

Travel Management Project

Soil Resource Report

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for:

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Introduction

The Travel Management project proposes to identify a designated system of roads available for public motorized vehicle use on the Chequamegon-Nicolet National Forest (CNNF). The travel system proposed by three different alternatives each includes the use of highway legal vehicles, all-terrain vehicles (ATV), or both. All roads proposed open for public motorized use in alternatives 1-3 are existing travel-ways, with no new ground disturbing activities proposed. These travel-ways primarily have a native soil road surface and are assigned a Maintenance Level (ML) 2, which is a single lane, lower standard road intended for use by high clearance vehicles (USDA Forest Service, 1992). There is a small percentage of ML 3, 4, and 5 roads that have improved surfacing intended for passenger cars, with about the same miles for each alternative. The Travel Management Project Environmental Assessment (EA) provides complete descriptions and maps of the alternatives.

Management Concerns

The CNNF received no specific soil quality issues or concerns from the extensive general public involvement process conducted to date. Internal soil resource management concerns regarding the public use of motorized vehicles on the three travel systems proposed include:

- Amount of the road system located on sensitive soils with a high risk for adverse impacts
- Amount of land that is committed to the motorized transportation system

Motorized use may cause compaction, rutting and erosion of a road surface that can result in deposition of eroded materials into adjacent productive uplands, wetlands, or water bodies (see hydrology specialist report for wetland hydrology and open water concerns). Excessive erosion and deposition may adversely affect oxygen to tree roots of an adjacent timber stand and reduce soil functions and productivity. Land designated for use as part of the CNNF transportation system commits a portion of the soil resource to a non-productive use. Consideration should be given to the amount of productive land that is committed to the transportation system proposed by alternatives 1-3.

Background

The physical scope of the Travel Management Project includes the entire 1.5 million acre Chequamegon-Nicolet National Forest. The glaciated terrain of the CNNF is complex, with a wide variety of glacial landforms and corresponding soil types. Common landforms include ground moraine, drumlins, end moraine, eskers and outwash plains. Depth of soil over bedrock averages 15 meters and ranges from 0-120 meters. Topography is generally level to rolling, with 5% to 20% slopes common. Steep slopes (>30%) do occur on some landforms, but occupy less than 0.5% of the Forest. Elevation ranges from 180 to 550 meters above sea level across the Forest. The soil resource across the Forest has developed in about 16 % coarse sandy materials, 34 % coarse loamy materials, 22 % medium loamy materials, and 28 % muck or peat materials. There are about 434,000 acres (23%) of wetland within the CNNF boundary.

The soil resources of the CNNF are mapped and characterized within a multi-scale, hierarchical, ecological classification framework as described by Cleland et al (1997, 20p). Land type phases (LTP) provide the most site-specific scale of soil information by defining similar ecological

conditions relating to soil texture, moisture, nutrients, drainage class, slope and other physical, chemical and biological characteristics.

Methodology for Analysis

Potential soil resource direct, indirect and cumulative effects to be analyzed for the Travel Management project are very limited due to the fact that alternatives 1-3 do not propose any new ground disturbing activities. Also, the Eastern Region of the USDA Forest Service Soil Quality Standards state that national forest system roads and trails are dedicated land uses and not considered detrimental soil conditions (USDA Forest Service, 2005, p6). Thus, the CNNF Land and Resource Management Plan (LRMP) soils guideline that adopts the Eastern Region soil quality standards and threshold values for detrimental compaction, rutting, erosion, nutrient loss, and maintaining ground cover, does not apply to the alternatives in this project. There are no site-specific soil resource threshold values established by regulatory or forest plan direction that the environmental consequences of the Travel Management project must meet. The determination of compliance will be based on consistency with USDA Forest Service regulations 36CFR219.27 (a) and the CNNF Forest Land and Resource Management Plan direction pertaining to the soil resource.

Effects to the soil resource were analyzed by determining the miles of roads proposed open to motorized use that are on low, moderate, and high risk soils in alternative 1-3. Also, the total miles and acres of land proposed for use as permanent system roads were determined, to evaluate the amount of productive soil resource that is committed to the transportation system in alternatives 1-3. The “affected area” for analysis of direct and indirect effects to the soil resource is the land area each road in the proposed travel system occupies. For this report, duration for short-term effects to soil is considered to be less than 10 years, and will be greater than 10 years for long-term effects. The spatial analysis boundary for cumulative effects to the soil resource is the total land area the roads occupy in each alternative, across the entire CNNF. The time span selected for soil cumulative effects analysis is the past 25 years. Potential effects to the soil resource were also evaluated based on applicable research, site-specific field observations, and the professional judgments of a soil scientist

To measure the potential risk for motorized use of a transportation corridor to cause excessive compaction, rutting, erosion, and off-road deposition; interpretations derived from standard soil rating criteria (USDA NRCS, 1998, p537-6) were used to assign all soil types/polygons across the CNNF to a low (1), moderate (3), or high (5) risk category. The potential risk to soil rankings intended for ML 2 road analysis can be found in the CNNF GIS corporate soils geodatabase. Soil physical properties used to rank each soil type include drainage class, surface texture, and slope class. For example, a well drained, sandy loam soil with a slope range of 0 to 5 % was given a low (1) risk rating for compaction, rutting, and erosion. A moderately-well drained, silt loam soil with a slope range of 0 to 18 % slope was given a moderate (3) risk rating. All poorly drained (wetlands and/or hydric) soils, and soils with a slope range greater than 30 % were given a high (5) risk rating for compaction, rutting and/or erosion.

