United States
Department of
Agriculture

Forest
Service

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Road Analysis Report

For the Travel Management Plan Project

Chequamegon-Nicolet National Forests

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CHAPTER 1 SETTING UP THE ANALYSIS

Background and Purpose

In August 1999, the Washington Office of the U.S. Department of Agriculture (USDA), Forest Service (USFS) published Miscellaneous Report FS-643 *Roads Analysis: Informing Decisions about Managing the National Forest Transportation System.* The objective of roads analysis process (RAP) is to provide decision-makers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions (USDA FS 1999a)

In October 1999, the agency published interim Directive 7710-99-1 authorizing units to use, as appropriate, the roads analysis procedure embodied in FS-643 to help land managers make major road management decisions. On March 3, 2000, the USFS proposed revising 36 CFR part 212 to shift emphasis from transportation development to managing administrative and public access within the capability of the lands.

The proposal was to shift the focus of National Forest System road management from development and construction of new roads to maintaining and restoring needed roads and decommissioning unneeded roads within the context of maintaining, managing, and restoring healthy ecosystems.

On January 12, 2001 the USFS issued the final National Forest System Road Management Rule. This rule revised regulations concerning the management, use, and maintenance of the National Forest transportation system. Consistent with changes in public demands and uses of National Forest resources and the need to better manage funds available for road construction, reconstruction, maintenance, and decommissioning, the final rule removed the emphasis on transportation development and added a requirement for science based transportation analysis. The final rule was intended to help ensure that additions to the National Forest System road network are those deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimizes adverse environmental impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated.

Although the final roads rule is extensive in providing a comprehensive approach to transportation systems, it does not address the use of off highway vehicles (OHVs). Further complicating matters, policies vary from state to state and between National Forests. In 2005, in response to the need for development of a consistent national policy, the Forest Service published the Travel Management Rule (TMR), a new rule for providing motor vehicle access to National Forests and Grasslands.

The final Rule (2005) requires each National Forest and Grassland to designate those roads, trails, and areas open to motor vehicle use. Designated routes and areas will be identified on a motor vehicle use map.

Process

Roads analysis is a six-step process. The steps are designed to be sequential with the understanding that the process may require feedback among steps over time as an analysis matures. The amount of time and effort spent on each step differs by project, based on specific situations and available

information. The process provides a set of possible issues and analysis questions for which the answers can inform choices about road system management. Decision makers and analysts determine the relevance of each question, incorporating public participation as deemed necessary.

- Step 1. Setting up the Analysis
- Step 2. Describing the Situation
- Step 3. Identifying Issues
- Step 4. Assessing Benefits, Problems and Risks
- Step 5. Describing Opportunities and Setting Priorities
- Step 6. Reporting

Products

The product of an analysis is a report for decision makers and the public that documents the information and analyses to be used to identify opportunities and set priorities for future Forest system roads. Included in the report is a map displaying the known road system, and the opportunities for each road or road segment being analyzed. This report will:

- Identify desirable roads for motorized use;
- Identify road-associated environmental and public safety risks;
- Identify areas of special sensitivity or any unique resource values.

This Report

This report documents the roads analysis procedure used for the TMR Analysis (wherever analysis area is referenced in this document, it corresponds to National Forest lands within the Forest boundary). This report is a "living" document and reflects the conditions of the analysis area at the time of writing. The document can be updated as the need arises and conditions warrant. This document shall be considered current until subsequent NEPA analysis is conducted for other management proposals at smaller scales.

Objectives of the Analysis

Level and Type of Decision-Making the Analysis Will Inform

The purpose of this roads analysis is to provide information concerning roads, and to determine what, if any management decisions will be required in order to add unauthorized roads to the travel system, designate motorized uses different from current approved uses on system roads, and ensure that those decisions be informed by a science-based roads analysis. These decisions are needed to ensure the forest travel system:

- Provides safe access and meets the needs of communities and forest users;
- Facilitates the implementation of the 2004 Chequamegon-Nicolet National Forests (CNNF) Land and Resource Management Plan (Forest Plan);
- Allows for economical and efficient management within likely budget levels;

- Meets current and future resource management objectives;
- Begin to reverse adverse ecological impacts, to the extent practicable.

Scale and Area of Analysis

This roads analysis is driven by a need to analyze changes and/or additions of motorized travel routes to the Forest Travel system. The analysis does not include snowmobile trails/routes on the Forest. Existing Maintenance Level (ML) 1 and 2 roads specifically identified as a result of public meetings, governmental meetings, and internal comments were reviewed. Opportunities regarding their future use are stated in this report. ML 3, 4 and 5 roads were addressed in a Forest scale analysis titled "Roads Analysis Chequamegon-Nicolet National Forest (USDA FS 2002a)". Other agencies, such as townships, having joint or partial road jurisdiction on ML 3-5 roads, will continue to determine motorized uses on those roads.

This Analysis:

- Includes all roads highlighted in Figures 1-1 through 1-6.
- Is spatial or geographic information system (GIS)-based whenever possible.
- Only uses existing information.

The following figures depict the Chequamegon-Nicolet National Forests, and individual Ranger Districts. Roads considered part of this analysis are also shown.

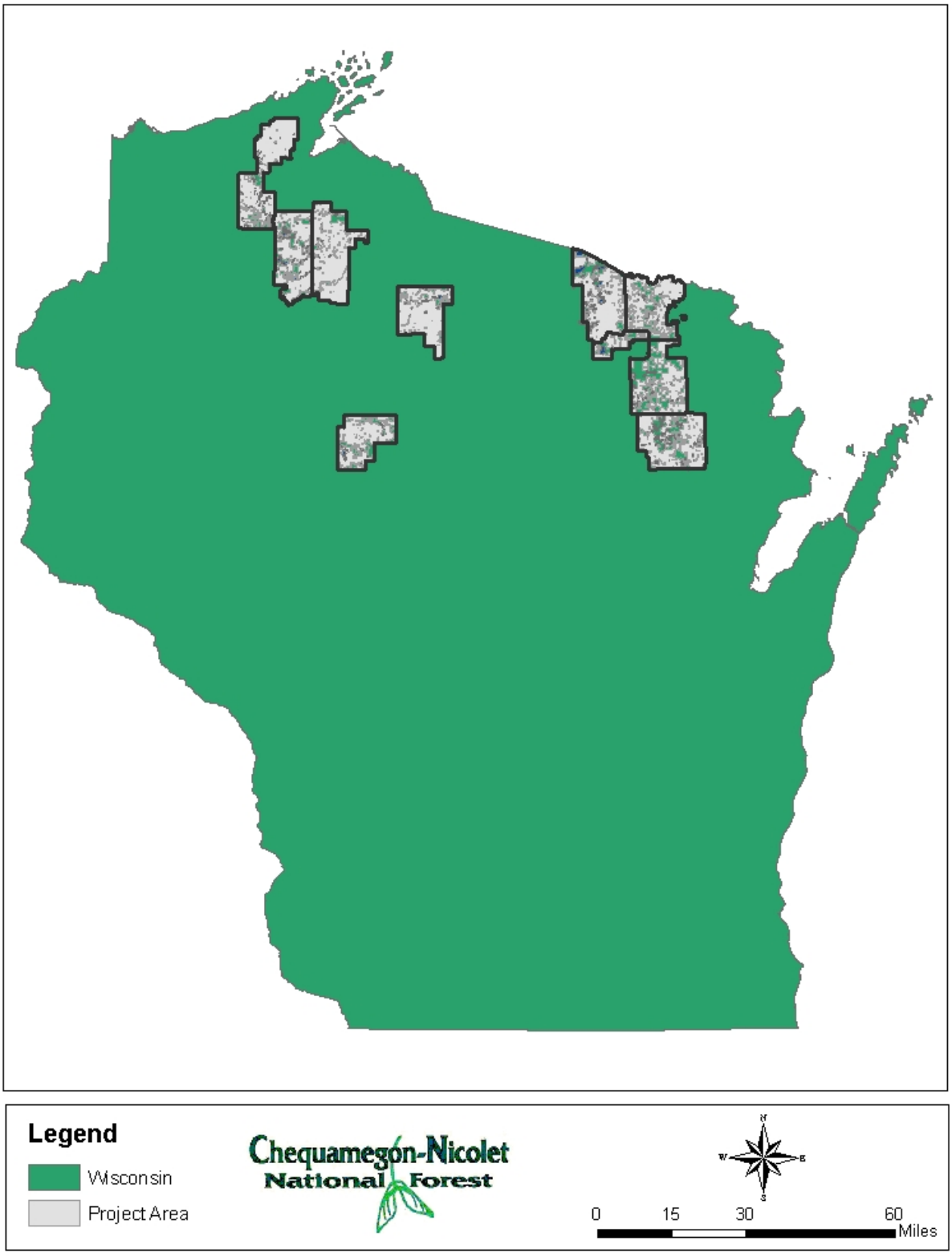

Figure 1-1 Chequamegon-Nicolet NF

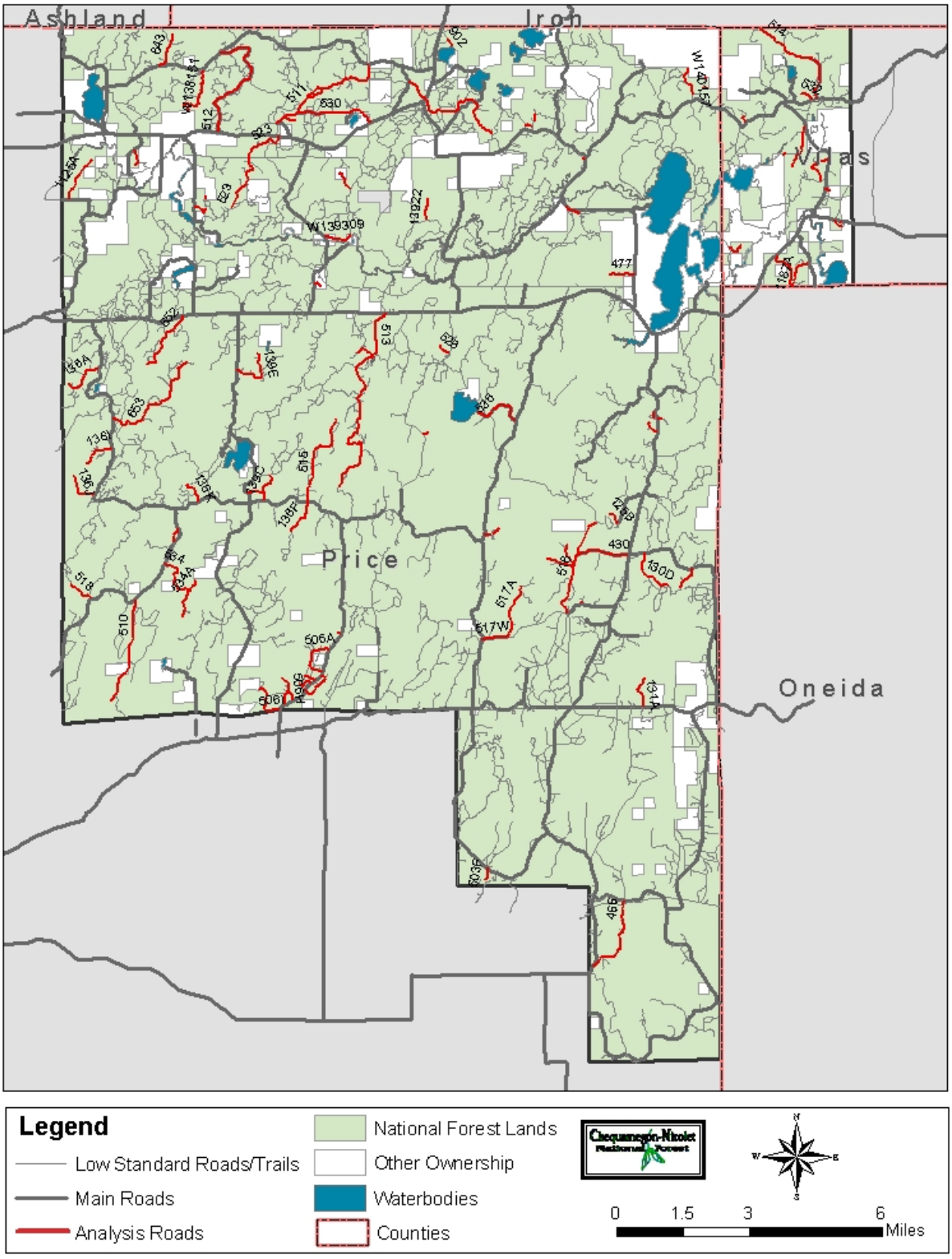

Figure 1-2a Park Falls/Medford Ranger District - Park Falls Land-base and Analysis Roads

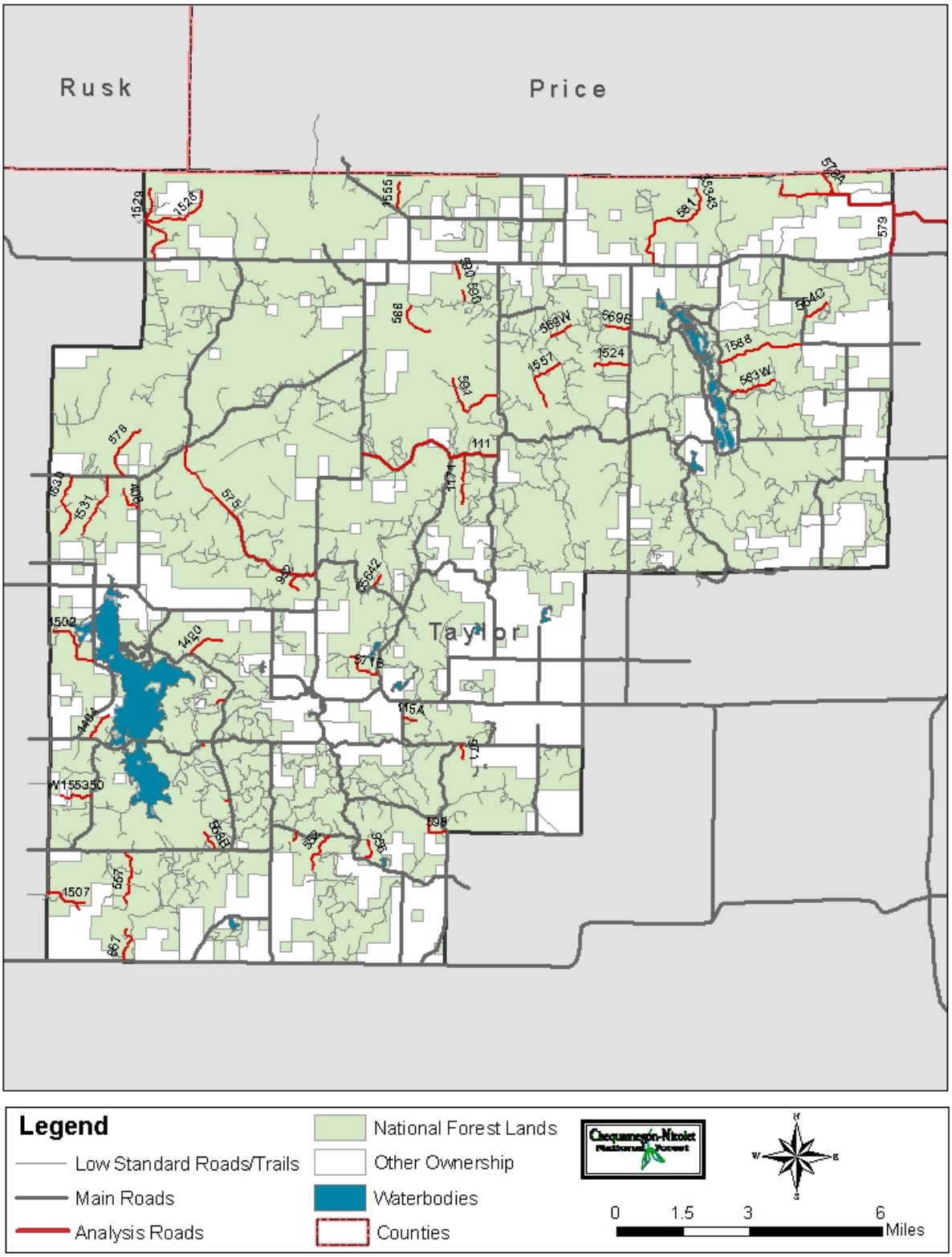

Figure 1-2b Park Falls/Medford Ranger District - Medford Land-base and Analysis Roads

