Grouse BMU Project

Soils Report

Prepared by:
Anna Courtney
Soil Scientist

for:
Bonners Ferry Ranger District

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Soil Resources

Introduction

This report discusses the soil resource of the Grouse Bear Management Unit (BMU), located on the Bonners Ferry Ranger District of the Idaho Panhandle National Forests (IPNF). In this analysis, soils are described in regards to their formation, unique properties, strengths and vulnerabilities, and current condition. Activities with known or expected impacts to the soils are identified and receive most of the focus. Expected outcomes from proposed activities and alternatives are discussed along with design criteria that are intended to protect soils.

The main purpose and need for action is to meet the standards for wheeled motorized vehicle access and security guidelines outlined in the Forest Plan amendments for the Selkirk and Cabinet-Yaak grizzly bear recovery zones (USDA Forest Service 2011). This means reducing open and total motorized road densities and increasing grizzly bear core habitat in the Grouse Bear Management Unit (BMU) by 2019 to be in compliance with the Forest Plan amendments.

Additional purpose and need for action is to increase user safety, reduce road maintenance costs, and reduce sediment in Grouse Creek by rerouting a section of the Grouse Creek Road (Forest System Road 280) from the bridge over North Fork Grouse Creek to approximately the Wylie Knob trailhead. This section of the road floods annually, making it unsafe to drive and expensive to maintain. It also washes sediment into the creek each time it floods which can affect bull trout spawning and rearing habitat downstream. Rerouting the section would make the road safe to drive, reduce annual maintenance costs, and help meet Forest Plan direction by reducing sediment in the Grouse Creek subwatershed.

Regulatory Framework

There is an extensive framework in place for the evaluation and determination of the soil condition. For the purpose of the National Environmental Policy Act (NEPA), soils are evaluated in the context of the IPNF Land Management Guides for Soils and the Regional Soil Quality Standards (project file S38).

The regulatory framework providing direction for protecting soils and a site's inherent capacity to grow vegetation comes from the following principle sources:

- Organic Administration Act of 1897
- Bankhead-Jones Act of 1937
- National Forest Management Act of 1976 (NFMA)
- FSM 2500 – Chapter 2550 – Soil Management
- Land Management Plan (2015 Revision) for the Idaho Panhandle National Forests and Northern Region Soil Quality Standards (project file S38)

The Organic Administration Act of 1897 (16 U.S.C. 473-475) authorizes the Secretary of Agriculture to establish regulations to govern the occupancy and use of National Forests and "…to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States."

The Bankhead-Jones Act of 1937 authorizes and directs a program of land conservation and land utilization, in order thereby to correct maladjustments in land use, and thus assist in controlling soil erosion, preserving natural resources, mitigating floods, conserving surface and subsurface moisture,

protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare.

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity.

The National Forest Management Act of 1976 (NFMA) charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity. To comply with NFMA, the Chief of the Forest Service has charged each Forest Service Region with developing soil quality standards for detecting soil disturbance and indicating a loss in long-term productive potential. These standards are built into forest plans. NFMA specifically states:

> Timber Harvest on National Forest Lands (16 USC 1604(g)(3)(E)): A Responsible Official may authorize site-specific projects and activities to harvest timber on National Forest System lands only where:
>
> a. Soil, slope, or other watershed conditions will not be irreversibly damaged (16 USC 1604(g)(3)(E)(i)).

The Forest Service Manual for soil management (FSM 2500, chapter 2550) establishes the framework for sustaining soil quality and hydrologic function while providing goods and services outlined in forest and grassland land management plans.

The Land Management Plan (2015 Revision) goal, desired conditions, objective and guidelines for soils (Forest Plan p. II-823-24) are listed in Table 1. The response to those are included in that table immediately following the reference.

