4.0 STEP 4: ASSESSING BENEFITS, PROBLEMS, AND RISKS

The purpose of this step is to examine the major uses and effects of the road system and to generate an information baseline that can be used to compare the existing road system with future road systems (USDA FS 1999c).

4.1 Current Road System Benefits, Problems, and Risk

The current road system was analyzed using thirteen major topics to identify benefits, problems, and risks. These major topics include ecosystem functions and processes; aquatic, riparian zone and water quality; terrestrial wildlife; economics; commodity production; special use permits; general public transportation; administrative uses; protection; recreation; social issues; and civil rights and environmental justice.

4.1.1 Ecosystem Functions and Processes (EF)

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

Fragmentation of the forest habitat would increase as large forest tracts are bisected by roads. This would fragment the large tracts of habitat needed for gray wolf.

Table 4-1. Ecological Attributes within the Medford Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
123	No	Yes
1440	Yes	No
1563	Yes	No
35632	No	Yes
554	No	Yes
561	No	Yes
571	No	Yes
572	No	Yes
575	Yes	Yes

Table 4-2. Ecological Attributes within the Park Falls Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
1132	No	Yes
130	No	Yes
131	Yes	Yes
142	Yes	No
143	No	Yes
147	Yes	No
509	Yes	Yes
514	Yes	No

Table 4-3. Ecological Attributes within the Great Divide Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
187	Yes	Yes
188	Yes	No
189	Yes	No
192	Yes	Yes
21841	Yes	No
202	Yes	No
209	Yes	No
253	Yes	No
383	Yes	No
604	Yes	No

Table 4-4. Ecological Attributes within the Eagle River - Florence Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
2150	Yes	No
2156	Yes	Yes
2158	Yes	No
2178	Yes	Yes
2181	Yes	Yes
2182	Yes	Yes
2183	Yes	Yes
2184	Yes	Yes
2186	Yes	Yes
2205	Yes	Yes
2402	Yes	No
2414	Yes	Yes
2442	Yes	Yes
2460	No	Yes
2558	Yes	Yes
2597	Yes	Yes
2827	Yes	Yes
2828	Yes	Yes
2989	Yes	Yes
3902E	Yes	Yes

Table 4-5. Ecological Attributes within the Lakewood - Laona Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
2121	Yes	Yes
2144	Yes	Yes
2295	Yes	No
2338	Yes	Yes
2354	Yes	Yes
2384	Yes	No
2647	Yes	Yes
2648	Yes	Yes
2778	Yes	No
2988A	Yes	Yes

Table 4-6. Ecological Attributes within the Washburn Ranger District

Road	Contains a High Concentration of TES Occurrences	Roadways That Might of Contribute to Illegal Collection Susceptible Species
223	Yes	Yes
224	Yes	No
225	No	Yes
228	Yes	No
229	Yes	No
241	Yes	No
244	Yes	No

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, disease, 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?

Roads on the CNNF lead visitors to important refuges for wildlife in wilderness areas, allow naturalists and tourists to view nature from their cars, provide access to wildlife biologists and Forest Service professionals for survey/census work, and facilitate resource extraction that is vital to local economies. However, new road construction, reconstruction, and the mere existence of roads can have ecological consequences that should be considered in any roads analysis. Effects of roads can be immediate and localized in extent or geographically widespread and not noticed for many years after road construction (Brown et al. 2000). In the long term, roads may harm population viability of some species, favor establishment of other species, and have relatively little effect on some highly reproductive species (Brown et al. 2000). Despite species-specific effects, the existence of roads almost always leads to a change in species composition of forest ecosystems (Brown et al. 2000).

Ecological effects of roads on wildlife are various and include: direct mortality on slow-moving organisms from road construction/rehabilitation activities; direct mortality from vehicle collisions (i.e. road kill); modification of animal behavior (i.e. movement, reproduction, ability to hunt and hide); alteration of physical environment (including soil density, temperature and moisture, light levels, dust, water flow, run-off and sedimentation); alteration of chemical environment from gasoline additives, salt, ozone, and other pollutants; spread of exotic, competing species; fragmentation of habitat (some species such as lynx need large areas of unfragmented habitat); and improved access and increased use of areas by humans for hunting, fishing, and poaching (Trombulak et al. 2000; Wildlands League 2002). Given that recent research has provided a better understanding of the effects of roads on biological organisms, possibilities now exist to plan a road system that allows wildlife and motorists to co-exist (Trombulak et al. 2000).

Impacts on wildlife can be greatly minimized by retrofitting existing roads to reduce ecological damage, avoiding new road construction within important wildlife habitat, and by considering the natural contours of land and ecosystem processes in road design (Trombulak et al. 2000).

4.1.2 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 and permanently 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.

Since 1998, 56 of the worst road-stream crossing problems on the CNNF have been corrected through the Forest Roads and Trails 10% Watershed Program in conjunction with road maintenance. Another eight problem crossings are in the process of being corrected. In addition, 11 stream crossings and nine motorized trail crossings have been eliminated and restored over the same time period.

Maintenance Level 3, 4 and 5 roads on the CNNF contain 938 stream crossings. Of these, over 670 have been inventoried to determine existing water quality. The inventory, as shown in Table 4-7, includes the number of stream crossings in each 5th level watershed, ranked according to severity of problems. The severity ranking was based on an evaluation of culvert condition; erosion and sedimentation from frequent washouts; road surface; ditches and embankments; and potential fish passage problems.