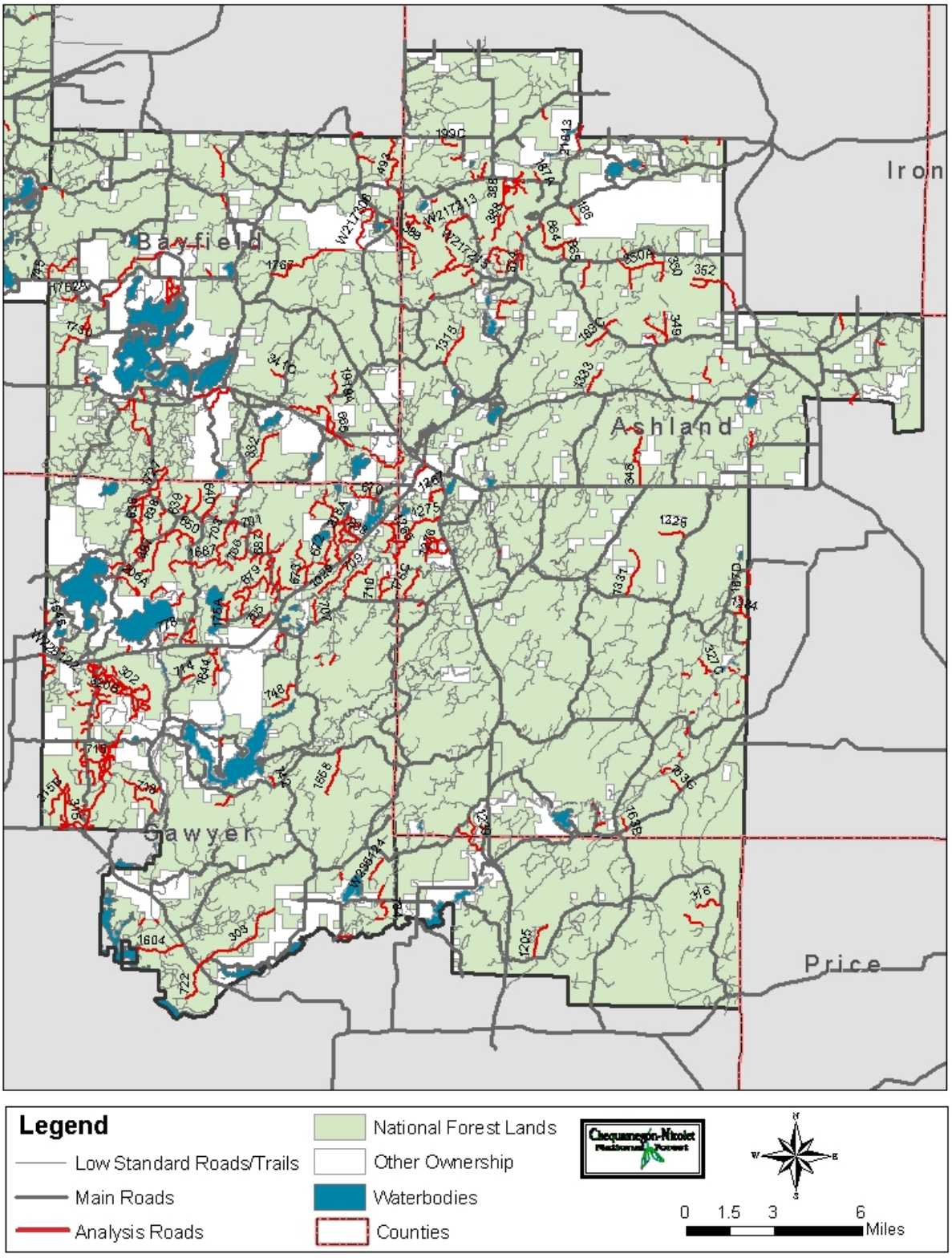

Figure 1-3 Great Divide Ranger District and Analysis Roads

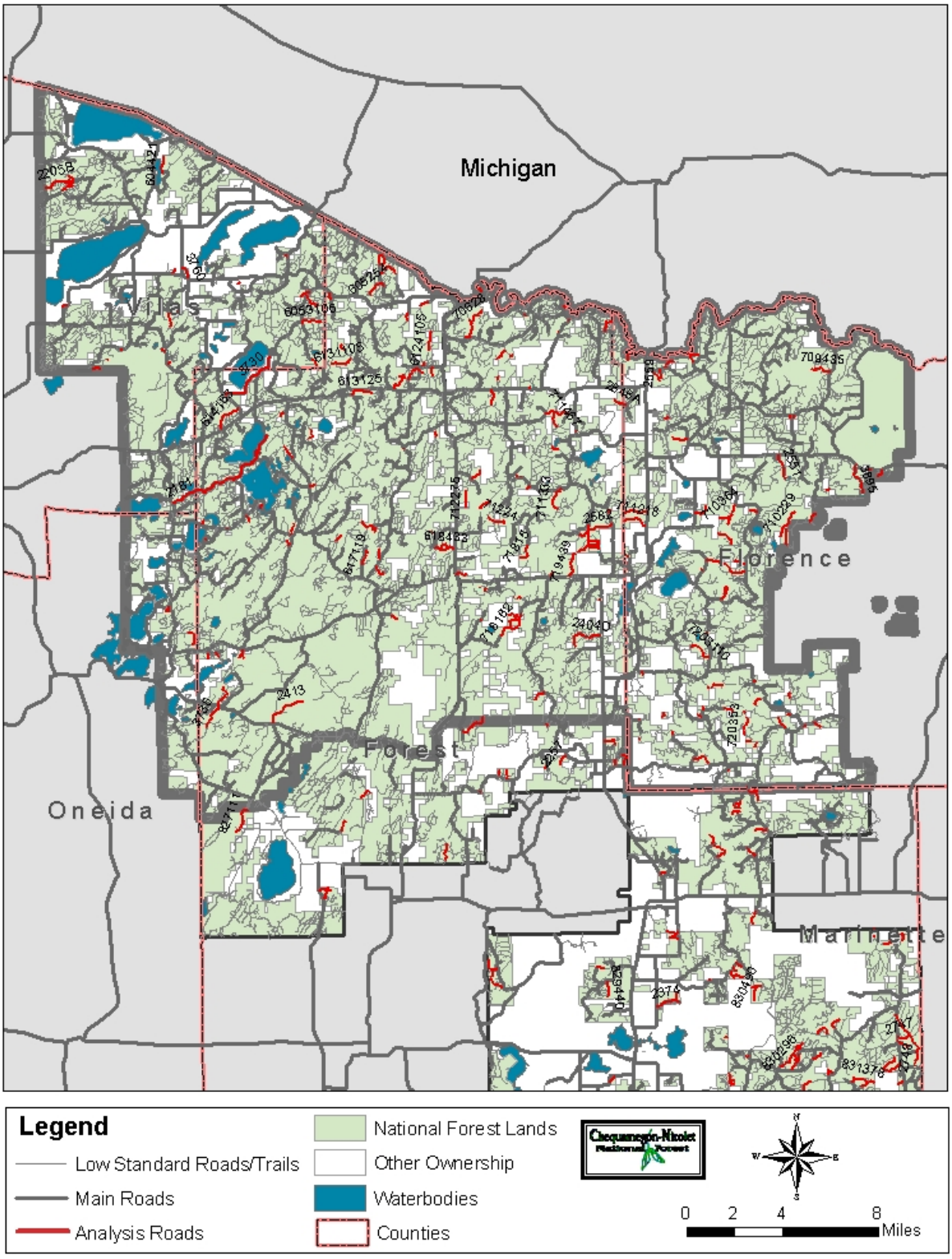

Figure 1-4 Eagle River/Florence Ranger District and Analysis Roads

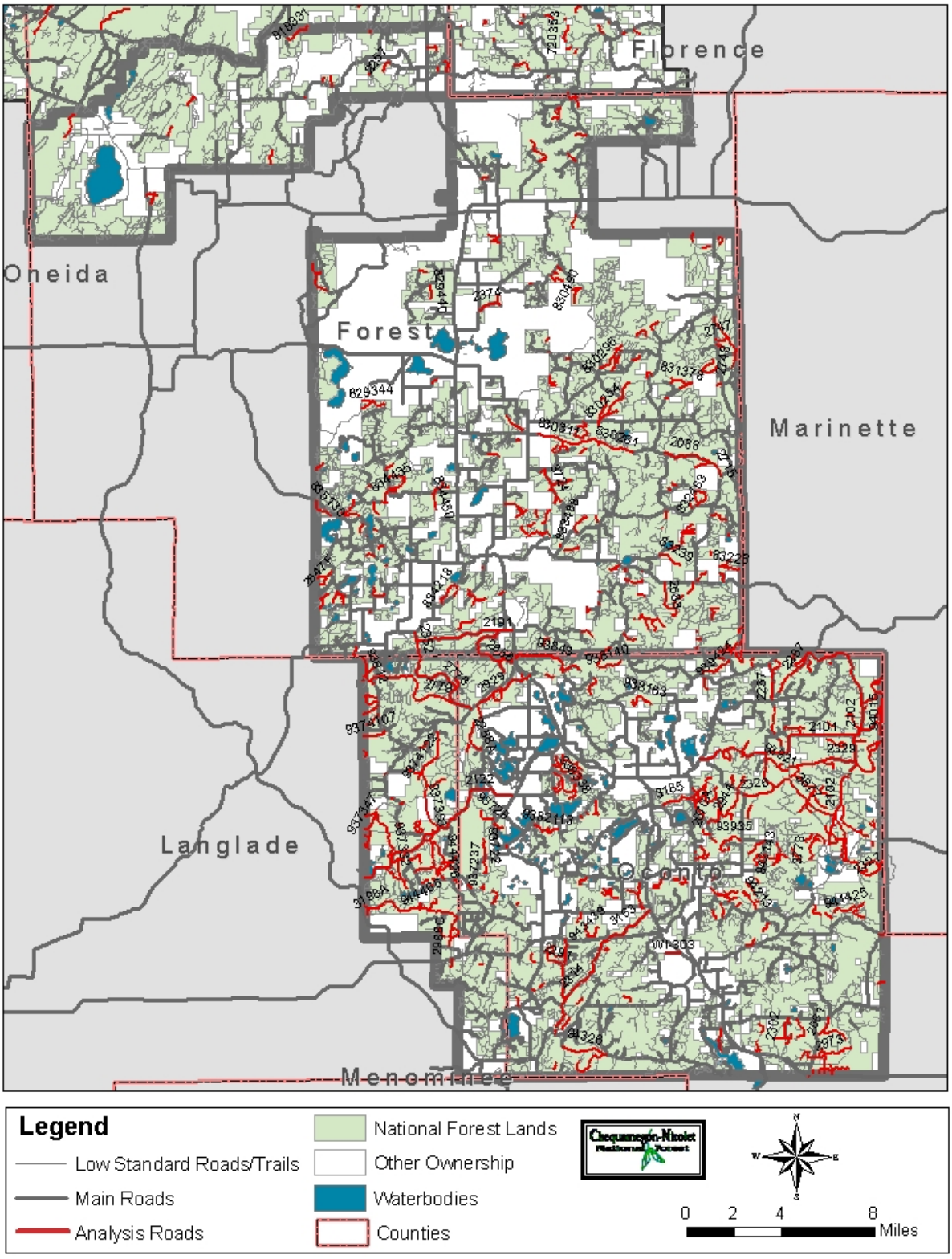

Figure 1-5 Lakewood/Laona Ranger District and Analysis Roads

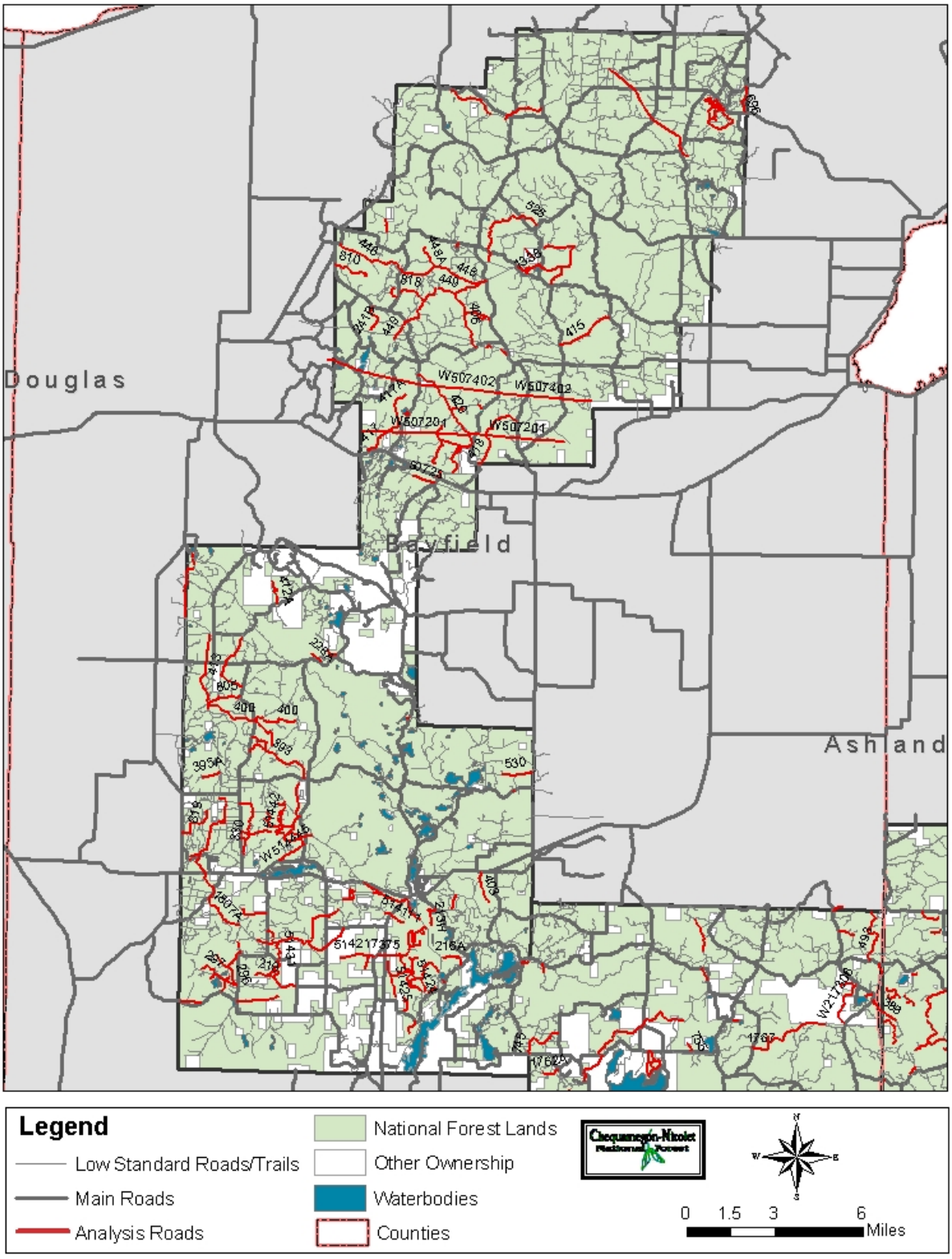

Figure 1-6 Washburn Ranger District and Analysis Roads

Interdisciplinary Team Members and Preparers

TMR RAP Core Team Members

Dave Campbell	Transportation Planner, Co-Team Leader
Mike Miller	Transportation Planner, Co-Team Leader
Joan Marburger	TMR Coordinator
Kyra Walton	Biologist
Jake Lubera	Recreation
Linda Parker	Ecology/Botany
Mike Harnois	GIS Specialist
Sue Reinecke	Fisheries
Mark Bruhy/Kim Potaracke	Heritage
Dave Hoppe	Soils
Dale Higgins	Watershed

TMR RAP Preparers

Dave Campbell	Writer/Editor, Risk/Value Analysis, Minerals Management, Range Management, Water Production, Timber Management, Special Products, Special Uses, General Transportation, Administrative Use, Passive Use Value, Social Issues, Civil Rights
Mike Miller	General Transportation, Protection
Kyra Walton	Terrestrial Wildlife, Passive Use Value
Linda Parker	Ecological Functions, Administrative Use, Passive Use Value
Dave Hoppe	Aquatic, Riparian Zone and Water Quality
Jake Lubera	Economics, Unroaded Recreation, Roaded Recreation
Dale Higgins	Aquatic, Riparian Zone and Water Quality
Sue Reinecke	Aquatic, Riparian Zone and Water Quality
Mark Bruhy/Kim Potaracke	Passive Use Value, Social Issues

Analysis Plan

Gathering Information

The initial phase of the analysis was to gather road information through public meetings, governmental meetings, and internal comments. This information was then used to update road attribute information in the Forest GIS database and is the basis or scope of the analysis. This information was used by team members during and after an initial ID team meeting, while answering the RAP questions listed in FS-643, *Roads Analysis: Informing Decisions about Managing the National Forest Transportation System.* Each ID team member was assigned questions relative to his or her field of expertise. Maps were provided to help team members respond to questions.

Identifying Major Issues

The first part of this phase was to establish a list of major issues based on discussion and responses to assigned questions by team members. The second part in this phase was to develop issue criteria and assign numeric values to each, relative to value or risk. High, moderate, low, and very low/none

were developed relative to value in the following categories: public access, private access, and administrative access. High, moderate, low, or very low/none were also developed based on associated risks relative to the following categories: aquatic and water quality, TES plants, TES wildlife, non-native invasive species, reference areas, heritage, and soils.

Numeric values were then assigned to each high, moderate, low, and very low/none value or risk within each category. The ID team then used these numbers to assess each road in the analysis.

Reporting Findings and Making Recommendations

During this phase, information was synthesized to provide an overall assessment of the analysis roads and their relevance to motorized mixed use on the CNNF. Based on the RAP findings, a list of recommendations and potential opportunities for management of wheeled motorized use on the travel system was developed.

Information Used

- The Chequamegon-Nicolet National Forest Land and Resource Management Plan (USDA FS, 2004a) and EIS (USDA FS, 2004b)
- Roads Analysis Chequamegon-Nicolet National Forest (USDA FS, 2002a)
- Travel Management Rule Public Involvement Process Content Analysis Report (TN and Associates, Inc./Ecological Services of Milwaukee, Inc., May, 2007)
- TMR Public Comments data base (TN and Associates, Inc./Ecological Services of Milwaukee, Inc., May, 2007)
- Travel Management Rule (36 CFR212 and 36 CFR 261)

CHAPTER 2 DESCRIBING THE SITUATION

The Analysis Area

Description of the Project Area and Vicinity

History of the Chequamegon-Nicolet National Forests

The Chequamegon and Nicolet National Forests were established by presidential proclamation in 1933, created from tax-forfeited land either purchased from State and local governments or from private individuals and timber companies (USDA FS 2001a; Haugen et al. 1998). Social practices and cultural traditions of past inhabitants have greatly shaped the lands that make up the CNNF today. Forest archeologists have traced the cultural history of the CNNF to forest occupancy by Paleo-Indian people over 10,000 years ago (USDA FS 2001a; USDA FS 1998b). Paleo-Indian people were followed by Archaic Indian people, Woodland Tradition Indians, unknown prehistoric people, and American Indians. In more recent history, the forest was occupied by people involved in the fur trade, logging industry, forest management era, and settlement/recreation era (USDA FS 2001a; USDA FS 1998b).

In the 1600s, European missionaries and fur traders, as well as Native Americans, made their home in northern Wisconsin (USDA FS 2001a). The significance of the name of the Chequamegon-Nicolet National Forest can be traced back to this period. The name Chequamegon was derived from a Native American-Ojibway word meaning "place of shallow water," which referred to Lake Superior's Chequamegon Bay (USDA FS 2001a). The Nicolet National Forest was named after the French explorer, Jean Nicolet, who came to the Great Lakes Region in the 1600s to promote fur trading with the Native American Indians. During this time, an extensive portage trail system existed throughout northern Wisconsin, which connected river systems and lake chains from the Great Lakes and Canada to the Mississippi River, and ultimately, the Gulf of Mexico (USDA FS 1998d). Although traders and explorers were the first to describe this primitive trail/road system, many of these trails and roads were probably established by primitive peoples and Native Americans (USDA FS 1998b).

Lumbermen arrived shortly after the European fur traders and established a thriving timber industry in northern Wisconsin. The region was ideal for timber extraction due to an abundance of old-growth pine forests and rivers that were used to move pine logs to area sawmills (USDA FS 2001a). Besides the obvious effects of timber removal on forest communities, logging also greatly affected the aquatic environment of the CNNF. Many lakes and rivers were dammed or cleared of debris and re-channeled to accommodate logs. When the old growth pine forests dwindled, lumbermen started harvesting heavier hardwoods and used railroads built in the 1890s to transport the heavier hardwood logs to mills (USDA FS 1998b). During this time, many spur logging roads were created in order to access the timber base of the area. Many of these roads and railroad grades eventually were used to create the forest roads of today.

Although timber removal occurred before 1856 and continues today, peak wood production occurred from 1856 through 1945. Westward expansion of settlers into the Great Plains and both domestic and world wars created a great need for wood products during that time. When the available timber was depleted in many areas, much of the harvested land was sold to new immigrants for farms;

however, the soils of northern Wisconsin proved poor for agriculture and many farms were quickly abandoned. Much of the land now comprising the CNNF was often referred to at this time as "stump land" due to its degraded condition from extensive logging and ensuing brush fires (Haugen et al. 1998). The timber industry left towns, camps, farms, mills, dams, and other structures, many of which remain in the forest and are now considered archeological sites (USDA FS 1998b).

In 1928, the Federal Government, under the authority of the Weeks Law of 1911, began buying this "stump land" and other tax delinquent lands in the northern forest region with the idea of establishing a National Forest. In March 1932, President Herbert Hoover issued a proclamation establishing the Nicolet National Forest. In 1933, President Franklin Roosevelt established the Chequamegon National Forest as a separate National Forest, comprised of the westernmost lands of the Nicolet National Forest. At that time, Park Falls became the official headquarters for the Chequamegon National Forest, and Rhinelander became the headquarters for the Nicolet National Forest (USDA FS 2001a).

Once the National Forest System was established, the government defined initial goals for the lands within the system. These goals were centered on rehabilitation of the land and were accomplished through replanting the forests and controlling the natural fires that were burning through the remaining slash. National Forests of today were greatly influenced by the work of thousands of young, unemployed men who joined the Civilian Conservation Corps (CCC) during the Great Depression. The CCC, along with the Works Progress Administration (WPA), established camps, planted thousands of trees, built fire lanes and fire lookout towers, and constructed recreational, administrative, and transportation structures and roads across the National Forests. Much of their work on the CNNF is still evident in the form of administrative buildings, campgrounds, and fire towers. As early as the 1890s, people traveled from Chicago and Milwaukee to hunt and fish in northern Wisconsin. Early resorts were often rustic cabins, or consisted of lodging within the homes of hired recreation guides (USDA FS 1998b; 2001a).

Due to active forest management and natural processes, the previously logged forests of the CNNF have experienced remarkable recovery and currently provide many resources and values first envisioned by Presidents Hoover and Roosevelt. The CNNF provides habitat for a rich variety of both game and non-game wildlife species, contains a great diversity of plant and forest communities, and sustains a recreation and tourism industry that now rivals the logging industry in its contribution to the economic development of the north woods (USDA FS 1998b).

Background of the Chequamegon-Nicolet National Forests

The CNNF covers over 1.5 million acres of Wisconsin's northern forest. The Chequamegon side of the forest includes approximately 858,400 acres in Ashland, Bayfield, Price, Sawyer, Taylor, and Vilas counties; the Nicolet side covers nearly 661,400 acres in Florence, Forest, Langlade, Oconto, Oneida, and Vilas counties (USDA FS 2001a). An overview of the CNNF is shown on Figure 1. The USDA Forest Service managed these forests independently prior to 1998, with management decisions for each forest guided by separate Land and Resource Management Plans (Forest Plans; USDA FS 1986a and USDA FS 1986b). Since 1998, the Chequamegon National Forest (CNF) and Nicolet National Forest (NNF) have been consolidated and managed as one administrative unit, with offices headquartered in both Park Falls and Rhinelander.