The LTP/soil data layer (polygons) was then intersected with the Travel Management project roads data layer (lines) in the CNNF corporate GIS data base to identify specific soil type(s) for each road. The intersect process created multiple soil-road segments with 1, 3, or 5 risk ratings, depending on how many soil types a road corridor crossed. A statistical computer program, SAS, was then used to total the segments of a given road by risk category and divide by the total road

length to compute a weighted average soil risk rating for each road. Weighted average values were then rounded up or down to the nearest 1, 3, or 5 risk category for each road. All calculations were tabulated to determine the relative differences among the alternatives (see Table 1-3 below).

Existing Condition

The Travel Management Project Environmental Assessment document fully describes the existing condition relative to the type of motorized use and the roads, routes, and trails that are within the scope of this project. The current network of maintenance level 2 roads that are the primary focus of this analysis is the result of events dating from the late 1800's to present, and includes development and continued use of; logging railroad grades; homesteader roads; and Forest Service constructed, reconstructed, and temporary logging roads. Many former travel ways have re-vegetated naturally or by project design and are returning to productive land over time. Some roads (ML 1) are maintained for CNNF management, but are closed to public motorized use and not within the scope of this project. The remaining ML 2 roads, with a few miles of ML 3, 4, and 5, constitute the existing road network for which motorized public access is addressed by this Travel Management project and is displayed by the Alternative 1 roads map and data layer.

For the CNNF Travel Management Project, the baseline condition is outlined in the most current Forest Order R913-06-01 and the CNNF Forest Plan as summarized:

- Currently, no designated roads are open to ATV use on the Nicolet side of the forest;
- Street legal vehicles are allowed on any route that is not physically closed to use;
- Cross-country travel by any vehicle is prohibited;
- Forest roads are closed to ATV use unless posted open with a sign. The open roads are identified on ATV maps available at CNNF Ranger District Offices. The MVUM will replace these maps;
- Using an all-terrain vehicle (ATV) on National forest system roads and trails is prohibited from March 15th through April 30th of each calendar year (applies to all 3 alternatives)

Table 1. Alternative 1 (Existing Condition) Summary

OML Roads	Miles of Roads Open for Highway Legal Vehicles	Miles of Roads Open for ATVs	Miles of Roads Open to Both Vehicle Types
1	0	2	0
2	4,086	0	464
3	22	0	20
4	48	0	2
5	13	0	0
Total	4,169	2	486

Total Miles of Trails Open for ATVs: 318

The existing condition of the soil resource will be discussed under Alternative 1 - No Action.

Desired Condition

USDA Forest Service regulations 36CFR219.27 (a) Resource protection, All Management prescriptions shall-

(1) Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land;

(10) Ensure that any roads constructed through contracts, permits, or leases are designed according to standards appropriate to the planned uses, considering safety, cost of transportation, and effects upon lands and resources

The Chequamegon-Nicolet National Forest Land and Resource Management Plan (USDA Forest Service, 2004b) contains the following desired conditions for the soil resource that are applicable to the Travel Management Project:

Goal 1.6 - Provide desired physical, chemical, and biological soil processes and functions on the Forests to maintain and/or improve soil productivity.

In addition to the above listed desired future conditions, the LRMP contains the following guidelines that are applicable to the Travel Management Project:

Soils Guideline – Designate the location of roads, trails, landings, main skid trails, and similar soil disturbing activities. Stabilize disturbed sites during use and revegetate after use to control erosion.

Construction, Reconstruction, and Use of Motorized Vehicles Guideline – Avoid (when possible) wetlands, riparian areas, stream crossings, sustained grades of 5% or more, highly erodible soils (silt cap, sand, etc.) when designing new all-terrain vehicle trail systems, relocating existing motorized trail segments, or considering the designation of roads as all-terrain vehicle routes. Where such locations cannot be avoided, consider stabilizing the trail tread and ensuring adequate drainage. Give priority to relocating trail segments that cause erosion, and degradation of water quality and other resources.

Roads Management and Related Soils and Vegetation impacts Guidelines:

- Minimize road impacts by utilizing soil protection measures described in “Wisconsin Best Management Practices for Water Quality”, and “Wisconsin’s Construction Site Best Management Practices Handbook”.

- consider seasonal road use restrictions (with effective closures) for roads that traverse silt-cap soils. Utilize road design modifications that are environmentally sound and minimize erosive rutting on poorly drained soils.

- control erosion and effectively manage water flow on and adjacent to roads by providing adequate roadside and outlet ditches, ditch checks, and cross-drainage.

Overview of the Forest Proposal

This alternative represents the initial proposal revealed at the October 2007 open house meetings. As described under the Public Involvement section of this document, the RAP included ranking criteria for resource risks (water quality, soils, heritage resources, resource protection-based management areas, Threatened, Endangered, and Sensitive species habitats, other wildlife needs and the potential to spread invasive species) and road values to the public (access for hunting, bough and firewood gathering, recreation, access to private in holdings, and administrative access).