Table 1: Soil References from the IPNF Land Management Plan (2015 Revision) and Region 1 Soil Quality Standards

Land Management Plan Goal	
GOAL-SOIL-01	Maintain soil productivity and ecological processes where functioning properly, and restore where currently degraded. Maintain the physical, chemical, and biological properties of soils to support desired vegetation conditions and soil-hydrologic functions and processes within watersheds.
	Response: All alternatives would make progress towards helping to achieve this goal. The productivity of the soil would be maintained. More detail can be found in the responses to the following plan elements: FW-GDL-SOIL-01, FW-GDL-SOIL-02, FW-GDL-SOIL-03 and FW-GDL-SOIL-04.
Land Management Plan Desired Conditions	
FW-DC-SOIL-01	Soil organic matter, soil physical conditions, and down woody debris maintain soil productivity and hydrologic function. Physical, biological, and chemical properties of soil are within the natural range of variability; enhance nutrient cycling, maintain the role of carbon storage, and support soil microbial and biochemical processes. Areas with sensitive and highly erodible soils or land types with mass failure potential are not detrimentally impacted or destabilized as a result of management activities.
	Response: All alternatives would move towards this desired condition. Use of design features and mitigations are expected to protect current soil function and productivity. After being decommissioned, natural recovery will be allowed to progress on the roads through revegetation and possibly accumulation of CWD. The properties of the soil under the road will not immediately return to natural variability, but they will progress in this direction.

FW-DC-SOIL-02	Soil impacts are minimized and previous activity areas that have incurred detrimental soil disturbance recover through natural processes and/or restoration activities. Organic matter and woody debris, including large diameter logs, tops, limbs, and fine woody debris, remain on site after vegetation treatments in sufficient quantities to maintain soil quality and to enhance soil development and fertility (refer to FW-GDL-VEG-03).
	Response: All the alternatives would remain status quo for this desired condition. As there are no vegetation treatments in this project, coarse woody debris would remain in the current condition.
FW-DC-SOIL-03	Soil organic matter and down woody debris support healthy mycorrhizal populations, protect soil from erosion due to surface runoff, and retain soil moisture. Volcanic ash-influenced soils that occur on most of the Forest are not compacted and retain unique properties, such as low bulk density and high water holding capacity, to support desired vegetative growth.
	Response: All the alternatives would make progress towards this desired condition. Design features would minimize soil compaction, displacement and other detrimental disturbances while protecting soil organic matter. All activities are proposed on the existing road system, which is land dedicated to administrative use and not productive forest land.
Land Management Plan Objective	
FW-OBJ-SOIL-01	Over the life of the Plan, initiate restoration of 75 to 150 acres not meeting soil quality criteria.
	Response: This project does not include restoration of the soils resource.
Land Management Plan Guidelines	
FW-GDL-SOIL-01	Ground-based equipment should only operate on slopes less than 40 percent, in order to avoid detrimental soil disturbance. Where slopes within an activity area contain short pitches greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed, as designated by the timber sale administrator.
	Response: The new re-route of FSR 280 will have sort stretches along the contour of slopes over 40%, and will be designed by a roads engineer to ensure proper stability and erosion control. The design features will help ensure there is little to no erosion that occurs. The road itself will be considered an administrative site, and will not contribute to detrimental soil disturbance as it will no longer be a part of productive forest land.
FW-GDL-SOIL-02	Coarse woody debris is retained following vegetation management activities per (FW-GDL-VEG-03).
	Response: All alternatives would not have vegetation management activities, so the CWD would continue to accumulate at current rates given natural processes.
FW-GDL-SOIL-03	In order to provide for leaching of nutrients and maintenance of long-term soil productivity, fine woody debris should be distributed throughout harvest units when conducting vegetation management activities located on nutrient limited rock types and should remain on site for at least 6 months, during one winter (wet/rainy) season, and prior to any subsequent activity such as prescribed burning or mechanical slash piling. Exceptions may occur in areas where a site-specific analysis indicates that leaving fine woody debris untreated would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources.
	Response: All alternatives are consistent with this guideline, alternatives do not have vegetation management activities. Implementation of design features would protect current levels of coarse and large woody debris.