The CNNF is located in the Northern Highlands Ecological Province of Wisconsin (Martin 1965). The majority of the forest is located within the Upper Wisconsin/Michigan Moraines, Lac Veaux Desert Outwash Plain, and Spread Eagle-Dunbar Barrens Ecological Subsections of the Northern Continental Michigan, Wisconsin, and Minnesota Ecological Section (Albert 1995). The CNNF land base lies within the glaciated portion of the Northern Highlands upland area, which extends northward to Canada and Hudson Bay and contains an abundance of lakes, streams, and wetlands (Martin 1965). The Highland Lake District of northern Wisconsin, which consists primarily of Vilas and Oneida Counties, contains the fourth largest concentration of lakes in the world (Martin 1965; USDA FS 1998b). The National Forests have often been called the "headwaters of the nation" and this is especially true of the CNNF, which is located in the headwaters of the Upper Mississippi River, Lake Superior, and Lake Michigan (USDA FS 1999b). The Nicolet land base alone contains the headwaters of the Wolf, Pine, Popple, Oconto, Peshtigo, Deerskin, and Wisconsin Rivers (Haugen et al. 1998).

According to previous studies by the USDA Forest Service, CNNF is the only National Forest in Wisconsin and contains two of the largest contiguous blocks of public land in the State. The CNNF boundary abuts the Ottawa National Forest in Michigan on its eastern side and contains many State, county, and tribal managed lands within and near its administrative boundaries. In fact, State and county-owned land together comprise a greater percentage of land than the CNNF in the 11 counties that it occupies. The future of the CNNF is largely dependent on future management priorities, condition, and access to adjoining publicly and privately owned properties, which provide similar resources, recreational opportunities, and values to the public (USDA FS 2001b).

A 1996 study of forest lands and land ownership by the USDA FS (USDA FS 1998c) indicated that as of 1996, the CNNF consisted of 1,520,464 acres, which is equivalent to 4.4 percent of all land in Wisconsin and 9.9 percent of all forested land in Wisconsin. The 1996 study further indicated that the land base of the CNNF comprises an average of 21 percent of all land in each of the 11 counties within which they occur, ranging from two percent of Oneida County to 53 percent of Forest County. State and County lands are also present within all 11 counties and together account for an additional 15 percent of the land base. When added to tribal lands, the area comprises an average of 38 percent of 11 counties containing National Forest System (NFS) land, ranging from 21 percent (Oneida) to 58 percent (Forest) of total land in these counties. The CNNF contains over 1,200 separate private or other in-holdings within its administrative borders, which corresponds to approximately 4,600 miles of property line between National Forest and other lands. A primary goal of the Forest Service mission is to acquire lands to increase National Forest ownership within the CNNF by consolidating isolated parcels and reducing property lines. To accomplish this goal, the USDA Forest Service acquired approximately 13,000 acres of land between 1986 and 1996, adding an additional one percent of NFS land in the 11 forest counties overall. Nearly 3,000 acres were added to each of the three counties of Bayfield, Oconto, and Price over this ten-year period. Although National Forests, State Forests, and County Forests are all "public lands," land ownership patterns can profoundly affect biological diversity, local societies, local governments, cultures, and economies.

History of the Chequamegon-Nicolet National Forests Roads

Roads make our National Forests accessible; define recreational opportunities and the nature experience for most recreational users; and are important means of social, cultural, and economic

interchange. The Forest Service Natural Resource Agenda stated that even the most remote parts of our National Forests, the wilderness areas, would not be accessible to the public without roads leading to trailheads. Although most forest roads were originally built for timber removal activities during the last 50 years, logging currently accounts for only one-half of one percent of all forest road use. Recreational use now dominates motorized traffic within the National Forests. In 1996, recreation traffic per mile of road was over five times greater in the National Forests than in 1950 (USDA FS 2001c). Driving for pleasure on forest roads is the single largest recreational use on NFS lands, comprising 35.8 percent of all recreational use in 1996 (USDA FS 1998a). Due to these changing public uses within the National Forest, many recreational users are presently driving on old logging roads that are unsafe, damaging to the environment, and not maintained. Nationally, there is currently a $10.5 billion reconstruction backlog for fixing the most highly traveled roads within the NFS, and current funding appropriations are sufficient to maintain only about 40 percent of forest roads to public safety and environmental standards for which they were built (USDA FS 2001c).

About five percent of the CNNF, or approximately 69,000 acres, are considered Inventoried Roadless Areas (USDA FS 2000a). Inventoried Roadless Areas are generally considered public lands that meet the minimum criteria for wilderness designation under the Wilderness Act of 1964 (USDA FS 2000b). Roadless areas of the National Forests were inventoried during the 1979 Roadless Area Review and Evaluation (RARE II) and were also inventoried for inclusion into the 1986 CNF and NNF Land and Resource Management Plans (USDA FS 1986a, 1986b). Inventoried Roadless Areas within the CNNF allow for some road construction and reconstruction to repair resource damage; provide essential private or public access and recreational opportunities; and support limited timber harvest, mining, stewardship activities, and other special uses (USDA FS 1986a, 1986b). However, inventoried roadless areas are not being considered under this roads analysis.

In 1992, the Forest Service adopted a new management philosophy called ecosystem management, which provides an ecological approach to managing the National Forests (USDA FS 2001a). The Forest Service defines ecosystem management as “an ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values” (USDA FS 2002b). Ecosystem management considers the holistic effects of forest management decisions over large landscape levels of the National Forests. The roads analysis is an initiative that resulted from this new management philosophy.

The Forest Service’s new Transportation Policy, adopted in 2000, requires that all National Forest road decisions that “may affect access or generate adverse environmental effects be informed by a roads analysis” (USDA FS 2002a). After more than a decade of *Forest Plan* implementation on the CNNF, there is a trend toward reducing soil disturbing activities (such as road construction and reconstruction forest-wide), and increasing road closures (USDA FS 1998d). However, most road closures generally take place on lower Maintenance Level roads, which may have been user-developed roads or administrative roads that are not needed for public or private access.

Meeting National Objectives

National Objectives – 2005 Travel Management Rule

- Each national forest and grassland to designate those roads, trails, and areas that are open to motor vehicle use by class of vehicle and if appropriate, time of year.
- Designated roads, trails, and areas shall be identified on a motor vehicle use map.
- Public involvement and coordination within state and local government agencies.
- Prohibits motor vehicle use off the designated system or inconsistent with the designations, with publication of the motor vehicle use map.

CHAPTER 3 IDENTIFYING ISSUES

The ID team developed a list of preliminary issues based on team discussion and answers to the questions in Chapter 4. Major issues identified are listed below. Where the ID team determined an issue would not be carried forward through the analysis, a rationale is provided for that determination.

Evaluation of the standard questions in Chapter 4 identifies the effect each issue has on different resources and the opportunities or guidelines to address these issues. Chapter 5 uses information from Chapter 4 to explain the issue and summarizes opportunities by issue.

Table 3-1. Major Issues Identified and Relevant Document Sections

Major Issues	Pertinent Questions/Section
Access (General Transportation)	
• Access to private in-holdings • Connectivity to other roads • Access for traditional gathering	GT (1-4); SP (1)
Access (Administrative)	
• Access for wildlife opening maintenance • Access for inventory and monitoring • Access for fire protection and management • Access for law enforcement	TW (1-4); TM (1-3); MM (1); AU (1); PT (1-3)
Access (Recreation)	
• Access to trails and hunting areas • ATV use	UR & RR (1-5); PV (1-4); SI (1-10)
Access (Timber Management)	
• Access for present and future timber needs	TM (1-4)
Reference Areas	
• Ecological pattern disruption	TW (1), TW (4)
Soils	
• Surface Erosion • Road Condition	AQ (2), EC (1-3)
TES	
• Risk to threatened and endangered species	EF (2-5); AQ (10); AQ (12-14); TW (1-4)
Hydrology	
• Road-stream crossings • Wetland crossings • Hydrologic connection • Riparian zones	AQ (1-14)

Table 3-1 (continued). Major Issues Identified and Relevant Document Sections	
Major Issues	**Pertinent Questions/Section**
Heritage	
• Risk to Heritage sites	SI (3), SI (5)
Non-Native Invasive Species	
• Vehicle and ATV use contributing to spread	EF (1-3), AQ (13)

CHAPTER 4 ASSESSING BENEFITS, PROBLEMS, AND RISKS

Introduction

Chapter 4 contains narrative answers to the questions contained in FS-643, *Roads Analysis: Informing Decisions about Managing the National Forest Transportation System*. These questions and answers provide an assessment of the ecological, social, and economic considerations of the current analysis area transportation system. **Table 4-1** provides a summary of the questions reviewed to scan the range of possible benefits, problems, and risks and to screen them for those relevant to project-related roads. Where appropriate, questions have been grouped together to facilitate a more coherent discussion of the relevant factors. The scope of the answer to each question is a reflection of its relevance to the issues raised during the RAP, and its relevance to the project-specific scale of this analysis. Some questions are more appropriately answered at the watershed and/or Forest-wide scale.

Table 4-1. Questions Reviewed for the Roads Analysis

Question and Topic	Addressed in Report?
ECOSYSTEM FUNCTIONS AND PROCESSES (EF)	
EF (1): Roading unroaded areas	No. No roading of unroaded areas would occur during this project.
EF (2): Introduction and spread of exotic species	Yes. See page 4-3
EF (3): Pest control	Yes. See page 4-3
EF (4): Ecological disturbance	Yes. See page 4-4
EF (5): Noise	Yes. See page 4-4
AQUATIC, RIPARIAN ZONE, AND WATER QUALITY (AQ)	
AQ (1): Hydrology	Yes. See page 4-4
AQ (2): Surface erosion	Yes. See page 4-5
AQ (3): Mass Wasting	No. Mass wasting does not, and has not occurred on the CNNF.
AQ (4): Stream channels and water quality	Yes. See page 4-6
AQ (5): Chemicals and water quality	Yes. See page 4-6
AQ (6): Hydrological connections	Yes. See page 4-7
AQ (7): Beneficial Uses	Yes. See page 4-8
AQ (8): Wetlands	Yes. See page 4-8
AQ (9): Channel dynamics, floodplains, and sediment	Yes. See page 4-9
AQ (10): Aquatic movement restrictions	Yes. See page 4-9
AQ (11): Riparian Areas	Yes. See page 4-10
AQ (12): Fishing, poaching, and habitat loss	Yes. See page 4-10
AQ (13): Non-native aquatic species	Yes. See page 4-10
AQ (14): At-risk aquatic species	Yes. See page 4-11
TERRESTRIAL WILDLIFE (TW)	
TW (1): Terrestrial habitat	Yes. See page 4-11
TW (2) and TW (3): Legal and illegal human activities and terrestrial habitat and wildlife	Yes. See page 4-12

Table 4-1. Questions Reviewed for the Roads Analysis	
TW (4): Unique terrestrial communities	Yes. See page 4-12
ECONOMICS (EC)	
EC (1): Direct costs and revenues	Yes. See page 4-13
EC (2): Priced and non-priced consequences	Yes. See page 4-14
EC (3): Distribution of benefits and costs	Yes. See page 4-14
COMMODITY PRODUCTION: TIMBER (TM) , MINERALS (MM), RANGE (RM), WATER PRODUCTION (WP), SPECIAL FOREST PRODUCTS (SP), and SPECIAL USE PERMITS (SU)	
TM (1) & TM (2): Logging feasibility and timber management	Yes. See page 4-14, 4-15
TM (3): Silvicultural treatment	Yes. See page 4-15
MM (1): Locatable, leasable, and salable minerals	Yes. See page 4-16
RM (1): Range management	No. There are no range allotments in the analysis area.
WP (1): Water diversions, impoundments, and canals	Yes. See page 4-17
WP (2): Water quality in municipal watersheds	No. There are no known municipal water locations within the analysis area or within the watersheds containing CNNF lands.
WP (3): Hydroelectric power	No. There are no roads accessing hydroelectric power generation systems that are part of this analysis
SP (1): Special forest products	Yes. See page 4-17
SU (1): Special use permits	Yes. See page 4-18
GENERAL PUBLIC TRANSPORTATION (GT)	
GT (1): Connection to public roads	Yes. See page 4-18
GT (2): Land connections	Yes. See page 4-18
GT (3): Shared ownerships	Yes. See page 4-18
GT (4): Public safety	Yes. See page 4-19
ADMINSTRATIVE USES (AU)	
AU (1): Research, inventory, monitoring	Yes. See page 4-19
AU (2): Investigative or enforcement activities	Yes. See page 4-19
PROTECTION (PT)	
PT (1), PT (2), & PT (3): Fuels management and wildfires	Yes. See page 4-19, 4-20
PT (4): Air quality	Yes. See page 4-20
RECREATION: UNROADED AREAS (UR) AND ROAD-RELATED RECREATION (RR)	
UR (1) & RR (1): Supply and demand of non-motorized and motorized recreation.	Yes. See page 4-20, 4-21
UR (2) & RR (2): Type of recreation, user-created routes	Yes. See page 4-21, 4-22
UR (3) & RR (3): Noise and recreation	Yes. See page 4-21, 4-22
UR (4) & RR (4): Recreation users	Yes. See page 4-21, 4-22
UR (5) & RR (5): User attachment	Yes. See page 4-21, 4-22

Table 4-1. Questions Reviewed for the Roads Analysis	
PASSIVE-USE VALUE (PV)	
PV (1): Unique road values	Yes. See page 4-23
PV (2): Cultural significance	Yes. See page 4-23
PV (3): Personal Significance	Yes. See page 4-23
PV (4): Passive-use value	Yes. See page 4-24
SOCIAL ISSUES (SI)	
SI (1): Users and user activities	Yes. See page 4-24
SI (2): Local access issues	Yes. See page 4-25
SI (3): Access to cultural sites	Yes. See page 4-25
SI (4) & SI (9): Traditional uses	Yes. See page 4-25, 4-27
SI (5): Roads that are historic sites	Yes. See page 4-26
SI (6): Community health	Yes. See page 4-26
SI (7): Economic dependence	No. There are no unroaded areas in the analysis area where identified roads occur.
SI (8): Natural integrity	Yes. See page 4-26
SI (9): Traditional plant and animal uses	Yes. See page 4-27
SI (10): Sense of place	Yes. See page 4-27
CIVIL RIGHTS AND ENVIRONMENTAL JUSTICE (CR)	
Cr (1): Minority, low-income, or disabled impacts	Yes. See page 4-27

Current Road System Benefits, Problems, and Risks

Ecosystem Functions and Processes (EF)

EF(1): What ecological attributes, particularly those unique to the region, would be affected by roading of current unroaded areas?

No roading of unroaded areas would take place during this project

EF(2): To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?

Automobiles utilizing the roads can carry invasive plant seeds and cuttings into many previously pristine areas (Wildlands League 2002). Recent studies have related abundance of exotic species to frequency of road usage (Brown et al. 2001).

EF(3): To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

Roads can provide improved access for vehicles used to reach areas of insect, disease and parasite infestation. However, road construction and chronic disturbance on roadsides for maintenance tends to promote exotic species infiltration. Roads can act as corridors for the travel and dispersal of exotic animal and plant species.

EF(4): How does the road system affect ecological disturbance regimes in the area?

Roads increase the potential for various types of disturbance related to recreational uses such as hunting and off road vehicle usage.

Roads also have severe ecological effects on many plant species. Trees and plants are often directly killed by new road construction and/or road rehabilitation activities. Vehicles also create dust that settles on nearby plants and blocks photosynthesis (Trombulak et al. 2000). Clearing vegetation for roads disturbs soils and exposes roaded areas to more sunlight, inviting invasion by early successional, exotic species (Trombulak et al. 2000; Wildlands League 2002). These non-native plant species can then further disrupt ecosystems by dominating large areas (Wildlands League 2002). Invasion becomes problematic because many invasive plants and trees produce inferior habitat and food sources for native wildlife (Wildlands League 2002). This, in turn, decreases biodiversity by limiting species that can occupy an area (Wildlands League 2002).

EF(5): What are the adverse effects of noise caused by developing, using, and maintaining roads?

Noise caused by developing, using, and maintaining roads can disrupt wildlife breeding and foraging activities (Forman and Alexander, 1998; Forman and Deblinger, 2000; Saunders et al., 2002; Trombulak et al., 1999). Wildlife species vary in their sensitivity to noise associated with roads. Some species, such as eagles, goshawks and other raptors, are more susceptible to such noise during the nesting season, while hunted species, such as deer and waterfowl, may be most sensitive during and after hunting seasons. In areas where poaching is common, road noises may affect selected species throughout the year. Such disturbances can create a corridor of low value, or low use habitat along roads. The width of the corridor will vary with the noise buffering properties of the adjacent vegetation.

Aquatic, Riparian Zone and Water Quality (AQ)

AQ(1): How and where does the road system modify the surface and subsurface hydrology of the area?

Roads can affect the movement of water through a watershed area by intercepting, concentrating, and diverting flows from their natural flow patterns. These changes can result in increases in peak flows if surface and subsurface flows are intercepted and routed directly to waterways. At locations where the roads intercept and store water or route it away from nearby waterways, it will have the opposite effect, decreasing peak flows. These effects are most likely to occur in areas with high drainage density, heavier soils and steeper slopes where surface and shallow subsurface runoff is greatest. These areas include the Penokee/Gogebic Iron Range in portions of the White, Marengo and Upper Bad Watersheds; the Flambeau Silt Capped Drumlins in the Thornapple, Log Creek, Elk, Scott, and Willow Sub-Watersheds; the steeper portions of the Perkinstown Moraine in the Upper Yellow and Trappers-Pine Watersheds; the steeper portions of the silty Iron River/Argonne Drumlins in the headwaters of the Brule Watershed; and the silty Wabeno Drumlins over bedrock and loamy Mountain Moraines in the upper Peshtigo and Oconto Sub-Basins.

Wildlife, such as beavers, sometimes plug roadway culverts. This causes water to backup and flood the area behind the plug, while reducing flow beyond the culvert. The blockage can temporarily alter water flow through a watershed area, thus altering hydrology.

AQ(2): How and where does the road system generate surface erosion?

Surface erosion occurs when rainfall or snowmelt detaches soil particles, which are then transported by water runoff. Sedimentation occurs when these soil particles are deposited into the waterways. Sediment is recognized as the most important water pollutant in the United States in terms of total quantity, miles of stream affected, and adverse effects on aquatic communities. Fine sediment, such as sand, silt, and clay, is a particular water quality problem in streams because it can reduce available habitat by filling pools. The filling of pools reduces the survival rate of fish eggs, which subsequently reduces the survival, composition, and abundance of aquatic invertebrates.

Roads that are poorly designed, located, or maintained can be significant sources of sediment to streams. Sediment can originate from unpaved road surfaces, ditches, cut slopes, and fill slopes. This sediment can be transported to streams when the runoff from road surfaces flows directly to the ditches and the ditches flow directly into streams. These roads are referred to as being 'hydrologically connected' to streams.

Roads with native surface material, inadequate gravel surface, poorly vegetated slopes or ditches, inadequate ditch armor, and inadequate drainage are the largest sources of erosion and sedimentation. The potential for erosion and sedimentation increases as the road slope increases. This occurs because water moves at higher velocities and increased volumes as slope increases.

Potential sources of erosion and sedimentation are minimized when roads are paved or have a minimum of six inches of crushed gravel and are regularly graded to maintain a crowned surface; have ditches and slopes that are protected by good vegetative ground cover; have good cross-drainage; and have a low hydrologic connection.

Areas with the greatest risk for both erosion (steep slopes) and sedimentation (high runoff potential, high drainage density, greater hydrologic connection) include the Penokee/Gogebic Range in portions of the Marengo, White and Upper Bad Watersheds, the steeper portions of the Perkinstown Moraine in the Upper Yellow and Trappers-Pine Watersheds; the steeper portions of the silty Iron River/Argonne Drumlins in the headwaters of the Brule Watershed; and the silty Wabeno Drumlins over bedrock and loamy Mountain Moraines in the upper Peshtigo and Oconto Sub-Basins. These locations have a large proportion of area with slopes over 5 percent and many slopes over 15 percent.

A large portion of the Washburn Ranger District has steep slopes (5-15 percent slopes over 45 percent of the area, and greater than 30 percent slopes over 15 percent of the area), with high erosion potential, which increases construction and maintenance costs. However, the potential for sedimentation is low because there are few surface waters. Exceptions to this would be the concentration of lakes and ponds in the vicinity of Bladder and Wanoka Lakes and the headwaters of Fourmile and Lenawee Creeks.