Season of Use Restrictions

- General ATV seasonal use restrictions will remain in place (March 15th –April 30th) as described in the current forest order, R913-06-01.
- There are no specific season of use restrictions proposed for this Alternative.

Table 2. Alternative 2 (Forest Proposal) Summary

OML Roads	Miles of Roads Open for Highway Legal Vehicles	Miles of Roads Open for ATVs	Miles of Roads Open to Both Vehicle Types
1	0	2	0
2	1,543	7	428
3	20	0	20
4	46	0	2
5	12	0	0
Total	1,621	9	450

Total Miles of Trails Open for ATVs: 318

Mitigation Applicable to All Alternatives

There are no soil resource mitigation measures needed for this project.

Monitoring

There are no soil resource specific monitoring requirements proposed for this project. The CNNF conducts annual timber sale implementation and effectiveness monitoring that includes effects to the soil resource from the road system in selected timber sale areas. Annual soil resource effects monitoring is also conducted by the CNNF soil scientist and timber sale administrators on randomly selected timber sale areas. Both types of monitoring consider transportation system effects to soils and the effectiveness of applicable Forest Plan standards, guidelines and best management practices.

Environmental Consequences

Table 3 below provides the mileage and risk rating data used in analyzing direct and indirect effect for all three alternatives.

Alternative 1 - No Action

Direct and Indirect Effects

No new ground disturbing activities are proposed. Table 1 displays road mileage by vehicle type and maintenance level for this alternative. A direct effect to the soil resource is the amount of land dedicated to the existing transportation system. The amount of productive soil resource that is committed to the public motorized transportation system in alternative 1 is 4,657 miles or about 8,102 acres (0.54 % of the CNNF). About 98% of this transportation system is comprised of ML 2 roads, about 2% is ML 3, 4 or 5, and a few miles of ML 1 roads are open as part of an ATV trail system. Again, national forest system roads and trails are dedicated land uses and not considered detrimental soil conditions.

An indirect effect to the soil resource could be erosion of a road surface with deposition of eroded materials off the road and onto adjacent productive/functioning wetland, riparian, or upland soils. ML 2 roads on the CNNF are usually an unsurfaced (native ground), single lane, with about a 14 foot travel width that is sod covered except for exposed soil in two HLV and/or ATV wheel tracks. The travel way of a given road may be compacted, rutted, or eroded to varying degrees, depending on specific physical soil conditions and amount and type of motorized use, especially during wet conditions. Table 3 above and Figure 1 below display the miles of roads in Alternative 1 that occur on low (1), moderate (3), or high (5) risk soils as an indicator for potential adverse effects to the off-road soil resource. There are 1,637 miles or 35% of this alternatives open roads with a low risk rating, indicating little or no compaction, rutting, or erosion is likely. About 2,755 miles or 59% of the open roads have a moderate risk rating, indicating compaction and some rutting of the road surface is likely and erosion would be common on steeper slopes with exposed soil. There are 265 miles or 6% of the roads in this alternative with a high risk rating indicating soils with severe limitations such as a high percentage of wetland or steep slopes that would compact or erode readily and need more road maintenance

Table 3. Soil Risk Rating Summary by Alternative

Motorized Vehicle Use	Soil Risk Rating	Alternative 1 (No Action)	Alternative 2 (Forest Proposal)	Alternative 3
Highway Legal Vehicles Only	1	1,452	534	544
	3	2,489	1,016	1,051
	5	228	71	69
<i>HLV Only Total</i>		4,169	1,621	1,664
ATV Only	1			6
	3	2	9	14
	5			
<i>ATV Only Total</i>		2	9	20
Both Highway Legal Vehicles and ATV	1	185	161	170
	3	264	252	265
	5	37	37	39
<i>HLV & ATV Total</i>		486	450	474
Total Miles of Roads		4,657	2,080	2,158