FW-GDL-SOIL-04	Ground-disturbing management activities on landslide prone areas should be avoided. If activities cannot be avoided, they should be designed to maintain soil and slope stability.
	Response: All alternatives are consistent with this guideline. No ground-disturbing activities would take place in Alt 1. In Alt 2 no activities are proposed on soils with high mass failure potential.
Region 1 Soil Quality Standards	
Region 1 Soil Quality Standard 1	Design new activities that do not create detrimental soil conditions on more than 15 percent of an activity area. In areas where less than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality.
	Response: All proposed activities will occur within an existing or proposed road, which is considered an administrative land use and not productive forest land. Therefor the Regional Soil Quality Standards do not apply.
Region 1 Soil Quality Standard 2	Organic matter layer thickness would be retained as appropriate for local conditions.
	Response: All alternatives are consistent with this guideline, alternatives do not have vegetation management activities Implementation of design features would protect the organic matter.
Region 1 Soil Quality Standard 3	Large woody debris would be maintained at recommended volumes (Graham and others 1994) in each proposed activity area.
	Response: By following the guideline (FW-GDL-VEG-03) in the Land Management Plan, this standard would be met.

Analysis Methods

Analysis Area (Spatial Context)

The analysis area for direct, indirect, and cumulative effects on soil resources encompasses all land within individual activity areas. Existing classified National Forest System roads and trails are considered dedicated lands for other purposes and, as such, Region 1 soil quality standards and Land Management Plan guidelines do not apply when evaluating the activity area. Cumulative effects to soils are those effects that overlap in time and space, so there would be no cumulative effect where there are no direct or indirect effects.

Analysis Timeframe (Temporal Context)

The temporal scale is dependent on the specific issue being addressed with no one scale being appropriate for all issues. This analysis strives toward an integrated approach to soil processes and function to project future trends in response to proposed management options to the best of abilities based on monitoring of similar projects on the IPNF.

The analysis evaluates the effects of proposed management over all seasons for years or decades. This is complicated by data constraints that require monitoring to detect change – though data are often insufficient to identify even trends or trajectories of change until the impact is large enough or has been occurring for some time. Furthermore, there is often a lag between an action and its observed effect. The temporal scales can be defined as long and short-term. For this evaluation, short-term effects are those that occur approximately within the first 10 years following proposed management activities. Long-term effects are those that are still evident approximately 10 years after proposed management activities.

Existing Condition

Soils and Landtype Associations

Soils are formed through the interaction of the five soil-forming factors. These are climate, organisms, topography, parent material, and time. Geology and geologic processes are important as they provide parent material for soil formation and heavily influence topography, which is a climate modifier. Many soil properties are directly inherited from the geologic characteristics of the parent material. Products of weathering from parent material can influence soil behavior and fertility. That influence can be beneficial, or something that requires varying degrees of effort to overcome.

There are six main landtypes where earth movement would occur under the prosed action for re-routing Forest System Road (FSR) 280.

The associated landtype, Map Unit (MU)102: Andic Dystrudepts -Typic Udifluvents complex; narrow valley bottoms and toeslopes, where FSR 280 currently is located, has a high sediment delivery potential. The high sediment delivery potential and its proximity and location to Lower Grouse Creek are the majority of the cause to the erosion and road issues that have been occurring on regular intervals. This map unit consists mainly of second order and higher perennial streams, a narrow riparian zone and adjacent mountain toeslopes. Many of these streams are bedrock controlled. Stream gradients generally are 2 to 4 percent. The riparian zone is commonly 100 to 200 feet wide on each side of the stream.

This unit occurs at elevations of 1840 to 5400 feet.

The new reroute proposal crosses five landtypes. These land types are MU 155 (Andic Dystudepts; outwash plains of mixed geology), MU156 (Andic Dystrudepts; outwash remants; rain-on-snow); MU250 (Andic Dystrudept - Typic Udivitrand complex; glaciated mountain slopes; belt geology; south aspects), MU251 (Andic Dystrudepts; moderately steep, glaciated mountain slopes; belt geology; south aspects) and MU260 (Andic Dystrudept -Typic Udivitrand complex; glaciated mountain slopes; belt geology; north aspects). All of these landtypes have low Mass Failure Potential and low Sediment Delivery Potential, except for MU156. MU156 has a moderate Mass Failure Potential and High Sediment Delivery Potential.

Geology

In general the geology in this area consists of Substratum materials that is glacial till derived mostly from metasedimentary bedrock sources. West of Priest Lake, the till is a mixture of metasedimentary and granitic rocks. The till is covered with a surface layer of Mazama ash.