AQ(3): How and where does the road system affect mass wasting?

Road-related mass-wasting typically occurs in steep terrain or mountainous topography.

The topography throughout the CNNF is relatively flat or rolling terrain with some short steep slopes. Only 0.5 percent of the area within the CNNF boundary has slopes that exceed 30 percent. Therefore, road-related mass wasting is not a significant issue and generally not a problem on the CNNF.

AQ(4): How and where do road-stream crossings influence local stream channels and water quality?

Roads affect water quality primarily through the processes of erosion and sedimentation as described in AQ2. However, roads can also affect water quality by increasing water temperatures. Road construction parallel to streams often involves permanent removal of a substantial portion of riparian vegetation. Without streamside vegetation to provide shade, temperatures of cool and cold water streams may increase.

Roads can affect the shape or morphology of stream channels both upstream and downstream from stream crossing locations. These effects occur where culverts are set too high or constrict the channel too much; where culverts wash out regularly; or where there is heavy sedimentation from the road surface, slopes and ditches.

Culverts that are installed too high at the inlet or that constrict the stream too much can cause sediment to deposit in the upstream channel. In low gradient streams, these deposits of sand, silt and muck (or organic manner) can extend upstream several hundred feet. In steep streams that transport gravel bedload at high flow periods, these deposits consist of gravel and cobble. The width of culverts or bridges should be designed to match the existing bankfull width of these stream channels in order to maintain natural bedload transport throughout the crossing.

Stream crossings that have undersized culverts and wash out frequently can cause the downstream channel to fill with sediment. In low gradient streams excessive sediment deposits can cause water to back and lead to even more sediment accumulation in the channel upstream.

Heavy sediment loads from frequent washouts or from eroding road surfaces can affect the downstream channel by causing it to become wider and shallower. Wide shallow stream channels with a predominantly sand bed tend to provide poor habitat for fish and aquatic invertebrates.

Most adverse effects to streams can be minimized by properly sizing culverts (usually to accommodate a 100-year flood), minimizing sedimentation from roads, and matching the culvert width to the bankfull width, particularly on streams with a loose gravel bed.

The roads in this analysis have about 78 stream crossings. Twenty-two of these have crossings have been inventoried for impacts to water quality, fish passage and stream channel morphology. Assuming the inventoried sites are representative of all sites, 4 percent have major impacts, 41 percent moderate, 32 percent minor and 23 percent none. There is a need to inventory the remaining sites and to correct problems at sites with major or moderate aquatic problems.

While these sites are scattered across the Forest, concentrations of streams crossings on the roads in this analysis tend to occur in the Lakewood/Laona, Great Divide and Medford/Park Falls districts.

AQ(5): How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters?

The road system provides a transportation route for traffic that hauls chemical and oil products. Motorized vehicles that use the road system require oil to operate. If a puncture would occur in the container that stores the chemical or oil product, the potential exists for it to leak onto the roadway and nearby ground surface. Depending on the amount of the leakage, the chemical or oil could directly enter nearby waterways, or it could be transported to surface waters during a rainfall event. However, roads where significant volumes of petroleum products are transported would seldom be

roads over which the Forest Service would have jurisdiction. Instead, they would be federal, state, or county highways.

De-icing salts are applied primarily on paved roads that are used throughout the winter. The de-icing salt is transported to nearby surface waters when the snow melts and the salt dissolves in the melt water. However, very few if any roads in this analysis are paved and the USDA Forest Service does not utilize de-icing agents. Dust abatement chemicals are likewise not used by the USDA Forest Service on gravel roads. Other agencies may use them on roads under their jurisdiction during the dry summer months. During rainfall events, these chemicals are also carried to nearby surface waters. Herbicides are not used to maintain Forest Service roads but may be used along roadways maintained by the state, county, or local agencies. They too, may be carried to surface waters nearby during heavy rainfall events.

AQ(6): How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity (such as, the delivery of sediments and chemicals, thermal increases, elevated peak flows)?

Roads are hydrologically connected to streams in locations where roadway runoff flows directly into surface water or is transported to them via roadside ditches. This direct connection can increase peak flow rates and deliver pollutants to streams. On the CNNF, hydrologic connections typically occur at stream crossings and extend up to the first slope break. While such connections can be estimated from topographic maps, they are best determined from field surveys. Road/stream crossings and length of road in riparian areas can serve as a good indication of the occurrence of hydrologic connections.

There are approximately 78 stream crossings on the 791 miles of Maintenance Level 2 roads in this analysis. Assuming an estimated distance of 100 feet on each side of a stream crossing, approximately 3.0 miles of road are hydrologically connected to streams at these crossings. Additional segments of road adjacent to but not crossing streams or lakes can also be hydrologically connected. Including stream crossing sites, there are 8.5 miles of road in this analysis within the riparian management zone. This amounts to about 1.08 percent of the total road miles being considered in this analysis. If about 3.0 miles of hydrologically connected roads are associated with stream crossings, there are another 5.5 miles of hydrologically connected road segments that parallel streams or lakes and are not associated with stream crossings. All stream crossings and most of the parallel road segments in riparian areas are most likely hydrologically connected to streams and lakes.

A few roads with particularly long segments in riparian management zones include 830311, 94326 and 9392133 on the Nicolet side; and 136E and 139C on the Chequamegon side. These roads should be reviewed in more detail to determine should be closed to motor vehicle use, relocated or obliterated.

Hydrologic connections are most prevalent in the areas with more frequent road/stream crossings (AQ4) and high sedimentation potential (AQ2). Sediment delivery from unpaved roads is the most prevalent problem associated with hydrologic connections.

AQ(7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

All beneficial uses of water designated by Wisconsin occur on the CNNF. For fish and other aquatic life, Wisconsin lakes and streams have five designated uses:

- Cold Water Communities
- Warm Water Sport Fish Communities
- Warm Water Forage Fish Communities
- Limited Forage Fishery
- Limited Aquatic Life

Most streams and lakes also have a recreation use designation that protects them from fecal contamination. All waters are designated for Public Health and Welfare and use by Wild and Domestic animals; these designations include criteria for toxic substances and cancer-causing agents.

No substantial changes in uses or demand are expected over time with the following possible exceptions. There could be a slight increase in Cold Water and Warm Water Sport Fish Communities through watershed, lake and stream restoration activities. Demand for recreational fishing in lakes and streams (Coldwater and Warm Water Sport Fish Communities) will probably increase in the future along with minnow trapping (Warm Water Forage Fish Communities and Limited Forage Fishery).

Road derived pollution, primarily sediment, is most likely to affect Fish and Other Aquatic Life beneficial uses.

AQ(8): How and where does the road system affect wetlands?

The road system can affect wetlands in two primary ways:

- Direct loss through filling or heavy sedimentation
- Alteration of wetland type through changes in water levels and flow rates

There are approximately 434,000 acres (23 percent of the total area) of wetland within the boundary of the CNNF. Because of their abundance, it is not always practicable to completely avoid wetlands during road construction. Therefore, crossing and filling of wetlands with roadway is sometimes unavoidable. There are 29 miles of Maintenance Level 2 roads in this analysis that are located in wetlands. This amounts to 3.7 percent of the 791 total road miles considered in this analysis. Assuming an average roadway width of 20 feet, multiplied by 29 miles, the total affected wetland area is approximately 70 acres (0.016 percent of the total wetland area). The fact that 23 percent of the area within the National Forest boundary is occupied by wetland yet only 3.7 percent of the roads are located in wetland is further evidence that wetlands have generally been avoided during construction of maintenance level 2 roads when practicable. At the same time, a small portion of roads in this analysis were identified as having more than 50 percent of road length within a wetland. They include 61626, 833210, 93426, 93612, 9403169, 94216, 94323, 9433123 and 832476 on the Nicolet side; and 184D, 1284, 637A, W229442, W228442, 621, 532, 137A, and 115A on the Chequamegon side. These roads should be reviewed in more detail to determine if they should be closed to motor vehicle use, relocated or obliterated.

Measures of impacts to wetland type from roads are not readily available. Roads can alter wetland type by impeding drainage which causes the upslope area to become wetter and the downslope area to become drier. Depending on the type of wetland, this typically causes the type to change from a forested or shrub wetland to a shrub, sedge, emergent or open-water wetland on the upslope side of the road and more shrub or tree growth in the downslope area. Alterations to wetland type can be avoided or mitigated by providing adequate cross-drainage. An exception would be where beaver activity plugs or dams cross-drainage culverts.

Wetlands are numerous on the CNNF, with the exception of the outwash sands area in the Washburn Ranger District. Therefore, wetland crossings and potential impacts to various wetland types occur throughout most of the Forest.

AQ(9): How does the road system alter physical channel dynamics, including isolation of floodplains: constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?

Roads that parallel streams and encroach upon the floodplain can constrain channel migration and isolate portions of floodplains. These effects are minimal for roads that border broad floodprone areas and more substantial for floodprone areas that are less than five times bankfull width. The movement of large wood, fine organic matter and sediment is primarily affected by the size and elevation of culverts. Undersized culverts can cause large woody debris and coarse sediments to accumulate above road crossings. When culverts are set above the streambed on low gradient (less than 0.3 percent) streams, fine sediments and organic matter tend to accumulate above the road crossings.

AQ(10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

Roads, particularly road/stream crossings, can act as barriers that restrict the migration and movement of aquatic organisms. Fish are the most commonly affected aquatic species, but roads can affect the movement of a variety of species including salamanders, turtles, and mussels. The CNNF has over fifty species of fish, most of which are small minnow species. Brook trout, walleye, smallmouth bass, largemouth bass, redhorse, dace, and darters are all found on the forest. Generally, the smaller fish have limited swimming and jumping abilities. The majority of streams in the forest are considered low gradient.

Typically, the type, size, and placement of culverts determine if fish movement is going to be blocked. Common problems associated with passage include culverts placed too high, resulting in a drop at the outlet; culverts placed too steep, resulting in increased gradient; culverts oversized or undersized, resulting in too much or too little water in the culvert; and culverts that are too long.

It is the intention of the CNNF to provide fish passage at all road/stream crossing locations. Exceptions to this would be to stop the spread of exotic species or if the crossing is in the headwaters of a watershed where fish passage is not critical.

A road/stream crossing inventory was conducted on the CNNF from 1997 to 1999, with periodic updates after that time. Over 670 sites were inventoried to determine potential water quality and fish passage problems. The information that was collected included an evaluation of the road surface material, culvert size and condition, evidence of road surface erosion, evidence of culvert failures or washouts, and condition of embankment. This information was used to determine the severity of a fish passage problem at each location. Probable fish passage problems were noted for culverts that

appeared too steep (high velocity and/or to shallow water) or had a drop at the outlet. If passage was unlikely for any of the species and their life stages, the site was rated as a probable fish passage barrier.

The survey conducted between 1997 and 1999 primarily focused on ML 3, 4, 5 roads although some ML 1, 2 roads were surveyed. For the road segments included in this analysis 24 road/stream crossings have been surveyed, of those three crossings have been identified as having fish passage issues. Those sites are: FR512 @ Hay Creek, FR2779 @Fern Creek, and FR518 @Squaw Creek Impoundment. There are most likely other road/stream crossings with fish passage issues but because the Forest wide inventory is still ongoing they have yet to be identified.

AQ(11): How does the road system affect shading, litterfall, and riparian plant communities?

Roads in riparian areas result in permanent removal of riparian vegetation. In forested riparian areas, this can result in a loss of shading, litterfall and large woody debris in streams and lakes. Roads that parallel streams or lakes for long distances are more likely to affect aquatic ecology than those that cross at right angles. Roads located in riparian areas and parallel to streams are described in AQ6.

AQ(12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

Any road that provides access to a lake or stream potentially contributes to fishing, poaching, or direct habitat loss. The easier it is to access a fishing area, the greater is the potential for impacts to at risk aquatic species. All road/stream crossings provide access, particularly for trout streams. Road segments within the riparian area of a lake or stream also provide easier access. Other field surveys have identified that, of lakes greater than 10 acres, 38 percent have carry-in access, 40 percent have vehicle access, and 22 percent have no public access.

The type of fishery, as opposed to the type of access, appears to dictate poaching activity. Anglers violating bag limits have been found in both remote and heavily roaded areas. The forest has no direct data that indicates a trend regarding the prevalence of poaching as access increases or decreases.

There are no Federally listed threatened or endangered aquatic organisms found on the forest. There are several species on the Regional Forester Sensitive Species (RFSS) list including Greater Redhorse, Pugnose Shiner, Lake Sturgeon, Ellipse mussel, Extra-striped Snaketail, Pygmy Snaketail, Green-faced Clubtail. Occurrences of these species are not widespread and tend to be limited to medium to large cool and warm water rivers. The greater redhorse and lake sturgeon are known to travel both up and down stream and thus, need clear passage within the river. All the species listed above require good water quality, stable river systems (except pugnose shiner, which is a lake species) and limited sedimentation.

AQ(13): How and where does the road facilitate the introduction of non-native aquatic species?

The road system contributes to the introduction of non-native aquatic species by providing motorized access to lakes and streams. Non-native aquatic species attach to boats and trailers when they are in the water and are then transported out of a lake or stream on boating equipment. When boats and trailers are returned to the water, if they are not thoroughly inspected and non-native aquatic species removed, they can spread the non-native aquatic species to another site. This occurrence is true for aquatic plant species such as Eurasian water milfoil, as well as zebra mussels

and bait fish. Road/stream crossings provide access and may increase the potential introduction of non-native aquatic species by allowing easier introduction of live fishing bait.

AQ(14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?

Areas with exceptionally high aquatic diversity are the large warm water rivers on the forest. Generally they have bankfull widths greater than 50 feet, summertime maximum temperatures of 79° F (26° C), and alkalinities greater than 20 mg/l. These river systems support a wide variety of fish species including walleye, smallmouth bass, muskie, darters, shiners, minnows, and dace. They also contain up to nine species of mussels and a diverse macro-invertebrate community. Most of the large warm water rivers are found in the Chequamegon land base and include the South Fork Flambeau, East Fork and West Fork Chippewa, and Yellow River.

The Wisconsin Department of Natural Resources (WDNR) has identified "Exceptional and Outstanding" waters within the State. These waters included National Wild and Scenic Rivers, State Wild and Scenic Rivers (Pine, Popple), all Class I trout streams, selected Class II trout streams and a few large flowages. Many of these designated waters occur on the CNNF.

The forest has one designated National Wild, Scenic, Recreation River and several candidates. Eligible segments occur on the East Fork Chippewa, South Fork Flambeau, South Fork Jump, Pine, Popple, and Pestigo Rivers. The Brule River has been designated by Congress as a study river. The Pine and the Popple Rivers are also state designated Wild Rivers.

These waters are spread across the CNNF, with the highest concentration of these stream systems found in the White, Pine, Brule, Popple, South Branch Oconto and Lower Peshtigo-Thunder watersheds. Road densities within these 5^{th} level watersheds range from 1.36-2.41 miles per square mile (Higgins et al. 2000). Given the roaded nature of the land base and the extent to which these systems are distributed, the road system overlaps these areas relatively equally.

Terrestrial Wildlife (TW)

TW(1): What are the direct effects of the road system on terrestrial species habitat?

Roads can affect wildlife habitat and species beneficially, detrimentally, or not at all; it varies from species to species. Effects can vary in relation to the type of landscape the road is located in. For example, a road through rich hardwood habitat may affect more species than a road through a jack pine plantation.

Direct effects from roads on terrestrial habitats include habitat fragmentation, disruption of drainage patterns, and micro climatic changes. Roads can become barriers or access corridors to wildlife. Roadsides can provide foraging habitat for deer, fox, coyote, wolf, bald eagles, and numerous other bird species. Some species such as woodchuck, badgers, and turtles utilize roadsides for nest and den sites. While roadsides can provide suitable habitat for many species, they also increase the risk of road-related mortality.

Increasing or maintaining access into various forest communities makes human-wildlife encounters a more likely occurrence. These encounters can lead to direct mortality via hunting or by vehicle collisions. Other species may be captured (collected) and removed from the forest or be disturbed to the point of nest/den site abandonment.

Some species of special concern that are likely to be affected by roads include gray wolf, red-shouldered hawk, northern goshawk, wood turtle, and American marten.

TW(2): How does the road system facilitate human activities that affect habitat?

Roads facilitate activities such as timber harvest, fishing, hunting, boating, and collection of various forest products (e.g. berries, mushrooms, pine boughs), all of which affect wildlife habitat. Roads increase the amount and frequency of visitation to areas within the forest. Merely driving on the road can affect wildlife (e.g. road-related mortalities), but habitats are most affected by the types of activities mentioned above. Direct impacts could include loss of nest/den trees because of timber harvest activities, while indirect impacts may include nest/den site abandonment due to continued disturbance from recreationists. However, Forest roads make maintenance and improvement of wildlife habitats possible, in addition to wildlife research and monitoring.

TW(3): How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the affects on wildlife species?

Roads sometimes allow access into remote or “protected” habitats via ATVs and four wheel drive vehicles. Providing access to remote areas can facilitate illegal activities such as poaching, timber theft, illegal harvest of non-timber forest products, illegal “take” of wildlife species (raptors in particular), and refuse dumping. Providing road access can also result in unauthorized fish stocking. Legal activities that occur in these remote areas include hunting, trapping, fishing, bird watching, berry picking, etc.

TW(4): How does the road system directly affect unique communities or special features in the area?

Roads are found within Management Area 8D, which could reduce Management Area 8D's value as an ecological corridor within the landscape. The reduction in value may be attributable to the barrier that roads may pose to dispersal, the increase in likelihood of introduction of exotic species, altered behavior of wildlife due to interference by people, and increased risk of harvesting of rare species due to increased access. Furthermore, roads may alter hydrologic regimes if not constructed or maintained properly which can jeopardize the wetland and lowland communities which harbor a number of species of viability concern onthe Forest.

Similarly, Ecological Reference Areas are vulnerable to the same road related effect described above.

Higher Traffic Service Level roads (“A”, “B” and “C”) experience higher use and cause more disturbance than “D” level roads. See question TW 1 for a description of effects of roads on wildlife species. The road system may influence the spread of non-native invasive species throughout the project area. There are known problems with high quality hardwood stands being affected by non-native earthworm species, which are spread in part by vehicles and general public use.

Economics (EC)

EC(1): How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

Annual maintenance is the total cost required to maintain a particular road to the assigned objective maintenance level. Annual maintenance typically includes repair, preventative maintenance and cyclic maintenance. The total cost of these activities combined is equal to the total annual maintenance cost.

Annual deferred maintenance is the total cost of annual maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or deferred until a future period.

Decommission cost is the total cost required for the stabilization and restoration of unneeded roads to a more natural state.

Condition surveys for all maintenance level 1 and 2 roads have not been completed forest wide. This is due to the inaccessibility of some of these roads to the necessary equipment needed to accomplish the survey. The purpose of such as survey is to determine road maintenance across the forest. Since level 1 and 2 roads, by definition, either receive little maintenance or none at all, there is no need for such a survey.

Funding to maintain any Forest Service system road has substantially declined over the past ten years. It is no longer possible to maintain the existing road system to the maintenance levels expected by the public. This results in a road system that is not environmentally sound or provides an unsafe environment for the user. This lack of funding has allowed many maintenance level 3 roads to become level 2 and level 2 to become level 1. By doing this we are losing some of our roads but can still provide for a safer experience for users. Some opportunities may exist to increase road maintenance funding through Recreation Enhancement Act funding for specific areas and through partnerships with local governments as well. Another approach to reduce road maintenance costs while increasing revenue would be to continue management of a suitable timber base that currently has road access. Timber purchasers are often required to perform road and trail maintenance on the roads and recreation trails used. Addition dollars received from any of these funding sources would provide better maintenance for these roads

The road system allows access for the number and amount of activities that occur in the area. Without the road system, the benefits and costs associated with hunters, sightseers, firewood cutters, and others would be reduced.

The current road system provides both positive and negative cash flows. Major sources of revenue associated with roads are timber sales, campgrounds and parking fees. Direct costs include road maintenance and resource restoration, or protection costs related to increased motorized use in roaded areas. At present, direct costs exceed direct revenues. Given current agency funding and sources of revenue, an increase in open road mileage will compound the negative cash flow. However, future costs can be mitigated or minimized if roads are properly constructed.