Soil Risk Rating Total Miles

1	1,637	696	720
3	2,756	1,279	1,330
5	265	108	108

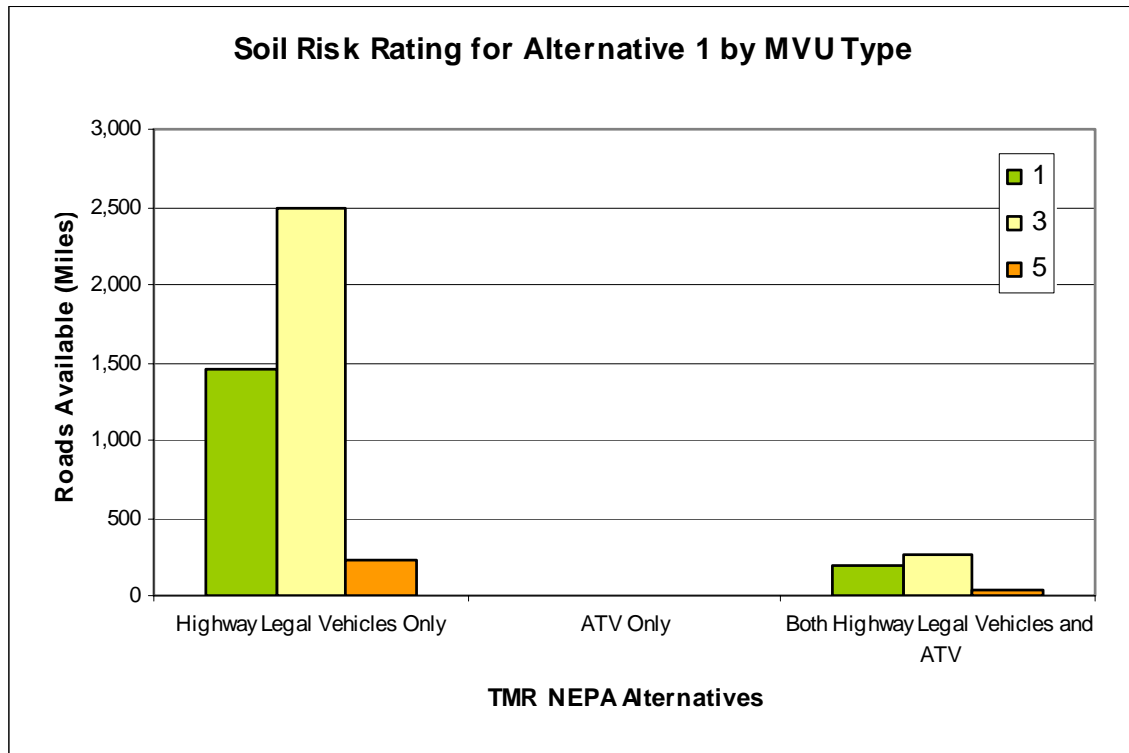


Figure 1. Alternative 1- No Action.

Soil risk ratings are for the most limiting season or conditions and do not account for the benefits of low motorized use, seasonal restrictions, sodded road surface, avoidance of steep slope or wetland areas, erosion control measures, ditching and maintenance, BMPs, spot surfacing, applying Forest Plan standards and guidelines etc, which commonly reduce the potential for adverse soil impacts by a minimum of one rating level.

High volumes of ATV traffic may keep an entire travel way in an exposed soil condition, increasing the potential for compaction and erosion of roads open to ATV use. Seasonal ATV use restrictions during the March-April wet period help minimize impacts. About 488 miles or 10% of the alternative 1 road system is open to ATV use, and 37 miles or 8% of those roads have a high soil risk rating. Increased maintenance needs and costs would be expected for roads/trails on these high risk soils, to minimize potential adverse impacts to the travel-way and adjacent land areas.

The existing designated 318 mile ATV trail system is identified open (except for March 15-April 30 seasonal use restrictions) in all three alternatives with no proposal for changes. The trail system is monitored and maintained and was not part of this analysis.

Cross-country travel (off road/trail) by any vehicle is prohibited on the CNNF. Illegal use happens and is dealt with through law enforcement, education, and appropriate mitigation of any resource

damage. This report cannot speculate on potential indirect effects from an unknown/unpredictable amount of a prohibited activity.

Designating 4,657 miles of roads or about 8,102 acres as part of the public motorized transportation system in alternative 1 is a long term direct effect that commits 0.54 % of the CNNF soil resource to system roads. Potential risk of short-term indirect effects to the off-road productive soil resource is high for 265 miles or 6% of the system roads in this alternative. Maintenance and control of off road/trail erosion will minimize potential adverse effects to adjacent areas. The transportation system identified in alternative 1 is not considered detrimental to the long-term productivity of the CNNF lands.

Alternative 2 – Forest Proposal

Direct and Indirect Effects

No new ground disturbing activities are proposed. The forest proposal reduces total roads open for motorized use by 55% or 2,577 miles from the existing condition based on a roads analysis and internal and external involvement. Table 1-2 on page 6 of this report displays road mileage by vehicle type and maintenance level for this alternative. A direct effect to the soil resource is the amount of land dedicated to this proposed transportation system. The amount of productive soil resource that is committed to the public motorized transportation system in alternative 2 is 2,080 miles or about 3,748 acres (0.25 % of the CNNF). About 95% of this transportation system is comprised of ML 2 roads, about 5% is ML 3, 4 or 5, and a few miles of ML 1 roads are open as part of an ATV trail system. Again, national forest system roads and trails are dedicated land uses and not considered detrimental soil conditions.

An indirect effect to the soil resource could be erosion of a road surface with deposition of eroded materials off the road and onto adjacent productive/functioning wetland, riparian, or upland soils. ML 2 roads on the CNNF are usually an unsurfaced (native ground), single lane, with about a 14 foot travel width that is sod covered except for exposed soil in two HLV and/or ATV wheel tracks. The travel way of a given road may be compacted, rutted, or eroded to varying degrees, depending on specific physical soil conditions and amount and type of motorized use, especially during wet conditions. Table 3 and Figure 2 below display the miles of roads in Alternative 2 that occur on low (1), moderate (3), or high (5) risk soils as an indicator for potential adverse effects to the off-road soil resource. There are 696 miles or 34% of this alternatives open roads with a low risk rating, indicating little or no compaction, rutting, or erosion is likely. About 1,277 miles or 61% of the open roads have a moderate risk rating, indicating compaction and some rutting of the road surface is likely and erosion would be common on steeper slopes with exposed soil. There are 108 miles or 5% of the roads in this alternative with a high risk rating indicating soils with severe limitations such as a high percentage of wetland or steep slopes that would compact or erode readily and need more road maintenance.