The till contains many hard angular to subrounded gravel and cobble in a coarse loamy matrix. The till closest to the surface is commonly loose and permeable. The deeper till can be dense and impermeable. The contact between the two tills is frequently where water is perched. This contact can be within or below the soil profile.

Bedrock is mainly from Precambrian Belt formations. The dominant rock types are quartzite, siltite and argillite, some of which are carbonitic. Where these rocks have come in contact with intrusions of the Kaniksu batholith they have been altered to schists, amphibolites, phyllites and other metamorphic rocks. Inclusions of quartz diorite, gabbro or metadiabase are found associated with sills within the metasedimentary rocks. Small areas of granite can occur. Cambrian limestone and quartzite occur on the west side of Lake Pend Oreille between Three Sisters Peaks and Bayview.

Existing Site Conditions and Past Activities

The existing conditions within the activity area were evaluated in regards to existing detrimental soil disturbance, landtypes and interpretations, road density, sediment delivery, and the overall soil health. This project focuses on roads. Permanent system roads (including stored, closed, and open) are considered dedicated unproductive lands and are not considered for soil detrimental disturbance under the Northern Region standards or the Forest's Land Management Plan.

Alternative 1 – No Action

The No Action Alternative would not preclude activities already approved in this area or activities planned as separate projects. Alternative 1: No Action Alternative provides a baseline of current conditions against which to compare the effects of the action alternative. Under the No Action Alternative, none of the project activities associated with the action alternatives would take place.

Alternative 2 (Proposed Action)

Road Storage

Approximately 28 miles of road in the project area are proposed to be stored. Only 7.9 miles of roads proposed to be stored are open for public motor vehicle travel from December 1 through March 31. The remaining 21.1 miles of roads proposed for storage are not open to public motor vehicle travel.

Stored roads would be stable, have little surface erosion, and no anticipated maintenance. They would remain part of the Idaho Panhandle's transportation system and could be reopened in the future. Roads stored to meet requirements for grizzly bear core habitat would remain stored for at least ten years. Storage would reduce road maintenance costs and reduce the risk of roads failing and adding sediment to streams.

Approximately 3.1 miles of undetermined roads would also be closed. Proposed work would remove any resource risks associated with these routes, and the road prism would be in an impassable state to discourage illegal use. Undetermined Roads identified for closure are: 215UC, 2636UC, 22656BUA, 2656BUAA, 2686AUA, 2686AUB, 2686AUC, 2686AUD, and 729UV. In addition, 1.3 miles of an unauthorized ATV road would be closed with this proposal.

The existing condition of, and proposed actions for, the roads are described below. Roads not discussed in the proposed action would remain as currently designated on the current motor vehicle use map. The proposed road storage activities are anticipated to begin in the summer or fall of 2018 and continue for approximately 2 to 3 years. See EA for table of Grouse BMU Road Storage

Road Re-route and Decommission

Lower Grouse Creek Road FSR#280 in sections 20, 21, 16, and 15 between North Fork Grouse Creek and Wylie Creek Trailhead has a history of road maintenance problems. Several locations encroach upon the Grouse Creek floodplain and frequently wash out or route flood waters down the road. Future damage and maintenance costs to these sections of encroaching road in section 20 should be expected due to the dynamic nature of the stream channel and low elevation of the road. Additionally, in section 21 the road bisects an open meadow where illegal access to off-road use regularly disturbs and degrades the grassy meadow. Beyond the meadow and the access to Grouse Creek Falls the road climbs a sidehill grade that has regular surface erosion issues and drainage problems. To alleviate these persistent problems and associated costs it has been proposed that the 1.96 mile stretch of FSR #280 road between the NF Grouse Creek and Wylie Creek Trailhead be replaced with a 2.1 mile reroute to the north. Some additional length to the proposed route may be required in the form of a switchback to gain elevation gradually to the aspect where the reroute runs eastward.

The reroute for FSR 280 exists on a mix of Forest Service and private land. There will be approximately 1.5 miles of new road construction total and 0.6 miles of reconstruction of Forest Service Land. There is an opportunity to locate the road around the perimeter of the existing Wylie Creek Trailhead parking area instead of running directly through it, thus compromising parking capacity. This option and the location of the road should be determined by engineering and recreation. The length of the reroute is about 2.01 miles. The length of existing Grouse Creek road that the reroute replaces is 1.96 miles, adding 0.05 miles of road. The 0.6 miles of road from Grouse Falls Trailhead to Wylie Creek Trailhead will remain and serve as motorized access to the Grouse Falls from the new FSR#280 reroute. See overhead view of project in the Draft EA.