Although the direct costs of road construction, maintenance, and mitigation measures exceed the direct revenues resulting from timber and other commodities, many other resource management objectives could not be accomplished or would cost more without an adequate road system.

EC(2): How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The road user groups that contribute the most significant recreation-related economic benefits are tourism (including camping and water sports, fishing, hunting, skiing, cross country skiing, snow shoeing, snowmobiling and ATV riding). These users contribute revenue through purchase of equipment, supplies, and services for their activities. Non-local recreationists contribute additional revenue by utilizing local lodging, restaurants, stores and services.

Construction, maintenance, or any change in maintenance levels of roads within the analysis area is not expected to have a significant long-term impact on the economic benefits derived from recreation unless there is a significant reduction in the total mileage of roads available for recreational use. Some displacement of individual users may occur as a result of some road designations. This has been taken into consideration and will be addressed in the final implementation.

EC(3): How does the road system affect the distribution of benefits and costs among affected people?

The road system offers greater benefits to people who use vehicles for travel to and within the CNNF than to visitors who travel on foot or by other non-motorized means. For those who choose non-motorized forms of transportation, the road system may cost more in terms of lost aesthetic values, noise pollution, and other potential conflicts with motorized vehicles.

Timber Management (TM)

TM(1): How does road spacing and location affect logging system feasibility?

Road spacing and location are critical to the feasibility of the logging system operation. The spacing of Maintenance Level 3, 4, and 5 roads provide access routes into the forest, which allows logging equipment to be transported to and from a specific harvest site. The closer the roads are to the harvest site, the more efficient the logging operation will be.

Due to the relatively flat topography on the CNNF, the most economical and feasible way to remove forest products is through ground based harvest systems. These systems require a road network of arterial, collector and higher standard local roads to move harvested wood from the forest to the market locations. Market locations for timber harvested in the CNNF are within 100 miles of the forest.

Most harvested timber is decked near Maintenance Level 1 and 2 roads. All harvested timber is moved along Maintenance Level 3, 4, and 5 roads. Logging equipment, such as haul trucks, can easily travel on Maintenance Level 3, 4, and 5 roads, thus increasing efficiency. Lower maintenance standard roads generally have seasonal restrictions and smaller hauling equipment may be needed to transport the timber, making it less economical to harvest.

Some areas of the forest experience a far greater proportion of intermediate cutting (thinnings and selection cuts) than others. The resulting need for such recurrent entry dictates a need for higher standards of roadway design and maintenance.

TM(2): How does the road system affect managing the suitable timber base and other lands?

Maintenance Level 3, 4 and 5 roads provide basic and efficient access into the forest for data collection, timber sale preparation, reforestation, timber stand improvement, insect and disease control, and for monitoring to achieve the goals of the management activities. Maintenance Level 3, 4, and 5 roads are also built to a standard set to accommodate the weight requirements of the logging equipment.

Adequate access provides economical skidding distances that require a minimum classified road system (including temporary roads). Normally a minimum cost-efficient road system provides road spacing about ¼ miles for timber management. From the current Forest Plan FEIS "Any road wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-termed motor vehicle access (i.e. every 15 years for timber harvesting), including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service should be on the permanent road system". Without an adequate road system the current Forest Plan management objectives and prescriptions for the suitable timber base and other commodity resources on the CNNF cannot be accomplished or will cost a great deal more.

TM(3): How does the road system affect access to timber stands needing silvicultural treatment?

The road system provides access to timber stands needing silvicultural treatment. Most silvicultural treatments use timber sales as a means of accomplishing their goal. Without roads, most silvicultural treatment could not be completed.

Thinning of conifer stands such as red pine, white pine and white spruce, is most often conducted on a 7 to 15 year entry cycle beginning when trees are 25 to 40 years old. This scheduled thinning is generally done to redirect or optimize potential growth for trees with better form, value, and vigor. However, an initial row-thinning is also done to provide stand access. Since an access road will be needed every 7 to 15 years, it is recommended that the road be part of the forest road system and maintained on a schedule consistent with its use. Some roads accessing these stands would be low standard roads that cannot be driven by a passenger car and would generally be closed to the public. However, they would still be part of the road system because of their periodic use every 7 to 15 years.

Northern and mixed hardwood forest types are slower growing than red pine, white pine and white spruce. Generally, a thinning or selection harvest (depending on stand condition and objective) would be made on a 10 to 20 year entry cycle. Again, since the roads entering these areas will be needed on a periodic basis, it would be part of the road system.

Aspen, jack pine and balsam fir are generally managed as even-aged stands through clearcutting with only one entry every 40 to 60 years. Access roads for any given stand would be constructed as a temporary road, decommissioned after harvesting and other cultural treatments are completed. With the current small size of aspen, jackpine, or balsam clearcuts (40 acre limit), many roads that access them (especially on the eastern half of the forest) are also used to access hardwood, pine, or spruce stands. If the road accessing these clearcut stands is extended to access other stands that need frequent entry, the road would not be temporary, but part of the road system and of a higher standard.

Much of the Nicolet's northern hardwood forest is located on heavy Iron River/Goodman/Wabeno soils. With the exception of winter only roads these wet/heavy soils restrict access for periodic,

recurring intermediate timber harvests. A proportion of these roads are currently built to a well-surfaced, well-ditched, and well-drained "C" Traffic Service Level (TSL). To restrict access to winter only will adversely affect the local economy due to the fact that a significant number of local residents are dependent throughout the year on the forest's timber resources in order to make a living. The maintenance level of these TSL "C" roads should be kept at a Maintenance Level 3 to protect the road resource.

There are parts of the forest, such as Management Area 1, where larger areas of land are managed for early successional species such as aspen. Not all the area would be harvested at one time, but it would be done with a series of entries to harvest a portion of the area each time. This procedure is used to develop age-class distribution in the forest type. Most of the roads accessing this type of area would be part of the road system because they will be used for entry into a portion of an area every 10 to 15 years.

If large areas (40 to 250 acre blocks) were to be clearcut under an even-age silvicultural system, the amount of roads needed would be less than in the same size area managed for hardwoods under the uneven-age silvicultural system. Access for timber harvest and hauling would not be needed for another 40 to 60 years. At that time, new temporary access would be created. Clearcutting in excess of 40 acres is not usually done because of limitations described in the National Forest Management Act.

Maintenance Level 3, 4 and 5 roads provide good access for silvicultural treatments as long as the density allows reasonable access to all areas of the forest where management is used to meet silvicultural objectives.

Minerals Management (MM)

MM(1): How does the road system affect access to locatable, leasable, and salable minerals?

The National Forests in Wisconsin are 'Acquired Lands'. Therefore, there are no locatable minerals on the CNNF. Leaseable and salable minerals occur or have the potential to occur anywhere on the CNNF. Therefore the developed road system is important for providing access to prospect for and develop leasable and salable minerals. A reduction in roads could reduce access to mineral resources.

For salable minerals, a reduction in access could mean a loss of existing and/or future sand and gravel resources. This is because the sand and gravel resources tend to be widely distributed across the CNNF; the cost to access the mineral would increase, causing an increase in the transportation cost of the minerals; increased cost may make it uneconomical to utilize small sand and gravel deposits; and reduced access would make it difficult to access the deposits.

For leasable minerals the roads provide access for hardrock prospecting that includes geophysical and core drilling activities. A reduction in road access could increase the cost of hardrock prospecting and mineral development. Increased road access costs might make smaller hardrock mineral deposits uneconomical for development.

Water Production (WP)

WP(1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

Of the above mentioned items, only impoundments (dams) are known to be relevant on the CNNF. There are 47 dams on the forest that are maintained by the Forest Service. There are an unknown number of other dams inside the CNNF boundary that are owned and maintained by other entities. The missions of these dams are diverse and include enhancement for fisheries, wildlife, and/or recreation; there is one Federal Energy Regulatory Commission (FERC) (power- generating) dam inside the forest boundaries; and at least one local township water reservoir.

One Forest Service dam, Day Lake Dam, and one other dam, Chequamegon Waters Dam, are high hazard structures and have Emergency Action Plans in place in case of a dam failure and resulting flooding of residences. The Mondeaux Dam is a medium hazard structure and also has an emergency action plan in place. Roads are necessary for emergency repairs and for notification and evacuation of nearby residences and forest users in the case of a dam failure.

All of the dams must be accessed via roads for operation and maintenance. Operations often include scheduled drawdowns and other such manipulation to carry out the mission of the dam. Maintenance includes removal of beaver debris and repair of other damage to prevent further damage to the dam and neighboring environments, as would happen in the event of a dam failure. All dams must be regularly accessed by Forest Service and State personnel who complete required safety inspections.

The missions of the dams usually involve road access. Recreational use in reservoir areas includes boating, fishing, camping, and hunting and all requires boat landings and/or access to trailheads and hunting areas. Fisheries personnel of the Forest Service and State of Wisconsin require access for fish monitoring and stocking, and law enforcement. Wildlife enhancement often includes vegetative manipulation of the dam and reservoir areas for waterfowl and game enhancement. In addition, Winter Dam is a power-generating dam that requires road access to maintain the dam, power plant, and power transmission lines. However, none of the roads in this analysis provide access to Winter Dam.

Special Forest Products (SP)

SP(1): How does the road system affect access for collecting special forest products?

The main special forest products collected on the CNNF are balsam boughs, moss, and birch limbs. These activities are typically road dependant. Time and economic return dictate the distance from roads that these products are collected. When motorized access is reduced or eliminated, the level of product collection is diminished due to the high level of physical labor required when carrying these products to the nearest road open for motorized travel. The potential agency consequence of reduced access is a reduction in permit fees collected by the Forest.

Special-Use Permits (SU)

SU(1): how does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

Special Use Permit holders on the CNNF rely on the road system very heavily. Many of the roads provide the only access (permitted and non-permitted) to numerous private in-holdings. These private tracts may be undeveloped timberland or be the site of both year-round homes and summer dwellings. This is especially the case around the numerous lakes, streams, and streams on the Forest.

The forest also has a large number of special use permits for commercial enterprises and utility companies. These permit holders not only provide services to private lands within the CNNF, but also to residents living adjacent to and in close proximity to the Forest. Many of the utility corridors also traverse the Forest providing services to northern Wisconsin residents far removed from the CNNF land-base. Maintaining access to the permitted sites on the Forest for system maintenance is essential.

General Public Transportation (GT)

GT(1): How does the road system connect to public roads and provide primary access to communities?

The present network of CNNF Maintenance Level 3, 4, and 5 roads coordinate with a system of township, county and state roadways to provide access to and from area communities.

GT(2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, in-holdings and so on)?

There are no ad-hoc communities per se within the CNNF, but may be considered a community by the residents in the area. Numerous subdivisions exist adjacent to waterways and lakes within the Forest, which give the permanent residents a sense of community. The number of individual private in-holdings is moderate to high in number and acreage. In addition, numerous large contiguous blocks in excess of 500 acres are owned by individuals and corporations. Many of these in-holdings have improvements.

The Forest has a legal obligation to provide current and future access to these in-holdings, which are completely surrounded, by National forest lands. Relative to isolated small in-holdings, lower standard local roads provide the link from these parcels to collector and arterial roads, which provide access into and out of the area. Subdivisions and large contiguous blocks of private in-holdings typically have access directly from collector or arterial roads.

GT(3): How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?

The Forest has a history of working cooperatively, with local and State Government where limited or shared ownership occurs. This cooperative venture is limited to maintenance level 3, 4 and 5 roads. Prescriptive rights and easements are considered on a case-by-case basis when making road management decisions.

GT(4): How does the road system address the safety of road users?

The current road system is managed in accordance with assigned traffic service levels/maintenance levels. In 1975, the Forest Service developed a Memorandum of Understanding with the FHWA that required the Forest Service to apply the requirements of the National Highway Safety Program, established by the Highway Safety Act, to all roads open to public travel. In 1982, this agreement was modified to define "open to public travel" as "those roads passable by four-wheeled standard passenger cars and open to general public use without restrictive gates, or prohibitive signs." Most roads maintained at level 3, 4, and 5 meet this definition. There is a direct correlation between traffic service levels/maintenance levels and design standards for the roadway. The highest traffic service level/maintenance level roads provide for the greatest travel comfort while maintaining the highest degree for safety. As traffic service levels/maintenance levels diminish, design speeds and user comfort decline as well.

Traffic control signing follows standards set forth in the Manual on Uniform Traffic Control Devices (MUTCD).

Administrative Use (AU)

AU(1): How does the road system affect access needed for research, inventory, and monitoring?

Other than making areas more accessible, roads would have little affect on research, inventory, and monitoring.

AU(2): How does the road system affect investigative or enforcement activities?

Open Forest Service system roads, open unauthorized, open user developed, and unclosed temporary roads are all accessible to, and used by the public. These same open roads are also used for both investigative and enforcement activities. Primary use activities include driving for pleasure, timber management, hunting, fishing, blueberry picking, and mountain biking, cross country skiing, snowshoeing, ATV use, and snowmobiling. While roads provide access for these activities, they also provide access for law enforcement personnel to engage in preventive and enforcement patrols. In areas where open road densities are highest, it becomes difficult to conduct thorough patrols. Many landowners access their property across the NF, many without a permit. Some hunters and squatters have permanently placed campers at the end of dead end roads and along recreational trails.

Motorized users sometimes access permanent tree stands, bait stations, blinds and areas with motorized vehicle restrictions via OHV/ATV's and four-wheel drives on open, gated, or bermed roads. Activities such as parties and hunting camps often leave behind large amounts of garbage. These roads also provide an opportunity for individuals to collect forest products (i.e. firewood, moss, boughs, etc). Trash dumping along roadsides is also a problem in some areas.

Protection (PT)

PT(1): How does the road system affect fuels management?

The road system provides an escape route for Forest Service personnel and the public. The roads also serve as "safe zones".

The existing road system would provide safe access into the project area for both the firefighters and the public. It would also provide access for other means of reducing fuels such as timber harvest and firewood gathering.

PT(2): How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The road system provides access for personnel and equipment needed to suppress wildfires. The roads also serve as a firebreak.

PT(3): How does the road system affect risk to firefighters and to public safety?

The road system provides an escape route for Forest Service personnel and the public. The roads also serve as "safe zones".

PT(4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

Roads have potential for extensive impacts on airsheds as a result of deposition of aeolian (windblown) material (Foreman, Sperling, etal. 2002). Numerous studies exist to support this, although most apply to higher standard roads than are the focus of this exercise.

One Canadian study conducted in Ontario examined dust around logging (forestry) roads and the off-road ruts of log removal (skidder) equipment within a forest (Steedman and France, 2000). The results were however, that the amounts of aeolian sediment deposition observed were not likely to cause important changes.

The current road system contributes to airborne dust emissions generally when the surface type is aggregate or a non-asphalt material. The potential for airborne dust emissions increases when rainfall is low. This condition is also dependent on the volume of traffic on the dry road, with airborne dust emissions increasing as traffic increases. These effects are typically localized and temporary. Dust abatement chemicals or asphalt surface material can reduce airborne dust emissions that result in reduced visibility and human health concerns.

On the CNNF dust emissions have not been measured or studied on low volume roads. Both commercial and recreational traffic is moderate to light with sporadic higher levels during summer holidays.

Unroaded Recreation (RR)

UR(1): Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

The July, 2000 *CNNF Wilderness / Roadless Evaulation* determined the total CNNF wilderness area practical maximum capacity to be approximately 68,000 recreation visitor days (RVDs), and the total roadless area practical maximum capacity to be approximately 102,000 RVDs. The study estimated a wilderness area demand of approximately 19,000 RVDs per year for the years 2000-2010, and about 22,000 RVDs for the year 2040. The study determined an excess wilderness capacity of about 46,000 RVDs in the year 2040 (practical maximum capacity). Therefore, present CNNF wilderness and Semi-Private Non-Motorized (SPNM) area capacity more than meets the demand for such areas.

UR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

Development of new roads or upgrading maintenance levels of existing roads in unroaded areas would have a negative impact on the quality of unroaded recreation opportunities. Depending on the size and nature of the construction, it could have a detrimental effect on the quantity of opportunities as well. It would do great harm to the sense of solitude and what type of activity would occur in unroaded areas. If there were no other feasible alternative other than road construction, we must take into account the proximity of the area to congressionally designated wilderness and wild and scenic river corridors. Consultation of each areas individual management plan would be necessary before any of these activities would occur.

UR(3): What are the adverse effects of noise and other disturbances caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

Noise and other disturbances caused by road construction, maintenance, and use would greatly reduce the quality of non-motorized recreation experiences within unroaded areas.

UR(4): Who participates in unroaded recreation in the areas affected by constructing, maintaining, and decommissioning roads?

Roaded and low road density forest areas are likely to have low to moderate levels of day use hiking, mountain biking, cross-country skiing, and canoeing. The number of participants increases during the months of September, October, and November because the primary unroaded recreation is hunting. Constructing, maintaining, and decommissioning roads would affect these participants.

UR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

When roads are constructed and maintained within unroaded areas, people who frequent these areas will have the option of pursuing their non-motorized activities within any one of numerous designated wilderness areas, SPNM areas, and other designated closed road areas in the general forest area. Hunters traditionally have strong attachments to 'their hunting location', and may be reluctant to change locations. Those who participate in winter non-motorized activities may have a strong attachment to these areas. If they were displaced from these areas, there are other opportunities provided by neighboring communities and National Forests (Superior and Ottawa).

Road-Related Recreation (RR)

RR(1): Is there nor or will there be in the future excess supply or excess demand for roaded recreation opportunities?

Road-related recreation may include scenic driving, driving for pleasure, four-wheel driving, and ATV usage. The following information was excerpted from the "Analysis of the Management Situation for All Terrain and Off-Road Vehicles."

"According to WDNR data, the participation rate for ATVs in Wisconsin has risen 4-5% each year for the past several years. Usage projections for the near future predict double-digit increases. Near future usage projections for off-road trucks, dirt bikes, and snowmobiles are also expected to

increase significantly. Based on this information, the demand for ATV, off-road truck, and dirt bike opportunities on the CNNF will probably exceed what the forest supplies. It is anticipated that the supply of Forest Service snowmobile trails, in concert with county systems, will continue to meet future demand needs."

The purpose of the travel management rule is to address these needs while still providing a safe and enjoyable opportunity for all users of the National Forest.

RR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?

The development of new roads and any change in maintenance levels could have a substantial effect on the opportunities provided motorized recreationists. This could, in some cases, provide better access to areas or simply provide more miles of road and trail to enjoy. If roads were to be developed strictly for access and consists of a short spur road, the user would be seeing a higher quantity of roads available but the quality of the experience would come into question.

Decommissioning of the roads is out of the scope of this project. This will be done on a project by project basis as managers see fit.

RR(3): What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

Dust, noise and other disturbances caused by road construction and maintenance will decrease the quality of road-related activities. This may cause recreationists to refrain from using those areas, at least temporarily. Through proper signing of temporary closures and possible interpretation of what is being done to the roads and trails much of this could be mitigated.

RR(4): Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning?

People who own motorized vehicles may participate in roaded recreation. Examples of roaded recreation include scenic driving, driving for pleasure, four-wheel driving, and ATV usage. Road construction, maintenance, and decommission would affect these participants.

RR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

When roads are decommissioned and obliterated within previously roaded areas, people who frequent these areas may have the option of pursuing motorized activities within other areas or on other trails designated for motorized uses. This attachment may also be observed if any roads are closed or change maintenance levels. Other landowners, such as state, county, private, or corporate owners, may develop new or additional motorized opportunities if future motorized usage demand exceeds the existing road system motorized opportunities on the forest. The levels of attachment recreationists have to a specific area for motorized activities would determine their willingness to use alternative locations.

Passive-Use Value (PV)

PV(1): Do areas planned for road constructing, closure, or decommissioning have unique physical or biological characteristics, such as unique features and threatened or endangered species?

Any area that currently has a low road density is valuable for those species that are associated with low human disturbance, such as timber wolves and goshawks. Similarly, areas that are presently roaded, but will have roads closed or decommissioned can provide the same type of habitat in the future.

Ranger District opportunity area plans and site-specific project Environmental Assessments and Environmental Impact Statements identify physical features, T&E species, and other natural features; and evaluate the impacts of future forest road entries, closures, and decommissioning.