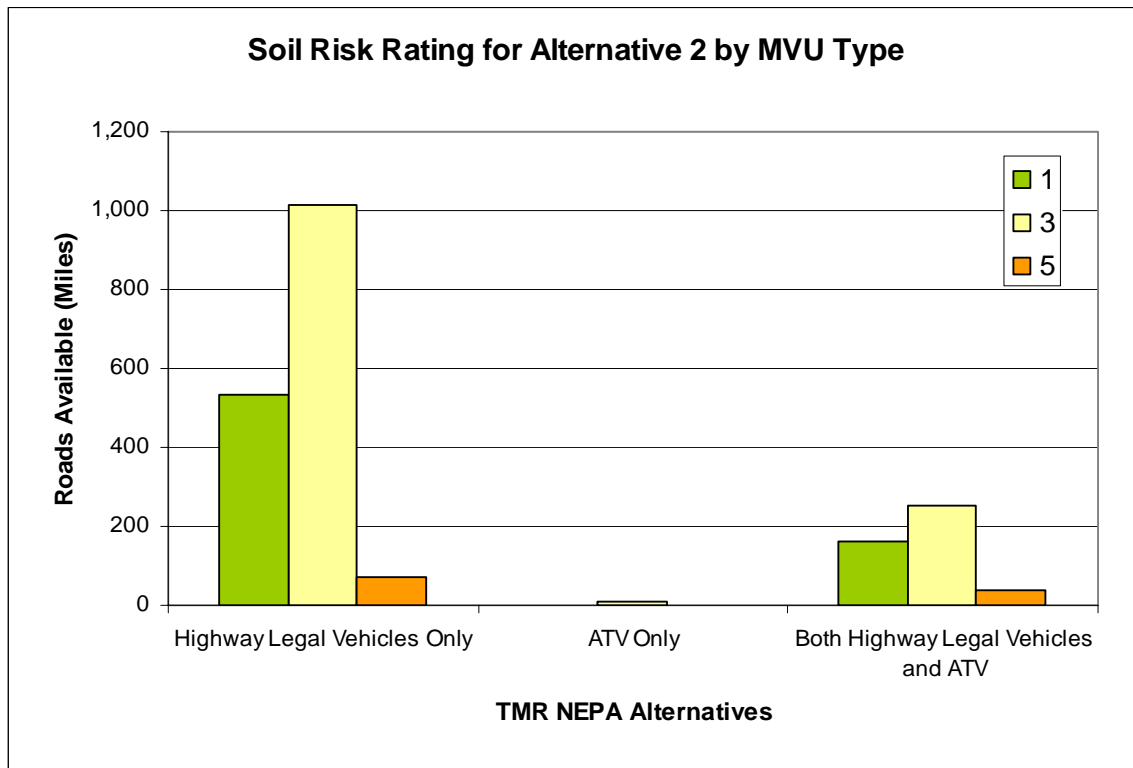


Figure 2. Alternative 2 – Forest Proposal

Soil risk ratings are for the most limiting season or conditions and do not account for the benefits of low motorized use, seasonal restrictions, sodded road surface, avoidance of steep slope or wetland areas, erosion control measures, ditching and maintenance, BMPs, spot surfacing, applying Forest Plan standards and guidelines etc, which commonly reduce the potential for adverse soil impacts by a minimum of one rating level.

High volumes of ATV traffic may keep an entire travel way in an exposed soil condition, increasing the potential for compaction and erosion of roads open to ATV use. Seasonal ATV use restrictions during the March-April wet period help minimize impacts. About 459 miles or 22% of the alternative 2 road system is open to ATV use, and 37 miles or 8% of those roads have a high soil risk rating. Increased maintenance needs and costs would be expected for roads/trails on these high risk soils, to minimize potential adverse impacts to the travel-way and adjacent land areas.

The existing designated 318 mile ATV trail system is identified open (except for March 15-April 30 seasonal use restrictions) in all three alternatives with no proposal for changes. The trail system is monitored and maintained and was not part of this analysis.

Cross-country travel (off road/trail) by any vehicle is prohibited on the CNNF. Illegal use happens and is dealt with through law enforcement, education, and appropriate mitigation of any resource damage. This report cannot speculate on potential indirect effects from an unknown/unpredictable amount of a prohibited activity.

Designating 2,080 miles of roads or about 3,748 acres as part of the public motorized transportation system in alternative 2 is a long term direct effect that commits 0.25 % of the CNNF soil resource to system roads. Potential risk of short-term indirect effects to the off-road productive soil resource is high for 108 miles or 5% of the system roads in this alternative. Maintenance and control of off road/trail erosion will minimize potential adverse effects to adjacent areas.

The transportation system identified in alternative 2 is not considered detrimental to the long-term productivity of the CNNF lands.