Table 2: Proposed Total Road Miles

Action	Miles
New road construction	1.5
Road reconstruction	0.6
Decommissioning	1.4
Decommissioning turned into non-motorized trail	0.3
Retain and improve existing road	0.6

Design Features to Protect Soils

Utilizing Best Management Practices (BMPs) include but are not limited to following design features.

- The rerouted portion of the 280 road would be located in a suitable location and would follow developed engineering plans.
- Erosion control would be considered for the road storage activities. An erosion control plan would be accepted during contract negotiations.
- Timing of construction activities will be considered during contract development, and should be limited to periods of low flows.
- Mass failure potential was field verified by the project hydrologist. Contract specifications will consider mass failure potential.
- Road storage and road construction designs will consider road drainage.
- The portion of the 280 road that will be rerouted will have new construction and the pioneer road will be within the limits of construction.
- All new road construction will limit sidecast material.
- Do not fuel vehicles within 100 feet of RHCAs as defined by INFS (RA-04).
- All in channel work will incorporate soil and water conservation practices during construction.
- Road storage contract specifications will address flow diversion at culvert removal sites.
- If gravelling roads and using on-Forest gravel sources, use sites that have been developed so as to minimize the potential for erosion in pioneer areas.
- Streambanks will be protected as directed by other BMPs and contract provisions.

- If drafting out of streams for purposes of road construction, maintenance, or dust abatement, consider using water sources directly off of existing roads, and in accordance with any temporary water use permits from the State of Idaho. To prevent injury to small fish during drafting, utilize either 3/32-inch or smaller mesh intake screens or double rolled 1/8-inch hardware cloth crimped at both ends when drafting water.

- Maintenance of road will be conducted in a manner that protects soil and water resources.

- Road storage designs and specifications will address road surface protection.

- Traffic associated with implementation of the project during wet periods will be suspended as determined by the contract inspector.

Soil Resources

Detrimental Soil Disturbance

Detrimental soil disturbance includes, but is not limited to, compaction, rutting, and soil displacement. Existing classified National Forest System roads and trails are considered dedicated lands for other purposes and, as such, Region 1 soil quality standards and Land Management Plan guidelines do not apply when evaluating the activity area. Disturbance from natural events, such as wildlife trails, are not considered detrimental because they are not caused by human activity.

Landtypes and Interpretations

The IPNF Land System Inventory (LSI) soil mapping has grouped soils of similar geology, geomorphology, hydrology, and other crucial soils characteristics into "landtypes". These landtypes contain a series of interpretations or probability ratings based on soil characteristics. Interpretation ratings for soil behavior have been compiled and are broken into subcategories of mass failure, productivity, surface erosion, subsurface erosion, and landtype sensitivity; each is rated as low, moderate, or high for a particular landtype. Six landtypes have been identified in activity area for Alternative 2. Detailed descriptions and characteristics of each are located in the soils section of the project file (PF: S01). Because this project focuses exclusively on land areas that are within the National Forest System of roads and trails and are dedicated to administrative use, productivity will not be discussed in further detail. Pertinent landtype interpretations to the Grouse BMU project are mass failure potential, surface erosion, and subsurface erosion as these activities have the potential to affect areas outside of the NFS road system.

Mass failure potential is the relative probability of down-slope movement of masses of soil material. Besides natural failure, landslides or slumping can be triggered by a number of mechanisms including harvest activities, severe burning, and related road building. Mass failures detrimentally disturb soils because organic matter, the productive ash layer, and even subsurface layers of the soil can be carried down slope during a failure. The rating for mass failure potential is derived through the use of landtypes and geographical information systems (GIS). Using GIS, several risk factors can be intersected and a potential rating derived. Based on the IPNF LSI (PF: S01), there are no areas in proposed actions that have a high mass failure potential in Alternative 2.

