate a portion of the existing trail #7 to the west edge of Dutchman Flat and it would relocate an existing snowmobile play area (approximately 17 acres) to the northern portion of this barren pumice flat. This alternative does not include the snowshoe trail and trail system for use with dogs.

Alternative 4 would construct the parking facility for 70 trailer slots and 40 auto slots. As described for Alternative 2, approximately 7.8 miles of new system trails would be developed to provide access to current system trails and provide a snowshoe trail and winter trail system for use with dogs. This alternative would also relocate a portion of the existing trail #7 and the motorized sno-play area at Dutchman Flat.

Under all action alternatives, existing curves would be straightened along snowmobile trail #5.

Under all action alternatives, the anticipated disturbance associated with clearing operations for new trail segments and minor modifications on existing Nordic trails would be inconsequential. The primary effects would be a temporary reduction in existing vegetation because none of the new trail segments would require any excavation of soil surface layers. Vegetation would be cleared 20 feet in width for new snowmobile and groomed Nordic trails and the ungroomed Nordic ski trail would be cleared 10-15 feet wide. An eight (8) foot wide route would be cleared by hand cutting or trimming vegetative materials for the snowshoe trail. An effective ground cover of litter, duff, forbes, and brush would be retained to hinder surface erosion. Brush and low growing vegetation would be maintained manually using chainsaws and hand tools rather than causing topsoil displacement through mechanical scalping. These non-mechanical treatments would produce only localized areas of exposed mineral soil that would not qualify as a detrimental condition (FSM 2520, R-6 Supplement). The planned locations for new trail facilities would not disturb sensitive soils with a high hazard for surface erosion. Felled trees for trails outside of the designated roadless and Dutchman Flat areas and other vegetation would be retained on the ground to provide surface cover and a source of nutrients as these organic materials gradually decompose. This would have beneficial effects to site productivity by improving the soils ability to resist surface erosion and providing organic matter for humus development in mineral soil. Recreation use on these completed trails would occur over a compacted snow base that would effectively prevent detrimental soil compaction. Therefore, the development of these winter recreation facilities would not detrimentally alter soil properties that affect long-term site productivity.

Under all action alternatives, the parking lot construction would temporarily expose the largest area of disturbed soil and increase the potential for accelerated soil erosion. The proposed site is located on nearly level, stable ground and is identified by the Soil Resource Inventory as being well suited for development. Surface erosion is not a primary concern because the dominant soils on these gentle slopes have a low erosion hazard rating. Some loss of surface materials can be expected during precipitation events, but soils are sufficiently resistant to erosion to permit limited and temporary exposure of bare mineral soil during the construction phase. The parking lot would be paved, so there is no potential for long-term erosion problems following the completion of this facility.

Soil quality standards and guidelines do not apply to intensively developed sites, such as parking lots, because they could not be constructed to result in limited disturbance below specific

thresholds. Soils dedicated to these land uses remove land from production and preclude other uses of the soil for as long as these facilities remain in use.

There are no soil-related extraordinary circumstances because construction activities would not disturb sensitive soils with a high erosion hazard or potentially wet soils that would require special mitigation. Under all action alternatives, project design would include temporary erosion-control measures during the initial construction phase of the parking lot facility. Application of these Best Management Practices (BMPs) is considered to be routine practices that have been used on numerous similar projects (General Water Quality Best Management Practices, Pacific Northwest Region, 1988). They are tiered to the Soil and Water Conservation Practices Handbook (FSH 2509.22) which contains erosion control measures that have proven effective in protecting and maintaining soil and water resource values. The types and locations of soil disturbance are not expected to cause any indirect, off-site impacts to soils in adjacent areas, such as loss or burial of productive surface soils.

Project Design Criteria

1. Include Best Management Practices (BMPs) as part of the project design. Apply appropriate erosion-control measures to all ground disturbing activities associated with the construction and development of new facilities, as described in General Water Quality Best Management Practices (Pacific Northwest region, 1988).

2. Provision should be made for surface drainage from new management facilities. The amount of maintenance can be reduced if drainage structures are properly installed during new construction.

Cumulative Effects

Cumulative effects on the soil resource include all past, present, and reasonably foreseeable actions that cause soil disturbance within the same activity area(s).

Under Alternative 1 (No Action), no additional land would be removed from production to build a parking facility and new system trails for winter recreation opportunities. The effects analysis (above) describes why there are no extraordinary circumstances associated with the combined effects of past and current disturbances and those anticipated from implementing the construction activities proposed under the action alternatives.