Alternative 3

Direct and Indirect Effects

No new ground disturbing activities are proposed. Alternative 3 is very similar to the forest proposal, with an additional 76 miles of open roads and increased fall season access. Table 4 below displays road mileage by vehicle type and maintenance level for this alternative. A direct effect to the soil resource is the amount of land dedicated to this “more motorized access” transportation system. The amount of productive soil resource that is committed to the public motorized transportation system in alternative 3 is 2,158 miles or about 3,880 acres (0.26 % of the CNNF). About 95% of this transportation system is comprised of ML 2 roads, about 5% is ML 3, 4 or 5, and a few miles of ML 1 roads are open as part of an ATV trail system. Again, national forest system roads and trails are dedicated land uses and not considered detrimental soil conditions.

Table 4. Alternative 3 Summary

OML Roads	Miles of Roads Open for Highway Legal Vehicles	Miles of Roads Open for ATVs	Miles of Roads Open to Both Vehicle Types
1	0	2	0
2	1,587	18	451
3	20	0	20
4	45	0	3
5	12	0	0
Total	1,664	20	474

Total Miles of Trails Open for ATVs: 318

An indirect effect to the soil resource could be erosion of a road surface with deposition of eroded materials off the road and onto adjacent productive/functioning wetland, riparian, or upland soils. ML 2 roads on the CNNF are usually an unsurfaced (native ground), single lane, with about a 14

foot travel width that is sod covered except for exposed soil in two HLV and/or ATV wheel tracks. The travel way of a given road may be compacted, rutted, or eroded to varying degrees, depending on specific physical soil conditions and amount and type of motorized use, especially during wet conditions. Table 3 and Figure 3 below display the miles of roads in Alternative 3 that occur on low (1), moderate (3), or high (5) risk soils as an indicator for potential adverse effects to the off-road soil resource. There are 720 miles or 33% of this alternatives open roads with a low risk rating, indicating little or no compaction, rutting, or erosion is likely. About 1,330 miles or 62% of the open roads have a moderate risk rating, indicating compaction and some rutting of the road surface is likely and erosion would be common on steeper slopes with exposed soil. There are 108 miles or 5% of the roads in this alternative with a high risk rating indicating soils with severe limitations such as a high percentage of wetland or steep slopes that would compact or erode readily, and need more road maintenance.

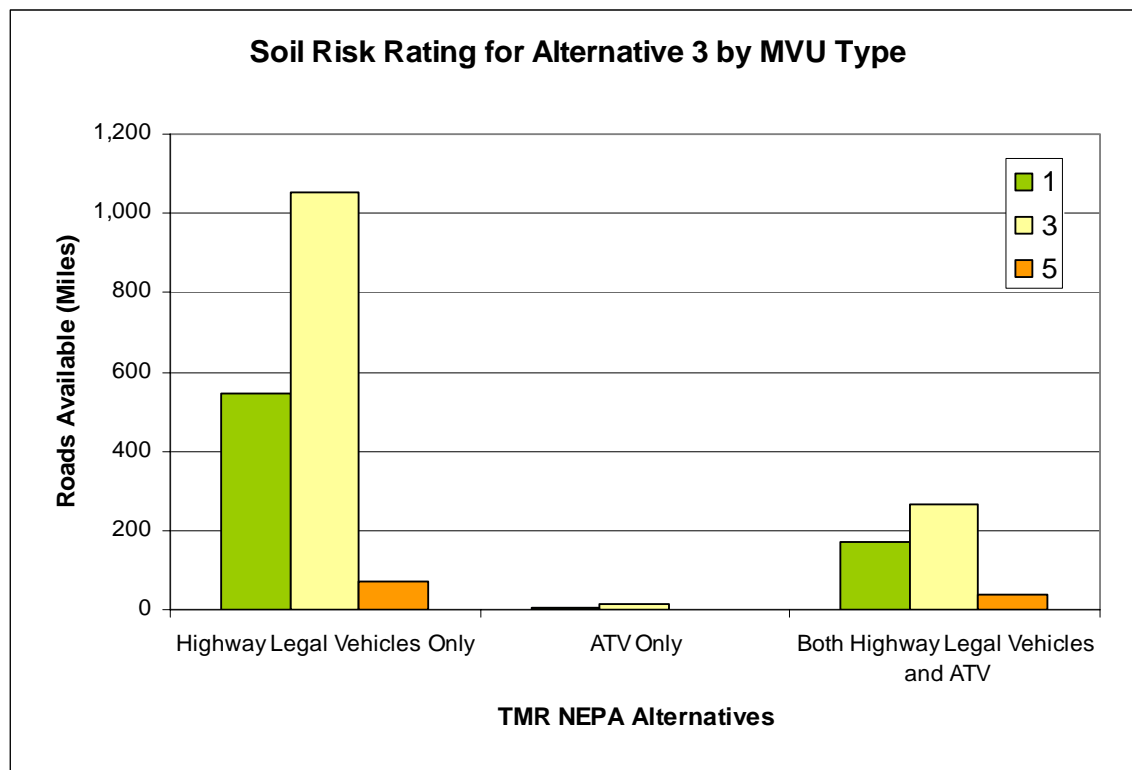


Figure 3. Alternative 3.