Slope gradient, soil depth, and water content are all important factors in influencing landslide hazards (Megahan and others 1978). Soil water, a major contributor to higher landslide potential, increases from ridge top to stream bottom, hence the landslide potential varies with slope position. Slides are infrequent at or near ridge tops and become more common with the increase in drainage area. There are no units which contain high mass failure potential.

Surface erosion potential is a rating of the relative susceptibility of exposed soils to sheet and rill erosion. Surface erosion potential within the proposed action is rated as low.

Subsurface erosion is a rating of the relative susceptibility of exposed sheet and rill erosion of the subsoils exposed during road construction. Alternative 2 proposes 1.5 miles of new road construction. This amounts to roughly 3 acres, of land converted to an administrative designation. The road reconstruction section of the proposed reroute of FSR 208, has a moderate subsurface erosion rating. Road reconstruction however is generally not an issue in regards to subsurface erosion because there is an existing prism that serves as the site of impact. Some detrimental effects are expected from subsurface erosion because the new construction of the reroute of FSR 280 has a High rating on approximately .2 miles.

Environmental Consequences

This analysis includes potential effects from proposed system and temporary roads on soils. To determine whether proposed activities would detrimentally impact or have cumulative effects on soils, the results of past monitoring was used (PF: S37). IPNF soil monitoring information about roads is encapsulated in the Summary of Soil Monitoring on the IPNF (2011). Roads are currently the primary source of sediment to streams on the IPNF, due to surface erosion of bare soils. Although road erosion tends to decrease after construction, large storm events could potentially trigger erosion with increased water yield. For this project, the timber that will be cut on the new road will occur within the prism, or the cut and fill slope of the new road. There are no anticipated landings, temp roads, or skid trails associated with it. All activities will occur within the prism or right of way of the new road.

Little to no increase in disturbance is expected because equipment would re-use existing roads for closing and treating weeds. Decommissioning FSR 280 will be a long term benefit reducing sediment into Grouse Creek. Reducing sediment into Grouse Creek will also improve bull trout spawning and rearing habitat downstream, reduce annual maintenance costs, and help meet Forest Plan direction by reducing sediment in the Grouse Creek subwatershed.

Mass Failure- Mass failure is unlikely to occur as the soil types are rated low and moderate. Along the proposed re-route of FSR 280, there are localized small areas (approximately 10 feet by 20 feet) showing some signs of movement. This is not a major concern as these localized areas may not be directly in the road prism. Engineers will also be taking a close look at the road location and design the road to maintain stability.

Weeds- Ground disturbance could create bare soils which can promote the establishment of invasive plants or expand their existing range of occupation. It is expected that weeds will expand even if corridors are treated. As forests grow and the tree canopies close, weeds are largely forced out of those areas due to restricted light. In time, soil stability and productivity would be improved and the expectant return of native vegetation would reduce the erosion potential along roadsides, riparian areas, and openings. A decrease in noxious weeds would likely lead to long-term declines in sediment by promoting native vegetation and restoring surface protection to lessen erosion potential. Existing weed populations are confined mostly to travel corridors, which are not considered part of the productive land base. The Forest Service has treated weeds in and around the project area in the past and will continue those efforts. However, 100% control is not expected, and weeds may still invade any areas where disturbance occurs. This includes natural disturbances, like game trails and fire.

Direct effects on soils from proposed activities were estimated by analyzing the effects of compaction, rutting, erosion, burning, and displacement on the soil surface. This is the most productive layer and also the easiest to disturb through management activities. Compaction, rutting, displacement, and severe

burning can affect the soil's physical, chemical, and biological properties, which indirectly can affect the growth and health of trees and other plants. Compaction and rutting reduce soil permeability and infiltration, which can cause soil erosion. Displacement reduces plant growth where topsoil and organic matter are removed.

The effects of roads in the treatment areas were evaluated using direction from the forest land management plan and the Northern Region Soil Quality Standard activity areas.

There are no anticipated landings, temp roads, or skid trails associated with this project. Roads that are to remain on the landscape for future use and added to the National Forest System are “dedicated” lands that are assumed to have detrimental soil conditions and are managed as unproductive forest land. Therefore, direct effect to the Soil Resource is very limited with the proposed action as the Regional Soil Quality Standards do not apply to dedicated administrative sites.