The CNNF has known occurrences of three Federally listed species: bald eagle, gray wolf, and Fassett's locoweed. In addition, there are known occurrences of RFSS. Some examples of RFSS include northern goshawk, red-shouldered hawk, cerulean warbler, ginseng, and goblin fern. Several natural communities are classified as globally rare (G3), including northern dry forest, northern wet-mesic forest, and boreal forest. Pine Barren communities are classified as globally imperiled (G2). The forest occurs within a band across the western Great Lakes, which contains the highest diversity of breeding bird species in the country. The CNNF is considered to be a source of breeding birds for the Midwest. The American Birding Association recently designated the forest as a Globally Important Bird Area (IBA). The forest is also home to a translocated elk herd and an increasing number of moose.

PV(2): Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

The process undertaken regarding the TMR would not result in the construction of, or decommissioning of any roads on the CNNF. The process could result in the elimination of motorized access on certain roads, which could in a sense be considered closure. To date there are no known, unique cultural, traditional, symbolic, sacred, spiritual, or religious uses that have been identified or brought to the attention of the Forest Service, that would be affected by roads that may ultimately be considered closed to motorized access. Numerous Native American Indian Tribes have treaty rights within the CNNF, but again, no unique significance has been identified or brought forward. Native American Indian Tribes could use the entire area for gathering of traditional materials, but this would not be a "unique" use to the area.

In the event that something of unique significance were discovered or brought to the attention of the Forest, thorough consideration would be given and appropriate changes made to the analysis recommendations.

PV(3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for area planned for road entry or road closure?

See PV2: Specific cultural, symbolic, spiritual, sacred, traditional, and religious values for proposed changes in motorized access are not known at this time. Native American communities may have specific concerns about some of these areas. There have been no specific passive value uses identified by the tribes on the CNNF to date that would be affected by road entry or road closure.

In the event that one or more of these unique values were discovered or brought to the attention of the Forest, thorough consideration would be given and appropriate changes made to the analysis recommendations.

PV(4): Will constructing, closing, or decommissioning roads substantially affect passive-use value?

Effects of changes to the CNNF road system or changes in use, on passive-use values are difficult to measure, due largely to the fact that passive-use value is a non-market value.

Natural resource economists have invested much effort over the last several decades to develop and test methods for estimating non-market values. The methods can produce useful information, but are very costly and their validity has not yet been demonstrated sufficiently to satisfy many economists (USDA FS 2000c).

Considering the extent of roads on the CNNF, some changes to the road system may not have a major effect on passive use values forest-wide. However, without providing an alternative means of access, micro scale passive use values can be noticeably altered for the major cultural groups in the forest by site-specific road changes. Areas planned for motorized use or road closure may have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance. The degree of significance would have to be determined during a project level road analysis.

Social Issues (SI)

SI(1): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

In general, peoples perceived needs depend on the uses they make of the forest and its transportation system. Two directly opposing viewpoints regarding the need for and value of roads have arisen on the CNNF. They are to provide additional roads as open to motorized vehicles and ATV's vs. reducing the current amount of roads as open to motorized vehicles and ATV's. Historically, use of roads on the Forest has been for a variety of reasons, but primarily tied to motorized use of the roads. The primary perceived (and real) motorized uses of roads include access to private lands; access to areas used for hunting, fishing, special products gathering, camping, and other recreational activities; recreational enjoyment derived from driving (e.g. auto-tours or ATV routes); and as an ingress and egress necessity (into and out of the Forest or geographic portion of the Forest). The perceived need and value for roads on the CNNF is much greater for those groups and individuals who use the roads on a regular basis versus those who feel a sense of ownership in National Forest lands, but may never actually visit or those who live near and/or use the Forest, but don't use many of the roads.

Road management proposals (especially closures) seem to catalyze interest from the public regarding their perceived dependence upon, need for, and desire for roads.

SI(2): What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

Due to the current publicity generated by opponents and supporters of the Travel Management Rule (36 CFR Parts 212, 251, 261, and 295) and 2004 Forest Plan implementation, there is a heightened awareness of the issues dealing with motorized access. Snowmobile and ATV enthusiasts, some

types of hunters and gatherers, and some general recreational enthusiasts are strongly opposed to any loss of motorized access. On the other hand, silent sport enthusiasts, some other types of hunters, some other general recreational enthusiasts and many environmentalists are just as strongly opposed to any increase or even retention of existing motorized access. Historically this area has had ample motorized access. Closing large additional portions of the road and trail system would be met with both support and opposition.

SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?

Over 2,400 cultural resources (i.e., "archaeological or historical sites") have been recorded within or immediately adjacent to the boundaries of the Chequamegon-Nicolet National Forest (CNNF). Most have been discovered through cultural resource surveys which continue on an annual basis. These surveys often result in documentation of 60 or more previously unrecorded resources each year.

Determining the road system's potential effects to cultural resources reflects direction provided in the National Historic Preservation Act of 1966 (NHPA), as amended (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470). NHPA Section 106 directs all Federal agencies to take into account effects of their undertakings (actions, financial support, and authorizations) on properties determined eligible, or potentially eligible, for the National Register of Historic Places. Specifically, 36 CFR 800, Protection of Historic Properties, provides clarification regarding criteria of effect (36 CFR 800.5(1)), and includes those "reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or cumulative."

Addressing the question of potential risk is done in accord with NHPA direction. Specifically, roads are considered "areas of potential effect" and as stated in 36 CFR 800.16, "area of potential effect means the geographical area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." Simply stated, operation of a road through a recorded cultural resource site may likely render disturbance, that is, a direct effect. Further, operation of a road near a recorded cultural resource improves access and increases the possibility of looting or vandalism, and for this reason poses an indirect effect. Consequently, a ML 1 or ML 2 road's distance from a recorded cultural resource is an appropriate measure of risk factor.

Regarding the question of effects to paleontological resources, resources of this nature have not been recorded within the CNNF largely due to the geologically recent nature of the forest's landscape.

SI(4): How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

See also PV02, PV03, and PV04. While no specific roads within CNNF have been identified (to date) as providing historic access to cultural or traditional uses of the forest, or as avenues for exercising treaty rights, it is known that motorized access (in general) for such uses of the forest is important to tribal members. If any specific areas of the CNNF are identified as important to Tribes, a transportation system that provides reasonable motorized access to those areas would be important, especially with regard to hunting and gathering.

SI(5): How are roads that constitute historic sites affected by road management?

Some CNNF roads can be categorized as historic in that they were developed and/or utilized prior to the establishment of the CNNF. Oftentimes these roads are categorized as Management Level 1

(ML1) or Management Level 2 (ML2) roads. Such categorization is consistent with NHPA direction. Historic roads may include old railroad grades abandoned in the early 20th century and now utilized as ML 1 or ML 2 roads. They may also include wagon roads that once linked 19th century communities, or historic Indian trails that once traversed the Forest landscape. Instances of both of these types of transportation features have been recorded as cultural resources. Historic roads and trails that have been improved for contemporary use have, almost certainly, been adversely affected.

SI(6): How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

The CNNF has an existing motorized trail system that in many instances follows old road locations and is accessed by the current transportation system. Tourism is often associated with these motorized uses (including hunting). Northern Wisconsin communities rely heavily on the economic benefits, as well as social benefits derived from this motorized recreational tourism.

Wood products are also an important part of the economic health for communities and counties in and around the Forest. Transportation systems can affect the ability to economically move products from the Forest to processing locations. This includes timber products as well as other commercial collections that occur.

SI(7): What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values?

Northern Wisconsin communities appear to have low economic dependence on unroaded areas, as evidenced by low visitor traffic for wilderness, wilderness study areas, and SPNM areas. The general "mood" of the communities within and near the forest supports the present amount of wilderness, but generally does not support taking more land out of timber production by creating wilderness study areas and more SPNM areas. Also, most of the recreation revenue generated in local communities is the result of activities that largely depend on motorized access (hunting, fishing, snowmobiling, ATV activities, and lodging).

Some local communities tend not to "value" unroaded areas as much as roaded areas. Motorized access, along with timber access and income from road taxes, are perceived as "multiple use" and preferred over unroaded areas.

SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

Wilderness areas on the Chequamegon-Nicolet NF are often surrounded by well traveled roads. Area integrity, natural appearance, and opportunities for solitude and recreation can be significantly affected by how perimeter roads are managed. The management of roads that border or cross wilderness areas certainly affects wilderness attributes. Scaled down maintenance, such as allowing tree canopies to grow over the roads, improves the adjacent wilderness appeal. Allowing vehicles that produce higher decibels, such as Off Highway Vehicle (OHVs), to have access to the roads that border the wilderness areas would have a great effect on user solitude than a regular street legal vehicle.

SI(9): What are traditional uses of animal and plant species in the area of analysis?

Roads provide access on the CNNF for gathering, hunting, fishing, and trapping. Hunting fishing and trapping appear to be the primary traditional uses of animals, although bird watching is

becoming increasingly popular. Most hunting activity focuses on white-tailed deer, ruffed grouse, and black bear. Trapping occurs in late autumn and throughout most of the winter months for muskrat, mink, fisher, otter, beaver, coyote, and bobcat.

Traditional use of plants is primarily for collection of special forest products (see SP01). Other uses of plants are collection for personal use.

SI(10): How does road management affect people's sense of place?

Road management is a primary factor of the CNNF traditional "sense of place." Ties to the land are based on the lifestyles and historical use of people that live in and near the Forest. The forest is dedicated to multiple uses of resources including timber management, big and small game hunting, trapping, fishing, and an extensive motorized (ATV and snowmobiles) and non-motorized trail system.

The Forest as a whole is moderately to heavily roaded, and to some traditional users it provides a roaded "sense of place" with a strong preference to keep the amount of access about the same. There are other users of the area that find that roads interfere with their experience of the forest and wish to see little or no road development as well as road closure and decommissioning. Many low standard roads on the CNNF are closed to highway vehicles when not actively being used for a project. These road closures allow access to the National Forest while giving the area some sense of "remoteness" for those who value that experience.

Civil Rights and Environmental Justice (CR)

CR(1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?

Although the road system and its management does not provide specific accommodations for persons with disabilities, the roads in the Twin Ghost/Moose analysis area are being used by all groups of people (including minority, ethnic, cultural, racial, disabled or low-income). To the best of our knowledge, the current road system and its management are not impacting the civil rights of any group.

One known major ethnic group that has expressed concern about the analysis area's transportation system is the local Ojibwa tribes, represented by the Great Lakes Indian Wildlife and Fisheries Commission. These people are concerned that the Forest Service may close roads that they use to gather different treaty resources as addressed in the Forest Service/Tribal MOU.

CHAPTER 5 DESCRIBING OPPORTUNITIES AND SETTING PRIORITIES

Introduction

A total of 1052 roads were originally considered under this analysis. Additional roads have been identified and have been measured against the benchmark set by the original 1052 roads. Presumably, each of these roads serves a given function or functions, and therefore provides some 'value' to the National Forest road system. As an example, a road that provides access to an area with a valuable timber resource has a certain value relative to its use in timber management operations. This same road may also provide access to a commonly used recreation area, administrative building, or a network of smaller roads, and thereby have multiple values.

In addition to its value, a road may also carry with it one or more risks, if its continued use and management results in impacts to forest resources. For example, if a road routinely delivers high volumes of sediment to a nearby stream, its continued use and management may be considered to pose a certain level of risk to nearby aquatic communities. As with the values described above, the continued use and maintenance of a given road may pose risks to different types of resources, such as wildlife resources or the spread of non-native invasive species.

The values of a road, and the risks that may be associated with that road, are the two key considerations for determining road management priorities. Accordingly, the evaluation of the values and risks of roads was the basis upon which the ID team assessed each of the 1052 roads initially considered under this RAP. The process is described in the following section.

Identifying Management Opportunities

Each maintenance level (ML) 1 and 2 road within the analysis area was assessed for its value (high, moderate, or low) with respect to its function in:

- Providing access to private in-holdings,
- providing access to hunting, recreation and/or gathering opportunities,
- providing access for administrative purposes, including timber

Likewise, each road was evaluated for the risk (high, moderate, low, or very low) it posed to:

- water resources (aquatic/water quality);
- the spread of NNIS;
- threatened, endangered, and sensitive wildlife species;
- threatened, endangered and sensitive plant species; and
- soils
- reference areas
- Heritage sites

Road value and risk ratings (high, moderate, low, or very low) were assigned numeric equivalents (5, 3, 1, or 0, respectively). For each road, the value ratings (private access, recreation access, administrative access) were added up, to obtain a Total Value rating. Similarly, risk ratings for each road were summed to obtain a Total Risk rating. An example is illustrated below in Figure 5-1.

Road # W217306	Relative Value/Risk Rating	Numeric Value/Risk Rating
Public Access Value	High	5
Private Access Value	High	5
Administrative Access Value	High	5
Soils Risk	Moderate	3
Reference Areas Risk	Low	1
(TES) Plants Risk	Very Low	0
(TES) Wildlife Risk	Very Low	0
Aquatic/Water Quality Risk	Low	1
NNIS Risk	Very Low	0
Heritage Risk	Very Low	0

Total Value = 5 + 5 + 5 = 15

Total Risk = 3 + 1 + 0 + 0 + 1 + 0 + 0 = 5

Figure 5-1. Road Ranking Example

Among the 1052 roads in the analysis, the total value ratings ranged from 0 to 15 with an average of 7.40. Total risk ratings ranged from 0 to 32 with an average of 7.20. Ratings for each of the 1052 roads are presented in Appendix A.

Average ratings were used to place the roads into four categories:

1. High Value - Low Risk;

2. High Value - High Risk;

3. Low Value - High Risk; or

4. Low Value - Low Risk.

That is, a road with an above-average value, and a below-average risk would fall into Category 1, and so on. On a graph, these groupings lie in four sectors around the average values and risks:

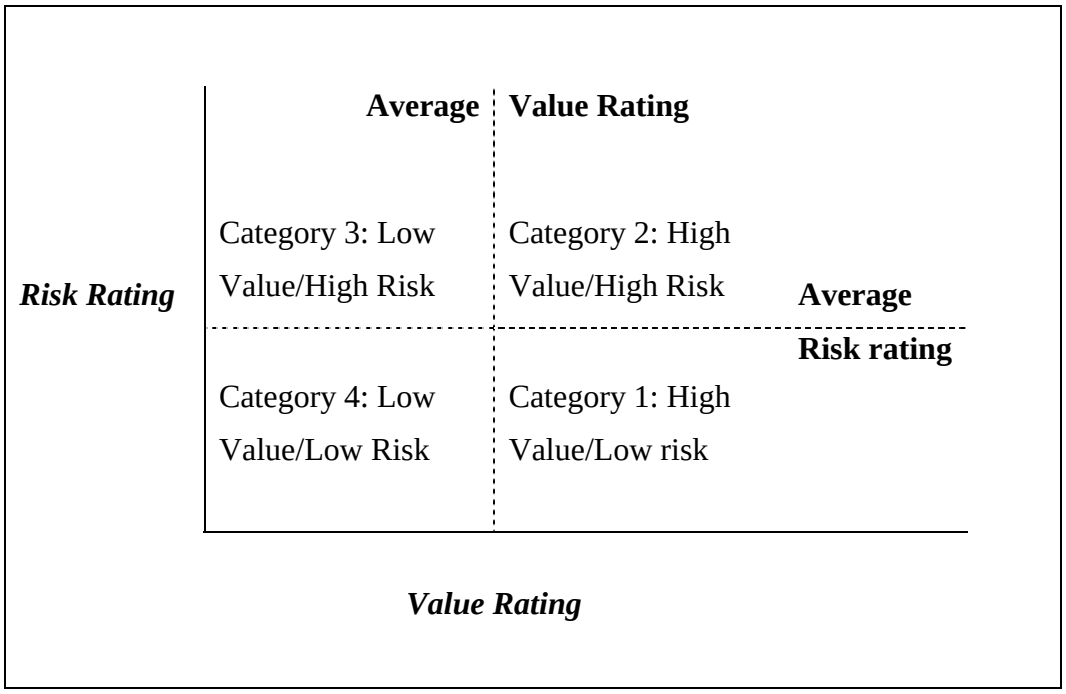

Figure 5-2. Value/Risk Categories

Based on the graph, each sector depicts the four categories of management priority.

Road Management Categories

Each of the four road management categories have a different priority for road system managers and therefore include different potential management options. The categories and their associated potential management options are listed in the following section.

Category 1: High Value and Low Risk: Ideal Situation

Options:

- Focus road maintenance funds on these roads to keep them in this category.
- These roads form part of the potential minimum road system for the project area.
- These roads are best suited for motorized mixed use.

Category 2: High Value and High Risk: Priorities for Capital Improvements

Options:

- High priority for reducing potential risks.
- High priority for road improvement, road relocation, capital improvement program, etc.
- Shift road maintenance funds to these roads to keep their resource risks from increasing.

• These roads are also part of the potential minimum road system for the project area.

• These roads may be suitable for motorized use.

Category 3: Low Value and High Risk: Priorities for Risk Analysis and Closure

Options:

• High priority for detailed risk assessment.

• Potential for closure and/or reducing maintenance level.

• Least suitable for motorized use due to risk.

Category 4: Low Value and Low Risk: Priorities for reducing Maintenance Level

Options:

• Lowest priority for expending annual road maintenance funding.

• Moderate potential for reducing maintenance level.

• Where there is a recreational demand, convert these roads to trails.

• These roads may be suitable for motorized use if public value warrants.

Values and Risks of the Current Road System

The protocols and available data utilized to assign values and risks to each road are described below. The complete road-by-road ratings are provided in Appendix A.

Road Related Values

Public Access Value

This access factor is based on the extent of public use by passenger cars, motor homes, pickups, etc. (such as for recreation, berry picking, firewood cutting, forest products gathering, etc.) for road segments. Road segments are rated on the type of public uses the segment serves such as access to dispersed or developed recreation sites (campgrounds, trailheads, viewing areas, etc.) and traditional uses (woodcutting, forest products gathering, hunting, etc.).

Available data used during the evaluation of this category included:

- Recreation areas
- Road locations
- Local knowledge of dispersed recreation and/or gathering use from ID team members.
- Analysis area reconnaissance notes from engineering staff.

Evaluation Criteria

High Value (5): Road is a primary motorized access route.

Moderate Value (3): Road has an established traditional motorized use for non-developed recreation and/or gathering (birch bark, hunting, berry picking, seed source etc.).

Low Value (1): Road segment is blocked to use by motorized vehicles and only provides access for non-motorized dispersed recreation/gathering use.

Very Low (0): Road has no traditional established use.

Table 5-1 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-1. Summary of Public Access Value from Roads

Public Access Value	Number of Roads
High	274
Moderate	565
Low	65
Very Low	148
Total	1052

Private Access Value

The road system provides access to many different types of landowners, power lines, rock sources, communication sites, and other special use permit sites. When the road provides access to other landowners, the Forest Service is obligated to provide for reasonable access if there are no other options. Because of the need to provide and manage this access, this factor is heavily weighed.

Available data used during the evaluation of this category included:

- Special use permits
- Road locations
- Land ownership

Evaluation Criteria

High Value (5): Road segment serves as the primary access to non-Forest Service managed land, and/or a special use permit site (power line, communication site, private rock source, etc).

Moderate Value (3): Road segment serves as an alternate access to non-Forest Service managed land, and/or a special use permit site (power line, communication site, private rock source, etc.)

Low Value (0): Road segment does not contribute in any way or provide access to non Forest Service managed land, and/or a special use permit site (power line, communication site, private rock source, etc.).

Table 5-2 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-2. Summary of Private Access Value from Roads

Private Access Value	Number of Roads
High	137
Moderate	118
Low	797
Total	1052

Administrative Access Value

Roads with administrative value are based on the extent of Forest Service use for administrative needs which include: administrative sites, heritage sites, repeater sites, special use sites, weather stations, ecosystem management, and fire activities.

Available data used during the evaluation of this category included:

- Road Locations
- ID team knowledge of maintained sites
- Timber stand inventory
- Special Use Permits

Evaluation Criteria

High Value (5): Road segment serves as the primary access to Forest Service administrative sites, heritage sites, repeater sites, weather stations, fire activities, special use sites, or ecosystem management.

Moderate Value (3): Road segment serves as an alternate access to Forest Service administrative sites, heritage sites, repeater sites, weather stations, fire activities, special use sites, or ecosystem management.

Low Value (0): Road segment does not contribute, in any way, to access to Forest Service administrative sites, heritage sites, repeater sites, weather stations, fire activities, special uses, or ecosystem management.