Soil risk ratings are for the most limiting season or conditions and do not account for the benefits of low motorized use, seasonal restrictions, sodded road surface, avoidance of steep slope or wetland areas, erosion control measures, ditching and maintenance, BMPs, spot surfacing, applying Forest Plan standards and guidelines etc, which commonly reduce the potential for adverse soil impacts by a minimum of one rating level.

High volumes of ATV traffic may keep an entire travel way in an exposed soil condition, increasing the potential for compaction and erosion of roads open to ATV use. Seasonal ATV use restrictions during the March-April wet period help minimize impacts. About 494 miles or 23% of the alternative 3 road system is open to ATV use, and 39 miles or 8% of those roads have a high soil risk rating. Increased maintenance needs and costs would be expected for roads/trails on these high risk soils, to minimize potential adverse impacts to the travel-way and adjacent land areas.

The existing designated 318 mile ATV trail system is identified open (except for March 15-April 30 seasonal use restrictions) in all three alternatives with no proposal for changes. The trail system is monitored and maintained and was not part of this analysis.

Cross-country travel (off road/trail) by any vehicle is prohibited on the CNNF. Illegal use happens and is dealt with through law enforcement, education, and appropriate mitigation of any resource damage. This report cannot speculate on potential indirect effects from an unknown/unpredictable amount of a prohibited activity.

Designating 2,158 miles of roads or about 3,880 acres as part of the public motorized transportation system in alternative 3 is a long term direct effect that commits 0.26 % of the CNNF soil resource to system roads. Potential risk of short-term indirect effects to the off-road productive soil resource is high for 108 miles or 5% of the system roads in this alternative. Maintenance and control of off road/trail erosion will minimize potential adverse effects to adjacent areas. The transportation system identified in alternative 3 is not considered detrimental to the long-term productivity of the CNNF lands.

Cumulative Effects for all Alternatives

The spatial analysis boundary for cumulative effects to the soil resource is the total land area the roads occupy in each alternative, across the entire CNNF. This is a forest-wide project, so cumulative effects are considered in that spatial context. Since direct and indirect soil effects analysis has indicated limited off-road erosion/deposition potential, cumulative impacts to the soil resource in the project area would not be expected to appreciably affect surrounding federal land or land in other ownerships. Therefore, potential cumulative effects to soils are reasonably confined to the land directly beneath and committed to the travel-way. The time span selected for soil cumulative effects analysis is the past 25 years. This time period is chosen because the CNNF has been operating under the 1986 and 2004 Land and Resource Management Plans during most of this time, with direction for managing the transportation system.

Over the past 25 years road/trail construction, reconstruction and maintenance has occurred across the CNNF as vegetation management or recreation access needs were identified and analyzed on a project by project basis. All transportation system projects were implemented following Forest Plan standards and guidelines and road/trail design criteria to minimize soil resource impacts. The amount of productive soil resource that is committed to the public motorized transportation system (within the scope of this project) from past actions is 4,657 miles or about 8,102 acres (0.54 % of the CNNF). About 6 % (265 miles) of this current road system is located on high risk soils, indicating greater potential for adverse impacts. With about 35 % (535,400 acres) of the CNNF soils rated high risk for roads, it is not feasible for a transportation system to completely avoid crossing them. The fact that only 6 % (486 acres) of the roads/trails

considered by this project are located on high risk soils is evidence that high risk soils have commonly been avoided where practicable.

Transportation system related resource damage or maintenance needs are identified for each vegetation management project across the Forest and addressed through a roads and environmental analysis. The CNNF End of Decade Monitoring Report (USDA Forest Service, 1998a, p65) covering management activities implemented from 1986-1996 indicated no appreciable effects to the long-term productivity of the land.

Wisconsin Forestry Best Management Practices for Water Quality (BMP) have been implemented across the CNNF since 1995 and field monitoring indicates that 99% of the time there will be no adverse effects to water quality from soil erosion/sedimentation when BMPs are applied correctly (Cooper et al, 1998, p62; Holland, 2003, p16-18; Shy and Wagner, 2007, p33). The trend over the past 25 years has been a reduction in the amount of open roads and the amount of land dedicated to the CNNF transportation system, with corresponding increase in road closures and/or decommissioning (USDA Forest Service 2004a, p3-40, 3-85-86). Soil productivity will be restored over several decades where roads have been decommissioned (NCASI, 2004, p62).

Current conditions indicate key soil properties affecting ecosystem health and sustainability such as porosity, organic matter content and nutrient availability are representative of the natural range of soil conditions inherent to the landscape of the Chequamegon-Nicolet NF (USDA Forest Service, 1998b, p6). No appreciable long-term effects to the soil resource or long-term productivity of the land from past motorized transportation activities have been identified.

Present actions proposed in alternatives 2 and 3 of this project do not include any new ground disturbing activities and would reduce the existing public motorized transportation system by 55 or 54 %, respectively. The roads located on high risk soils would be reduced by 157 miles or 59 % for both alternative 2 and 3. About 94-95 % of the roads in each of the three alternatives are on low to moderate risk soils. The transportation system identified in alternatives 2 or 3 is not considered detrimental to the long-term productivity of the CNNF lands.