Road storage will have little effect on the soil resource as these roads are being kept for future use and remain within the NFS, therefor no changes are being made to soil productivity on the stored roads. Decreases in erosion and sediment production can be expected from those roads that are open seasonally due to the revegetation, but these site improvements are not expected from roads that are currently closed to motorized traffic that are likely already revegetated. Improvements will be made to drainage features of the roads, to reduce the potential for mass wasting events due to over-whelmed culverts.

Soil erosion is expected with the construction of a new road, however these effects will be mitigated with the use of design features and BMP’s. Erosion from the decommissioned roads is expected to decrease due to the establishment of vegetation over the road surface.

Recovery of the 1.4 miles of road that is proposed to be decommissioned is limited. The decompaction and restoration of a road has been found to successfully recover only 60% at best. A conservative 30% recovery is utilized to estimate the improvements to soil function and productivity from a decompacted and restored road (Rone, 2011). Although the site condition will improve by rerouting the road away from the Grouse Creek floodplain, the decommissioning of this segment of road will not immediately inherit natural, undisturbed soil characteristics.

Indirect effects may cause slight change in water flow through the soil with the new reroute of FSR 280. The topsoil displacement and compaction necessary in constructing a road negatively influence infiltration and subsurface water flow. This will influence how water drains on the hillslope as subsurface flow may be hindered due to decrease in pore space beneath the road which may create areas if increased moisture upslope from the road. The decrease in infiltration can also result overland flow which can cause erosion and deliver sediment to the creek.

Cumulative Effects

Cumulative effects include the combination of direct and indirect effects from past, present, and reasonably foreseeable activities. Direct, indirect, and cumulative effects on soils are measured within each activity area, although adjacent land outside of the activity area is considered as well in regards to slope stability.

Existing classified National Forest System roads and trails are considered dedicated lands for administrative use and, as such, Region 1 soil quality standards and Land Management Plan guidelines do not apply when evaluating the activity area. Cumulative effects to soils are those effects that overlap in time and space, so there would be no cumulative effect where there are no direct or indirect effects. All current roads that are proposed for closure or to be stored will have no cumulative effects associated. The

creation of the reroute will not have associated cumulative effects since there are no other proposed actions at the same time on the same footprint, in addition it will be converted into administrative use.

Regulatory Consistency

Forest Land Management Plan Guidelines

The proposed activities would comply with the Forest Land Management Plan Guidelines for maintaining soil productivity.

FW-GDL-SOIL-01: Ground-based equipment should only operate on slopes less than 40 percent, in order to avoid detrimental soil disturbance. Where slopes within an activity area contain short pitches greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed, as designated by the timber sale administrator.

Ground based equipment will only operate on slopes over 40% to construct the FSR 280 reroute cross contour. The road design and implementation will be done by a roads engineer to minimize soil impacts. This ground will also become a part of the Forest Service roads system and dedicated to administrative use.

FW-GDL-SOIL-02: Coarse woody debris is retained following vegetation management activities per (FW-GDL-VEG-03).

FW-GDL-SOIL-02 does not apply to Alternative 1 activities are proposed. Alternatives 2 would comply with FW-GDL-SOIL-02 because trees will be cut only where the new road alignment will be place. Large woody debris retention would follow the guideline of FW-GDL-VEG-03 to ensure the maintenance of site productivity in the proximity of the corridor. All current levels of coarse woody debris would be maintained outside of the new road corridor.

FW-GDL-SOIL-03: In order to provide for leaching of nutrients and maintenance of long-term soil productivity, fine woody debris should be distributed throughout harvest units when conducting vegetation management activities located on nutrient limited rock types and should remain on site for at least 6 months, during one winter (wet/rainy) season, and prior to any subsequent activity such as prescribed burning or mechanical slash piling. Exceptions may occur in areas where a site-specific analysis indicates that leaving fine woody debris untreated would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources.

Alternative 1 would comply with FW-GDL-SOIL-03. Since no harvest activities would occur with alternative 1, there would be no removal of material. Alternative 2 would meet the guideline because were vegetation will be cut, the area will be converted into Administrative use, and will no longer be a part of the soils resource.