Table 5-3 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-3. Summary of Administrative Access Value from Roads	
Administrative Access Value	**Number of Roads**
High	562
Moderate	282
Low	208
Total	1052

Road Related Risks

Risk to Soils

This risk is based on the propensity for transportation corridors to facilitate compaction rutting and erosion. The potential impacts are dependant on the type of soils and slope class.

Available data used during the evaluation of this category included:

- Road Locations
- ELTP soil types
- Digital Elevation Models (DEM)

Evaluation Criteria

Low Risk (1): soil drainage class – well, somewhat excessive, excessive; and soil surface texture – fine sand, sand, loamy sand, loamy fine sand, sandy loam, gravelly sandy loam, very cobbly sandy loam, loam; and equipment use rating – slight compaction; and rutting risk – slight ; and slope class – 0-1, 0-2, 0-3, 0-4, 0-5, 0-6, 1-6, 2-6, 5-10, 6-12, 1-15, 4-15, 6-15.

Moderate Risk (3): soil drainage class – moderately well or well, and soil surface texture – fine sandy loam, very fine sandy loam, or silt loam; and equipment use rating – moderate; and compaction and rutting risk – moderate; and slope class – 0-18, 6-20, 10-20, 12-20, 15-24, 0-30, 4-30, 10-30, 15-30, 10-35, 15- 35, 18-35.

High Risk (5): soil drainage class - somewhat poor, poor, or very poor; and soil surface texture – any texture; and equipment use rating – severe; and compaction and rutting risk rating – severe; and slope class – 15-45, 20-45, 4-60; and all hydric soils.

Table 5-4 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-4. Summary of Soils Risk from Roads	
Soils Risk	**Number of Roads**
High	46
Moderate	643
Low	363
Total	1052

Risk to Reference Areas

Reference area risk rankings were developed based on location of roads within reference areas or proximity to those areas.

Available data used during the evaluation of this category included:

- GIS Road Locations
- Reference Area Inventory

Evaluation Criteria

No Risk (0): no impact.

Low Risk (1): Within 1 mile

Moderate Risk (2): Within ½ mile

High Risk (3): Located within MA 8

Risk to Aquatic/Water Quality

Aquatic and water quality risk rankings were developed based on the in FS-643, Roads Analysis: Informing Decisions about Managing the National Forest Transportation System and examples from western National Forests including the Olympic National Forest. A number of individual rankings were considered and combined to provide one ranking for aquatic species, water quality and hydrology. The percentage values for each rank were developed by looking at topographic maps for a few hours, making approximate measurements to get a feel for the ranges that are likely to occur across the Forest and by using professional judgment regarding the potential for impacts to aquatic ecosystems. It is expected that these percentages could change as analyses are completed and gain experience using them. Some of the rationale for each item is provided below.

Stream Crossings: At each location that a road crosses a stream there is a potential for impacts to the aquatic ecosystem. These potential impacts include sedimentation from road surfaces, ditches and culvert failure; upstream channel aggradations from culverts set too high; restricting the upstream movement of fish and other aquatic organisms because water in the culvert is too fast, too shallow or there is a drop at the outlet; and upstream channel down cutting from straightening of streams at crossings. As the number of stream crossings increase, the potential for aquatic impacts

increases. In addition, stream crossings are costly to construct and maintain. The highest road stream crossing densities on the Forest are probably in the range of 3-4 per mile of road.

Riparian Zone: Roads located in riparian areas can be sources of sediment and, where they parallel streams, can permanently remove riparian vegetation and the floodplain. Wisconsin's Forestry Best Management Practices call for no roads or skid trails within riparian management zones (i.e., within 100 feet of streams or lakes) except where they must cross a stream. Therefore, a road should only exist in a riparian area where it must cross a stream and the potential for adverse impacts to aquatic ecosystems increases any place where more than a small percentage of a road is in a riparian area.

Wetland: Roads primarily affect wetlands by restricting cross drainage and changing the type of wetland that occurs above and below the road. They can also result in the direct loss of wetland where road fill is placed in the wetland.

Hydrologic Connection: This includes any road segment that, during a runoff event, has a continuous surface flow path between any part of the road prism and a natural stream channel or water body. This measure identifies road segments that can accelerate runoff, deliver road-derived sediments and where road-associated spills or applied chemicals are likely to be delivered to streams or lakes. Hydrologic connection will tend to increase with increasing intensity of rainfall or snowmelt and with increasing antecedent soil moisture conditions. Hydrologic connectivity is best determined in the field but can be estimated from topographic and soil maps based on nearness to water bodies, slope and soil type.

Available data used during the evaluation of this category included:

- Road Locations
- Topographic maps
- Road/stream crossing inventory
- Road/stream crossing inventory

Evaluation Criteria

Very Low Risk (0): No stream crossings; or, no length within riparian zone (within 100 ft of water body); or, no length in wetland; or, no hydrologic connection.

Low Risk (1): >0-1.5 stream crossings/mile; or, >0-5% length within riparian zone (within 100 ft of water body); or, >0-25% length in wetland; or, >0-10% hydrologically connected to water bodies.

Moderate Risk (3): >1.5-3 stream crossings/mile; or, >5-10% length within riparian zone (within 100 ft of water body); or, >25-50% in wetland; or, >10-20% hydrologically connected to water bodies.

High Risk (5): >3 stream crossings/mile; or, >10% length within riparian zone (within 100 ft of water body); or, >50% in wetland; or, >20% hydrologically connected to water bodies.

Table 5-5 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-5. Summary of Watershed Risk from Roads	
Aquatic Risk	**Number of Roads**
High	104
Moderate	186
Low	156
Very Low	606
Total	1052

Non-Native Invasive Species (NNIS) Risk

This risk is based on the propensity for transportation corridors to facilitate the spread of non-native invasive species (NNIS). At locations in which an NNIS is present, there is potential for biological and ecological impacts. The potential impacts are dependant on the type of species, and impacts are often greater along existing roadways and at locations that have soil disturbance.

Available data used during the evaluation of this category included:

- Road Locations
- NNIS location inventories

Evaluation Criteria

Very Low Risk (0): No significant biological or ecological effects anticipated from NNIS.

Low Risk (1): Benign non-natives present, but not invasive or aggressive species.

Moderate Risk (3): Less than 10% of the road length has presence of NNIS on one or both sides; or, limited biological or ecological effects anticipated within existing clearing only.

High Risk (5): More than 10% of road length has presence of NNIS on one or both sides; or, serious biological or ecological threat beyond clearing.

Table 5-6 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-6. Summary of NNIS Risk from Roads	
NNIS Risk	**Number of Roads**
High	28
Moderate	73
Low	0
Very Low	951
Total	1052

Risk to Threatened, Endangered, and Sensitive (TES) Wildlife Species

Many scientific studies have documented impacts of roads on wildlife, including direct mortality, habitat loss and/or reduced available habitat due to road avoidance, habitat fragmentation, edge effects, increased competition and predation from edge-associated species, population isolation, nesting and rearing disturbances, and reduced habitat effectiveness. All of these impacts can adversely affect the viability and sustainability of wildlife populations.

Available data used during the evaluation of this category included:

- Road locations and inventory.
- Known, breeding, denning, and nesting site locations.

Evaluation Criteria

Very Low Risk (0): Road is not present within ½ mile of a nesting, denning, or breeding site for TES wildlife.

Low Risk (1): Road lies within ½ mile of a nesting, denning, or breeding site for TES wildlife.

Moderate Risk (3): Road lies within 1320 feet of nesting, denning, or breeding site for TES wildlife.

High Risk (5): Road lies within 660 feet of a nesting, denning, or breeding site for TES wildlife.

Table 5-7 summarizes the rating results for project related roads. Road-by-road ratings are provided in Appendix A.

Table 5-7. Summary of TES Wildlife Risk from Roads

TES Wildlife Risk	Number of Roads
High	37
Moderate	63
Low	130
Very Low	822
Total	1052

Risk to Threatened, Endangered, and Sensitive (TES) Plant Species

As with wildlife many scientific studies have documented impacts of roads on TES plant life, including habitat loss and/or reduced available habitat due to habitat fragmentation, edge effects, increased competition from edge associated species, population isolation, and reduced habitat effectiveness. All of these impacts can adversely affect the viability and sustainability of TES plant populations.

Available data used during the evaluation of this category included:

- Road locations relative to known TES plant occurrences.

Evaluation Criteria

Very Low Risk (0): Road is not present within ½ mile of a documented TES plant occurrence.

Low Risk (1): Road lies within ½ mile of a documented TES plant occurrence.

Moderate Risk (3): Road lies within 1320 feet of a documented TES plant occurrence.

High Risk (5): Road lies within 660 feet of a documented TES plant occurrence.

Table 5-8 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-8. Summary of TES Plant Risk from Roads

TES Plant Risk	Number of Roads
High	15
Moderate	138
Low	106
Very Low	793
Total	1052

Heritage Risk

For purpose of this analysis, ML 1 and 2 roads are considered "areas of potential effect," and as stated in 36 CFR 800.16, "area of potential effect means the geographical area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." Simply stated, operation of a road through a recorded cultural resource site may likely render disturbance, that is, a direct effect. Further, operation of a road near a recorded cultural resource improves access and increases the possibility of looting or vandalism, and for this reason poses an indirect effect. Consequently, a ML 1 or ML 2 road's distance from a recorded cultural resource is assumed to be the appropriate measure of risk factor.

Available data used during the evaluation of this category included:

- Road locations
- Known Heritage Sites

Evaluation Criteria

Very Low Risk (0): No cultural resource located within 400 meters of road.

Low Risk (1): Cultural resource located between 200 – 400 meters of road.

Moderate Risk (2): Cultural resource located between 100 – 200 meters of road

High Risk (3): Cultural resource located between 50 – 100 meters of road

Very High (4): Cultural resource located within 50 meters of road, bisected by a road, or road is a designated cultural resource.

Table 5-9 summarizes the rating results for project-related roads. Road-by-road ratings are provided in Appendix A.

Table 5-9. Summary of Heritage Risk from Roads	
Heritage Risk Value	**Number of Roads**
Very High	77
High	61
Moderate	67
Low	154
Very Low	693
Total	1052

Risk/Value Analysis Results

The following graph and figures depict the results of the value and risk analysis as described in the introductory sections of this chapter.

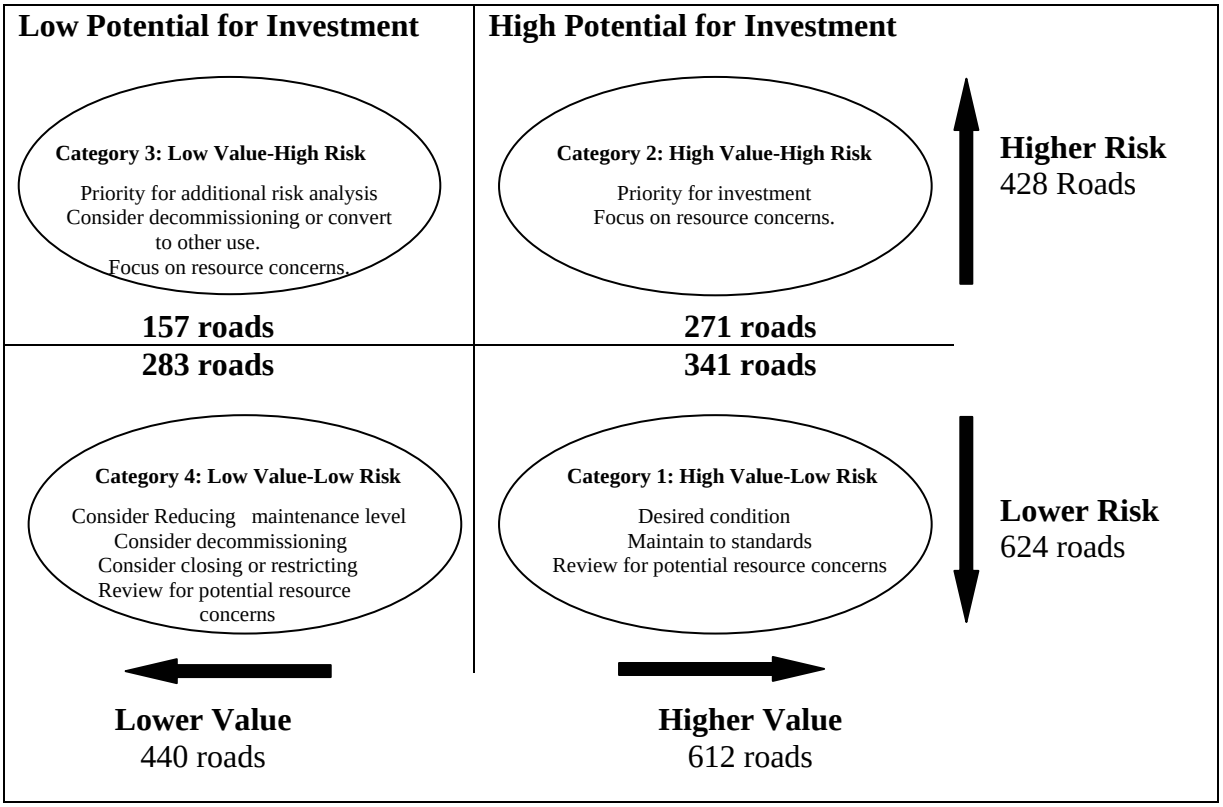

Figure 5-4. Number of Roads in Each Value Risk Category

Each Ranger District is displayed on the following pages, with analysis roads, color coded by risk/value or management category.