Travel management related projects on the CNNF are in various stages of environmental analysis, as listed in the October-December 2007 SOPA and are described in the EA for this project. Some of these projects are included as part of the existing condition for this Travel Management project analysis, while others require actions that are outside the scope of this project. All road system related decisions will have considered effects to the soil resource with design measures minimize impacts, thus, no appreciable long-term detrimental effects to the productivity of CNNF lands is expected when LRMP standards and guidelines are followed.

Future specific travel management related actions are unknown at this time. CNNF Forest Plan direction, and project by project closure/decommissioning of alternative 1 roads not brought forward in alternatives 2 or 3, would be expected to increase the amount of productive lands over time.

The effects of implementing alternatives 2 or 3 when added to the effects of past, present and reasonably foreseeable actions would not be expected to result in appreciable adverse cumulative effects to the quality of the soil resource on the CNNF.

Compliance with the Forest Plan and Other Regulatory Direction

All alternatives comply with USDA Forest Service regulations 36CFR219.27 (a) and the CNNF Forest Land and Resource Management Plan direction pertaining to the soil resource. Alternatives 2 and 3 reduce public motorized transportation on high risk soils by 157 miles or 59 %, from Alternative 1. About 94-95 % of the roads in each of the three alternatives are on low to moderate risk soils.

See Table 5 and Figure 4 below for comparison summaries of soil resource impacts and soil risk ratings for alternatives 1-3.

Table 5. Alternative 1-3 Soil Impacts Summary

Soil Resource Impacts	Alternative 1	Alternative 2	Alternative 3
Total Miles of Roads	4657 mi	2080 mi	2158 mi
Miles of Road on High Risk Soils	265 mi	108 mi	108 mi
Total Land Area Committed to Roads	8102 ac	3748 ac	3880 ac
Acres (%) of Roads on High Risk Soils	486 (6)	188 (5)	194 (5)
Acres (%) of Roads on Low and Moderate Risk Soils	7616 (94)	3560 (95)	3686 (95)

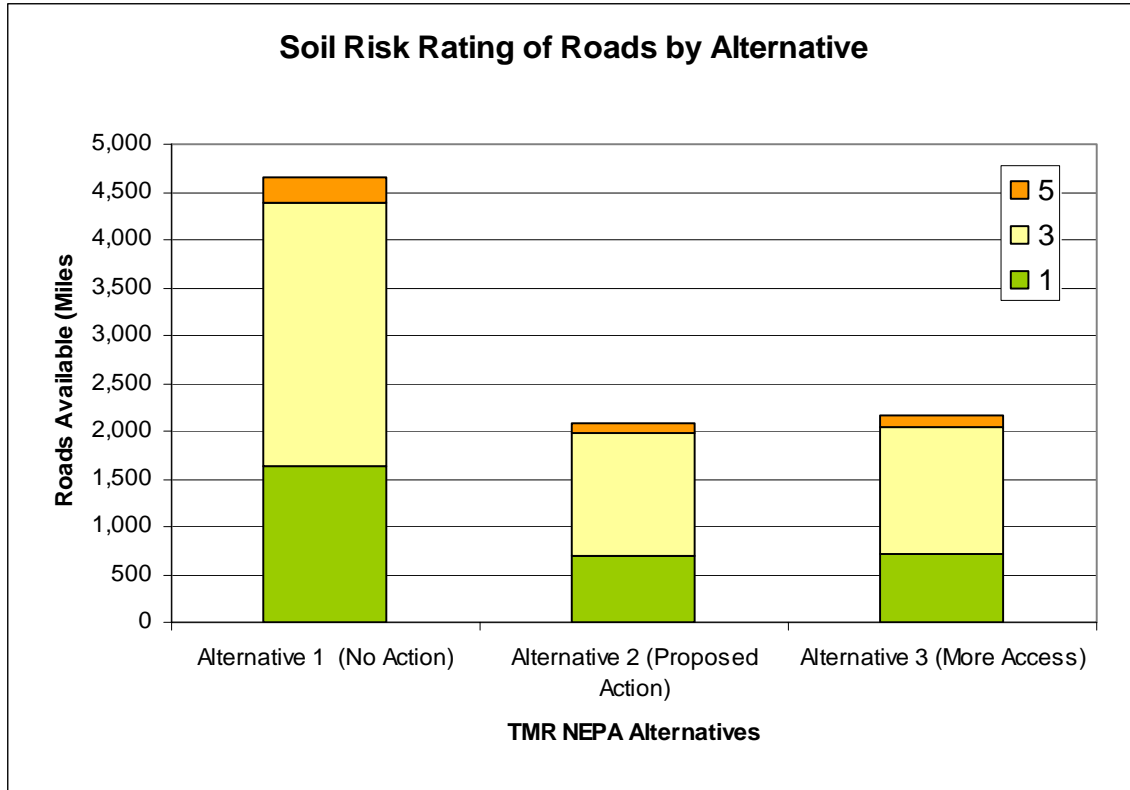


Figure 4. Alternatives 1-3 Soil Rating Summary

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