FW-GDL-SOIL-4: Ground-disturbing management activities on landslide prone areas should be avoided. If activities cannot be avoided, they should be designed to maintain soil and slope stability.

All alternatives comply with this guideline because there are no treatments proposed on landslide prone soils see Table 3. The new reroute of FSR 280 will be designed by an engineer.

Table 3: Mass Failure Potential for Reroute of FSR 280

Landtype Code	Mass Failure Potential
260	L
102	L
155	L
251	L
250	L
156	M

Region 1 Soil Quality Standards

Detrimental Soil Disturbance: Region 1 soil quality standards require the Forest Service to design new activities that do not create detrimental soil conditions on more than 15 percent of an activity area. In areas where less than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15 percent. In areas where more than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. The activity area of this project is entirely within existing road prisms or right of way, or on land that will be added to the NFS. Per regional guidance, the soils quality standards referring to DSD do not apply to these areas.

The proposed action would comply with this standard. The proposed action is below the 15 percent of the overall project area. This project is decommissioning, therefore restoring 1.4 miles of road to improve the state of soil productivity, 21.1 miles of roads proposed for storage, and 1.5 of new construction. The 1.4 of miles of road decommissioning will contribute to more benefits than its footprint. By rerouting the 208 road and decommissioning its current location, it will reduce sediment into a stream with sensitive species, creating a healthier stream, and a better habitat. It will also reduce long term maintenance lowering costs.

Organic Matter: Organic matter layer thickness would be retained as appropriate for local conditions. All alternatives would comply with this standard because the currently satisfactory levels of local organic matter would be maintained within the optimum range.

Large Woody Debris: This portion of the Regional standard does not apply to Alternative 1 because no activities are proposed. The proposed action would comply with the regional standard because current levels will be maintained since the majority of the work is on existing road beds, which is not part of the soil resource.

National Forest Management Act (NFMA)

Timber Harvest on National Forest Lands (16 USC 1604(g)(3)(E)): A Responsible Official may authorize site-specific projects and activities to harvest timber on National Forest System lands only where:

Soil, slope, or other watershed conditions will not be irreversibly damaged (16 USC 1604(g)(3)(E)(i)).

All alternatives comply with the NFMA. As previously discussed under the Forest Plan guidelines and Northern Region soil quality standards; neither soil, slope nor other watershed conditions related to the soil resource would be irreversibly damaged by implementing any of the proposed alternatives.

Present and Reasonably Foreseeable Activities

As previously discussed, the soils evaluation differs from most other resource evaluations because it is limited to the unit boundaries in most cases. Because of this, many present and reasonably foreseeable activities are not considered for the soils cumulative effects analysis because they do not leave a discernable trace within unit boundaries. In addition to a roads specific project, the unit boundaries of an activity area do not apply as they would in vegetation management.

Summary of Effects

Permanent system roads are considered dedicated lands and not considered for soil detrimental disturbance under the Northern Region standards or the Forest's Land Management Plan and therefore have no cumulative effects. The decommissioning of 1.4 miles of FSR 280 is expected to recover 30% from detrimental soil conditions, with the possibility of continuing rehabilitation over time. The overall decreases in sedimentation to Grouse Creek is will be benefit the creek returning to its natural floodplain, and aid bull trout habitat.

As specified in the "Design Features to Protect Soil" (pg. 9), BMPs will be used appropriately to ensure the least impact occurs in the proposed action to reroute FSR 280. Standard and site-specific best management practices to protect soil and water, and practices as described in the Soil and Water Conservation Practices (SWCP) Handbook (FSH 2509.22 USDA 1988) are included as design features and would be applied during the new Re-route of FSR 280 and road decommissioning of FSR 280, to minimize soil erosion. They have been shown to maintain acceptable soil productivity (Seyedbagheri 1996; Idaho DEQ 2001; PF: S37). The SWCP Handbook (USDA Forest Service 1988) outlines best management practices that protect the soil and water resources at a higher level than existing Idaho Forest Practices rules and regulations, thereby incorporating all Idaho State standards. All best management practices applicable to the Grouse BMU Project and can be found in the appendix to the environmental assessment.

Overall, the effects to the Soil Resource for this project area is minimal. The benefits of decommissioning the current route of FSR 280 will last for decades or longer.

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