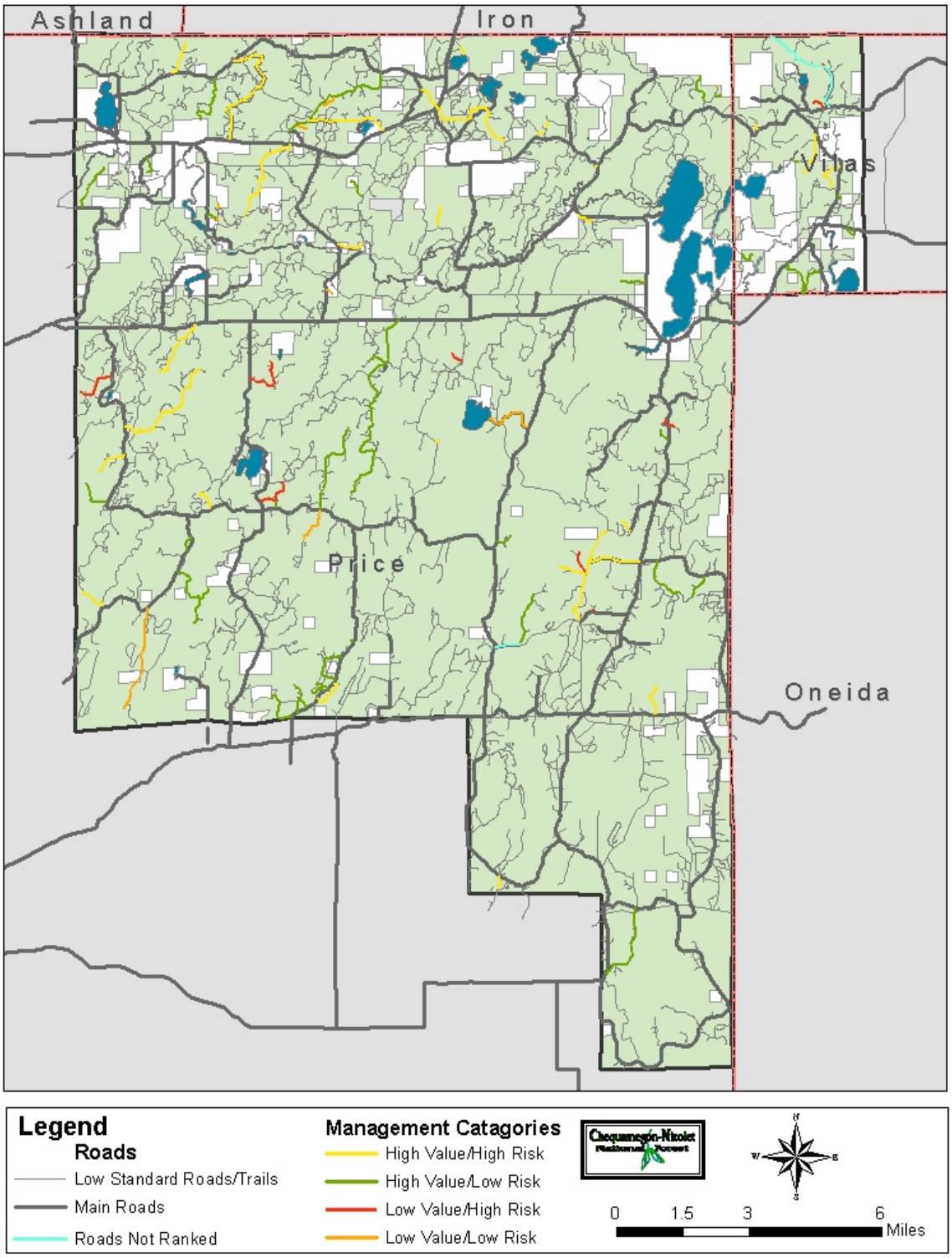

Figure 5-5a. Analysis Roads by Management Category – Park Falls Landbase

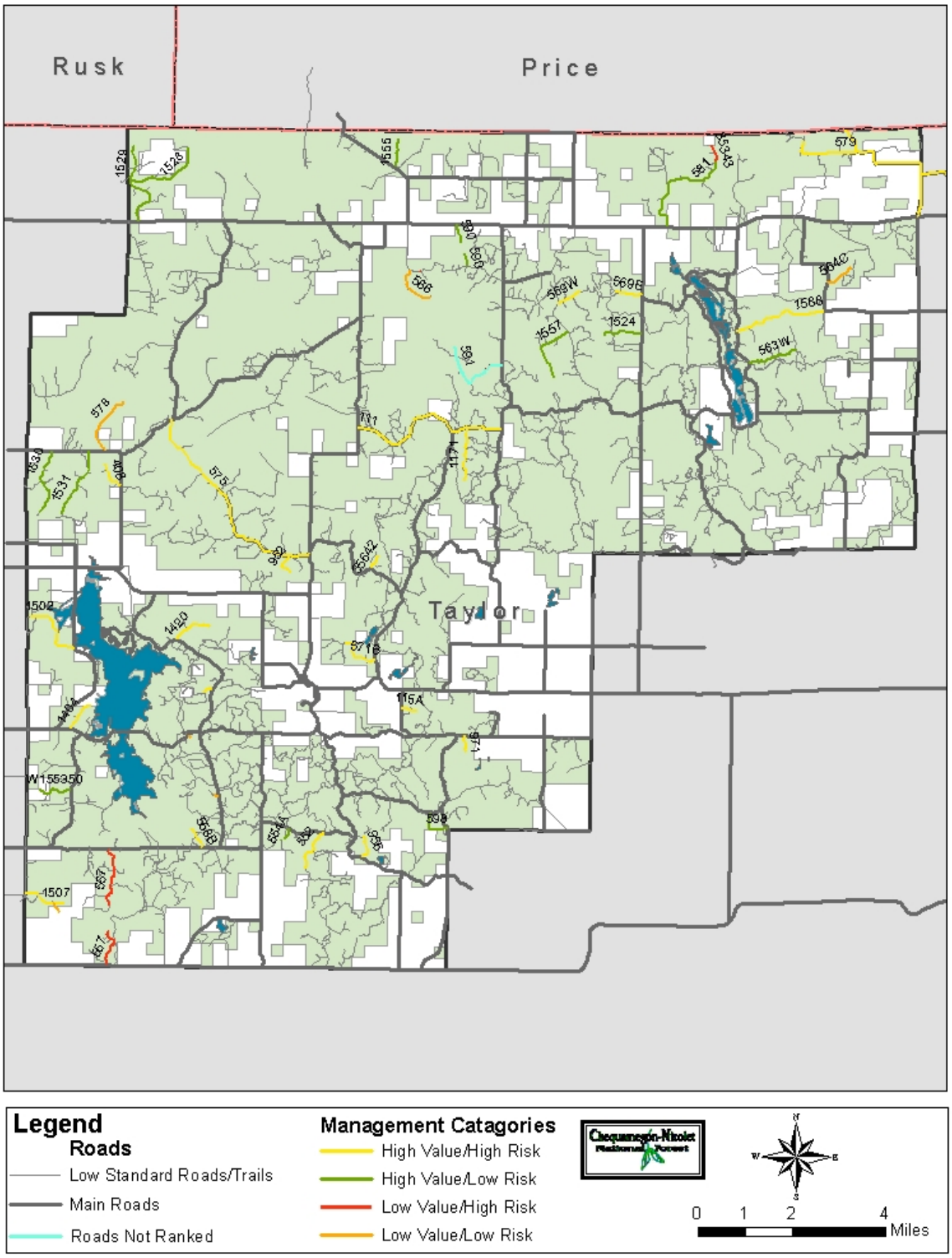

Figure 5-5b. Analysis Roads by Management Category – Medford Landbase

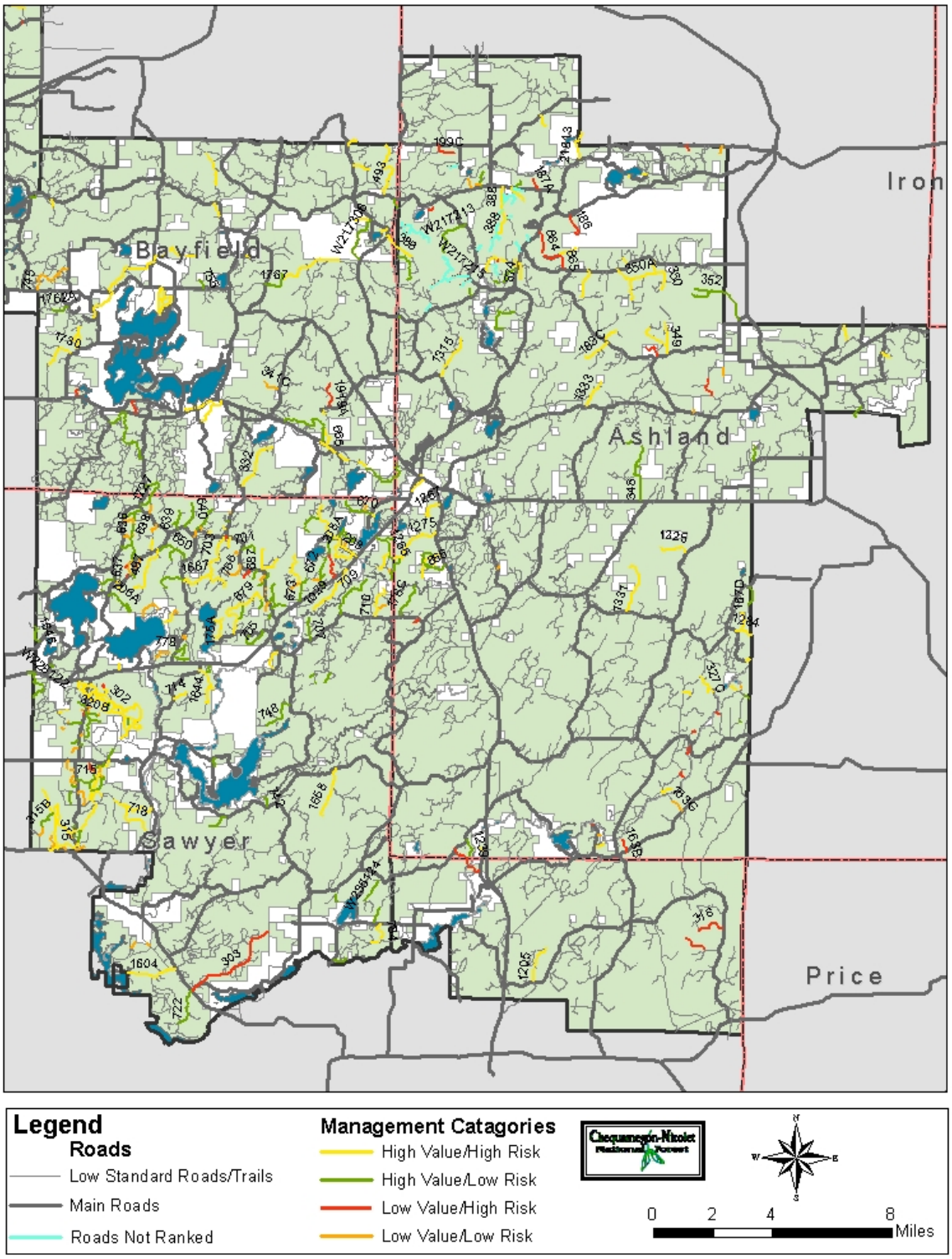

Figure 5-6. Analysis Roads by Management Category – Great Divide Ranger District

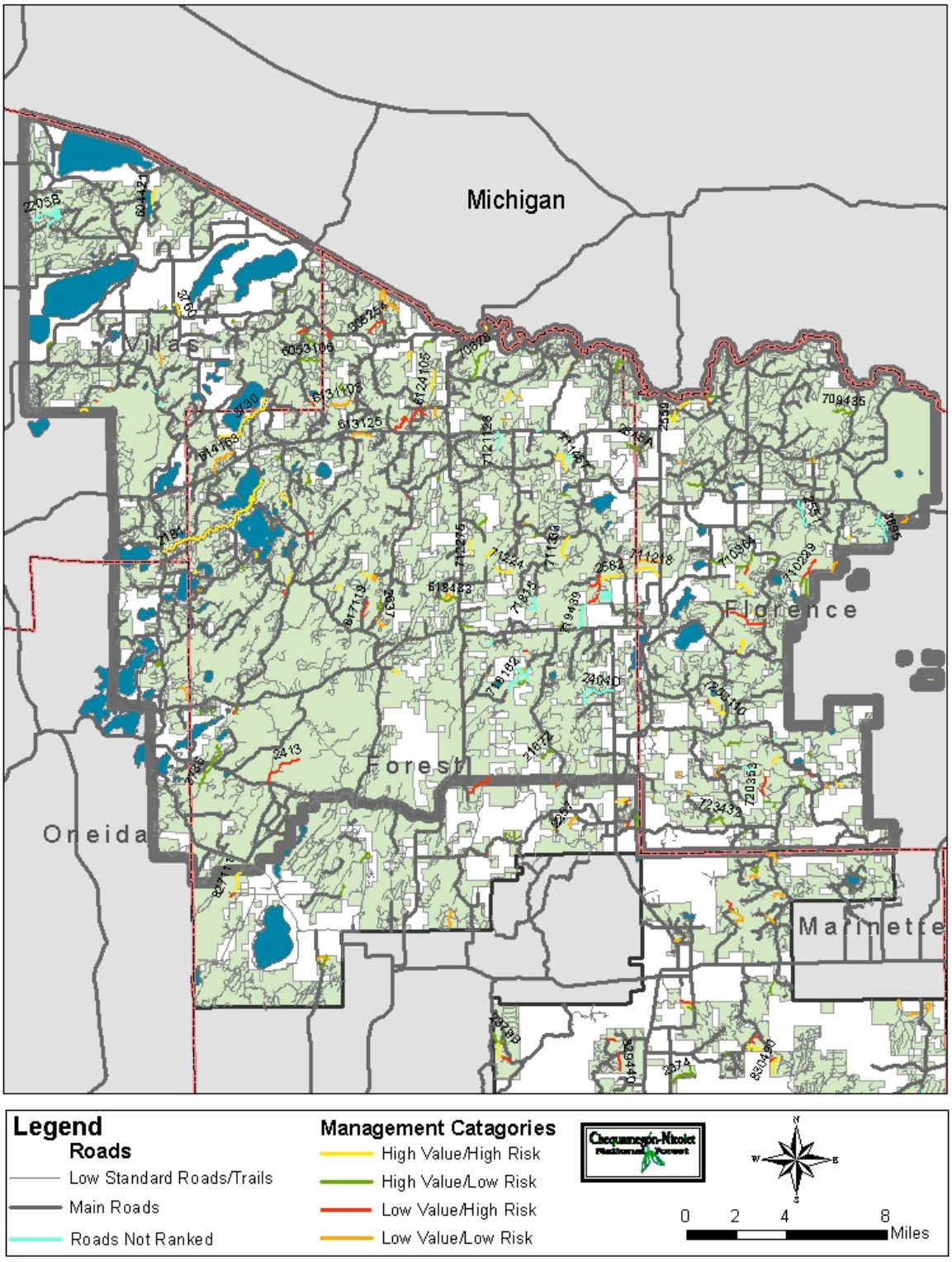

Figure 5-7. Analysis Roads by Management Category – Eagle River/Florence Ranger District

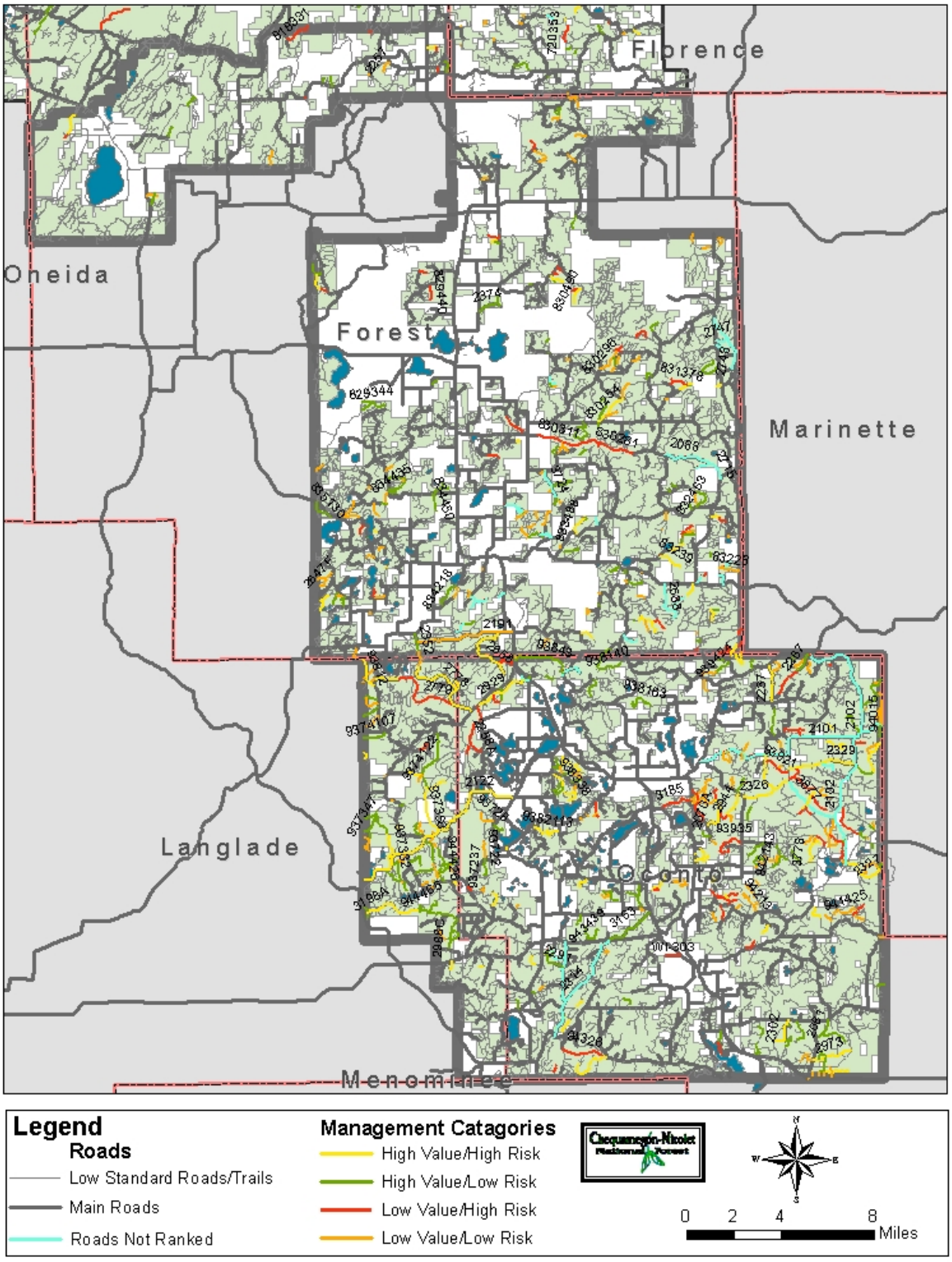

Figure 5-8. Analysis Roads by Management Category – Lakewood/Laona Ranger District

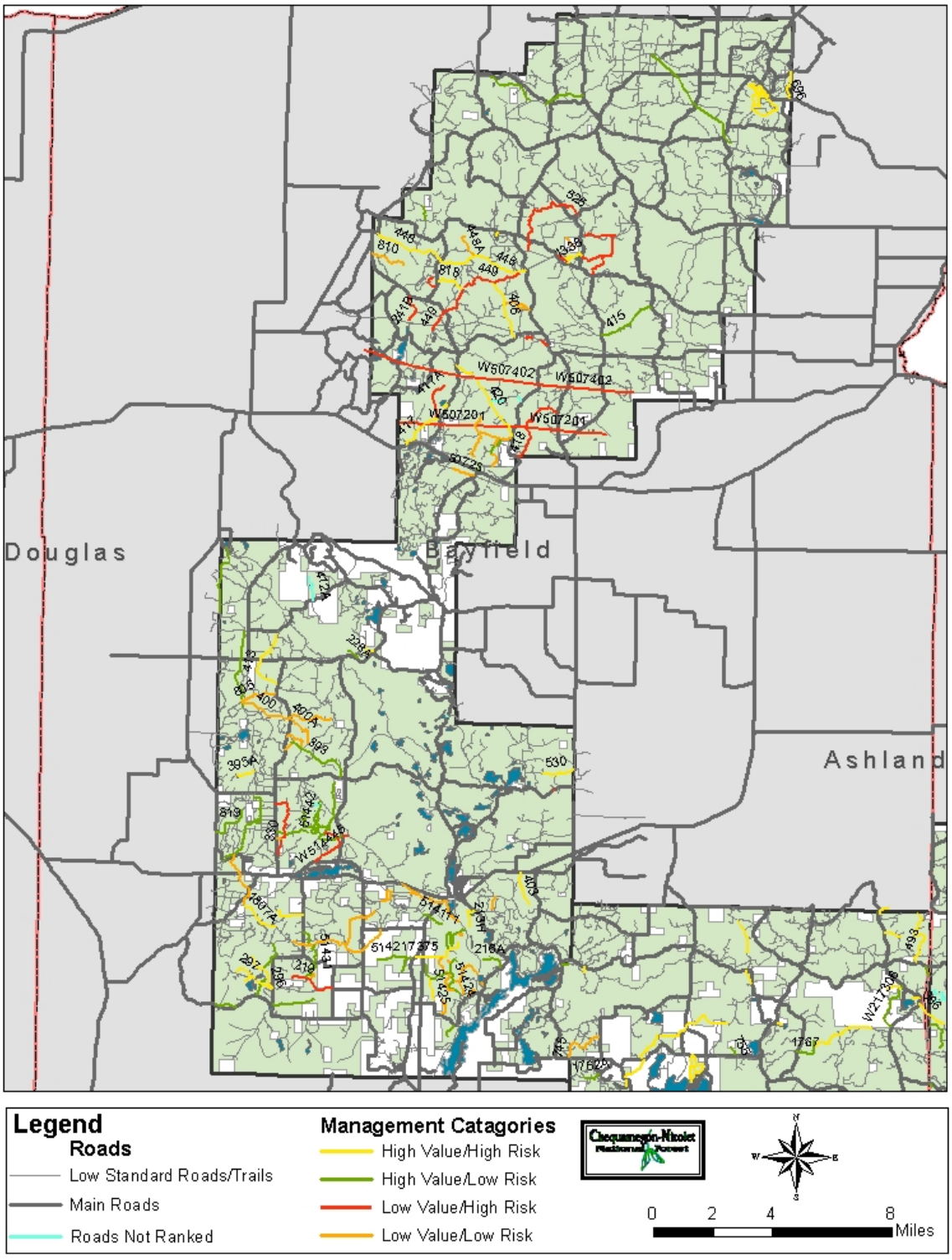

Figure 5-9. Analysis Roads by Management Category – Washburn Ranger District

Opportunities Based on Problems and Risks

Based on the existing and desired condition for roads, key issues, the answers to questions contained in FS-643, Roads Analysis: Informing Decisions about Managing the National Forest Transportation System, and the value/Risk analysis as displayed in Chapter 7 – Road Matrix, the analysis team has developed the following sets of opportunities.

Additions to the Analysis

This category was identified late in the analysis due to a number of public, governmental, and internal comments overlooked or received after initial analysis was complete. The majority of roads in this category were received as a result of a second round of public/governmental meetings where the draft RAP report was presented. The number of roads identified in this category is approximately 266. With few exceptions, these roads have been ranked in the same manner as the original 1052 roads in the analysis. Each was then measured against the management category baseline set by the original risk/value analysis. Opportunities, if not already determined, were then identified for each road. Roads from this category have been included in the following summaries.

Maintain at Current Level with Motorized Use

This opportunity category was identified for National Forest system roads that comprise parts of the long-term transportation system. The analysis shows that benefits exist in retaining these roads and maintaining them at current maintenance levels. Opportunities for public motorized use have been identified by type for this category. There are approximately 300 roads in this category. Of the 300 roads in this category, 1 has been identified that could be designated for ATV's only, 163 could be designated for highway-legal vehicles (hlv), 118 could be designated for both hlv and ATV, and 18 are currently closed (ml1). The 18 ml1 roads should remain closed and unavailable to public motorized travel.

Add System Roads with Motorized Use

The analysis identified opportunities for adding existing roads to the National Forest System. These roads, formerly termed unclassified, are now by definition unauthorized roads. Approximately 437 roads in the analysis area currently fall in this category. Each of these roads could be retained and added to the Forest transportation system. Through the analysis process it was determined that many of these roads are of value to long-term management of the Forest. These values are shown in the appropriate categories of Appendix A - Road Matrix. Opportunities for type of public motorized use have also been identified in this category. All but 7 roads in this category would be available to highway legal vehicles and/or ATV's.

Reduce Maintenance Level

Reducing the maintenance level on approximately 102 system and unauthorized roads in the analysis was identified primarily due to risks identified during the analysis. Opportunities for managing roads in the analysis as maintenance level 1 in the future would total 122. All road opportunities identified in this category are currently not available or would no longer be available to motorized use.

Do Not Add to System

The analysis identified opportunities for unauthorized roads that would not be added to the system. The primary reason for this is due to specific or aggregate risks identified during the analysis. Approximately 328 roads currently fall in this category. These roads if passable are currently available to highway-legal vehicle use. If these roads are not added as Forest Service system roads, future motorized use can not be designated, therefore public motorized use would not be allowed.

Defer
A deferred category has been included in part because specific long term management objectives have not been identified or specific information was not available for certain roads. Roads in this category show some value so were therefore deferred as to identifying opportunities for treatment (i.e. add to system, maintain at current level, convert). 4 roads have been deferred. These roads will be reviewed as part of subsequent NEPA analysis. Deferred roads should be revisited in 5 years.

Drop from Further Analysis
A category entitled, drop, was established while the team was identifying opportunities for individual roads based on management category. Roads in this category were ultimately dropped from opportunity identification due to one or more factors. Several roads were verified gas tax revenue roads that are considered beyond the scope of this project. It was also verified that other roads in this category were part of previous project level NEPA decisions. 101 roads were moved to this category.

Seasonal Closure
This category was identified in order to mitigate certain risks associated with wildlife. Roads in this category will have seasonal restrictions based on Forest plan standards and guidelines. 18 roads have been identified for seasonal closures.

Converted to Trail
This category was added for the final report when it was determined some roads in the initial analysis had already been converted to motorized trails based on prior decisions. The number of roads in this category is 4.

Fall Access
Following the second round of public/governmental meetings a new category for possible motorized access was developed. This category includes 24 roads added to the analysis as a result of comments received during this second comment period. Roads considered for this category could have potential motorized use on a seasonal basis. This seasonal allowance would limit motorized use to the autumn season. 2 out the 24 roads in this category could be suitable for motorized use. Additionally, another 86 roads previously identified for possible elimination of motorized use in other categories, could be suitable for fall access.

Updates

Since this roads analysis is based on existing information and spot examination, some additional field reconnaissance may be necessary during implementation of road management activities, to determine existing physical conditions and provide information for data updates. Regardless, this roads analysis will still provide important information for future projects on the CNNF.

CHAPTER 6 LITERATURE CITED

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CHAPTER 7 APPENDIX A - MATRIX