Future management activities are assumed to occur as planned in the schedule of projects for the Deschutes National Forest. No outyear timber sales or fuel reduction projects are currently scheduled within the Kapka Butte Sno-Park planning area.

The Noxious Weed Control EIS would likely implement various treatments to control invasive plants in site-specific areas. These future activities are not expected to cause any detrimental changes in soil properties. Hand removal of individual plants would result in small areas of soil displacement or the mixing of soil and organic matter which would not meet criteria considered detrimental to soil productivity. It is also unlikely that herbicide treatments would cause any adverse direct or indirect effects to soil productivity (18 Fire Herbicide Treatment Environmental Assessment, Soils Report, 2005).

The forthcoming Forest Travel Management Plan will address summer travel management issues and the need to change current policy and management direction. The proposed new direction

would identify a system of roads and trails for motorized travel and eliminate cross-country motorized travel except on designated routes in the summer. Future implementation of this new direction would have a beneficial effect on the soil resource because it would help prevent cumulative increases in the extent of detrimental soil conditions in random locations off authorized roads and trails.

Other foreseeable future activities include continued recreation use and standard road maintenance. Existing recreation facilities and surrounding areas would continue to be maintained to prevent or minimize soil erosion problems and potential impacts to other resource values. Impacts from dispersed recreation activities are usually found along existing roads and trails where vegetation has been cleared on or adjacent to old logging facilities in past harvest areas. Future impacts from dispersed camping and incidental use by hikers and mountain bikers are expected to occur in similar locations. Soil disturbances from future recreation use are not expected to have a measurable effect on site productivity. Road maintenance activities would reduce accelerated erosion rates where improvements are necessary to correct road drainage problems.

Therefore, the cumulative effects from the proposed management activities combined with all past, present, and reasonably foreseeable future activities would maintain acceptable soil productivity for the growth of desired vegetation on undeveloped portions of the planning area.

Felled trees on trails outside of designated roadless areas and Dutchman flat and other vegetation would be retained on the ground following clearing operations for new trail segments. The amount of down woody debris and surface organic matter would increase slightly over existing levels. This will provide ground cover protection and a source of nutrients for maintaining soil productivity. In the long-term (greater than 5 years), the accumulation of additional down woody materials from maintenance activities would increase the potential for a future wildfire.

Management Consistency

Management allocation area MA-9 and Northwest Forest Plan direction do not contain specific standards and guidelines for the soil resource in this area.

The primary objective for the soil resource is to plan and conduct management activities so that on-site loss of soil productivity is minimized on lands which are not officially dedicated to permanent facilities necessary to achieve other land management objectives. Management direction for the soil resource applies to lands where vegetation and water resource management are the principle objectives. Soil quality standards and guidelines do not apply to intensively developed sites such as recreation facilities (FSM 2520, R-6 Supplement No. 2500-98-1).

Construction activities associated with the new parking facility would not disturb sensitive soils with a high erosion hazard or potentially wet soils that would require special mitigation. Soils are sufficiently resistant to erosion to permit limited and temporary exposure of bare soil during development or use. The types and locations of soil disturbance are not expected to cause any indirect, off-site impacts to soils in adjacent areas, such as loss or burial of productive surface soils. Project design would include appropriate Best Management Practices (BMPs) to control surface erosion during and following construction activities. The parking lot would be paved, so there is no potential for long-term erosion problems following the completion of this facility.

The anticipated disturbance associated with clearing operations for new trail segments would not detrimentally alter soil properties that affect long-term site productivity. None of the trails would require any excavation of soil surface layers. Vegetation would be cleared by using hand tools rather than causing topsoil displacement through mechanical scalping. Winter recreation use would occur over a compacted snow base that would effectively prevent detrimental soil compaction.

The action alternatives are not expected to create any impacts that would cause irreversible damage to soil productivity. There is low risk for the proposed activities to cause soil mass failures (landslides) due to the inherent stability of dominant landtypes and the lack of seasonally wet soils on steep slopes. Careful planning and the application of erosion-control Best Management practices would be used to minimize surface erosion problems and prevent irreversible losses of the soil resource.

The development and use of recreation facilities is considered an irretrievable loss of soil productivity until their functions have been served and disturbed sites are returned back to a productive capacity.

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