In spite of the corrective work described above, there are still a number of road stream crossings with sedimentation and fish passage problems. Just over eight percent of the sites still have major or severe problems, approximately 20 percent have moderate problems, and almost 33 percent have minor problems.

While these sites are scattered across the Forest, concentrations of sites with moderate-severe sedimentation problems occur in the North Branch Oconto, Upper Yellow, Marengo, Trappers and Pine, White and South Branch Oconto Watersheds.

Table 4-7. Number of Stream Crossing Locations with Severity Rankings

	Number of Crossing Locations Ranked by Severity of Problems					
5th Level Watershed	**None**	**Minor**	**Moderate**	**Major**	**Severe**	**Total**
Upper Yellow River	30	27	10	5	0	72
Lower North Branch Oconto River	17	24	18	7	2	68
Marengo River	19	14	13	4	0	50
West Fork Chippewa River	17	18	12	3	0	50
Upper South Fork Flambeau River	23	11	9	1	0	44
South Branch Oconto River	10	21	6	2	1	40
Pine River	23	8	1	1	0	33
Trappers and Pine Creeks	11	9	5	3	1	29
East Fork Chippewa River	6	11	10	1	0	28
Upper Peshtigo River	11	8	6	1	1	27
Middle Peshtigo & Thunder Rivers	10	9	7	0	0	26
Otter Creek and Rat River	14	7	5	0	0	26
Upper South Fork Jump River	9	9	6	1	0	25
Popple River	15	4	2	1	0	22
Brule River	13	3	1	3	0	20
Upper Bad River	7	9	1	1	1	19
White River	4	4	3	5	0	16
Elk River	6	6	2	0	0	14
Upper Namekagon River	2	6	5	0	0	13
Eagle River	6	2	2	1	0	11
Middle Jump River	4	2	1	1	0	8
Deerskin River	1	3	2	1	0	7
Upper Wolf River and Post Lake	3	0	2	1	0	6
Weirgor Creek and Brunet River	1	1	2	1	0	5
Middle Tomahawk River	3	0	0	1	0	4
Lily River	1	1	0	1	0	3
Lower North Fork Flambeau River	0	2	1	0	0	3
Bayfield Peninsula Southeast	0	0	0	0	2	2
Tamarack Pioneer River	0	1	1	0	0	2
Thornapple River	0	0	2	0	0	2

Table 4-7. Number of Stream Crossing Locations with Severity Rankings (Continued)

	Number of Crossing Locations Ranked by Severity of Problems					
5th Level Watershed	**None**	**Minor**	**Moderate**	**Major**	**Severe**	**Total**
Bayfield Peninsula Northwest	0	0	0	1	0	1
Somo River	0	0	1	0	0	1
Wolf River/Langlade and Evergreen Rivers	0	1	0	0	0	1
Total Number	266	221	136	47	8	678
Total Percent	39.2	32.6	20.1	6.9	1.2	100.0

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, 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 delivery of sediments, 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.

Within the CNNF boundary there are approximately 1,050 stream crossings on Maintenance Level 3, 4 and 5 roads. Assuming an estimated distance of 100 feet on each side of a stream crossing, approximately 80 miles of roads are located in riparian areas. One-half of the riparian road miles are associated with stream crossings while the other half represent road segments that parallel streams or lakes. The riparian road miles represent about 2.2 percent of the total length of Maintenance Level 3, 4 and 5 roads. All stream crossings, and most of the parallel road segments in riparian areas, are hydrologically connected to streams and lakes.

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 this abundance of wetlands, it is not feasible to completely avoid them. Therefore, crossing and filling of wetlands with roadway is sometimes unavoidable. There are 237 miles of Maintenance Level 3, 4, and 5 roads located in wetlands, which accounts for 6.6 percent of the total road miles on the CNNF. Assuming an average roadway width of 40 feet, multiplied by 237 miles, the total affected wetland area equals 1,149 acres (0.26 percent of the total wetland area). The fact that 23 percent of the area is occupied by wetland yet only 6.6 percent of the roads are located in wetland is further evidence that wetlands are frequently avoided during road construction when practicable.

Measures of adequate cross-drainage and impacts to wetland type are not readily available. Impacts to wetland type can be mitigated by providing adequate cross-drainage. However, wildlife, such as beavers, have built dams in cross-drainage culverts. This restricts flow rates and alters water levels on both sides of the dam structure, thus changing the wetland type to adjust to different waterlevels.

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.

Table 4-8 provides a summary of the road-stream crossings identified on the forest to have a fish passage concern.

Table 4-8. Total Sites with Fish Passage Concerns

5th Level Watershed	Total Number of Sites With a Fish Passage Concern
Upper Yellow River	10
Lower North Branch Oconto River	16
Marengo River	8
West Fork Chippewa River	7
Upper South Fork Flambeau River	2
South Branch Oconto River	6
Pine River	3
Trappers and Pine Creeks	8
East Fork Chippewa River	5
Upper Peshtigo River	3
Middle Peshtigo and Thunder Rivers	3
Otter Creek and Rat River	1
Upper South Fork Jump River	0
Popple River	2
Brule River	4
Upper Bad River	0
White River	4
Elk River	0
Upper Namekagon River	5
Eagle River	0
Middle Jump River	0
Deerskin River	3
Upper Wolf River and Post Lake	0
Weirgor Creek and Brunet River	2
Middle Tomahawk River	0
Lily River	0
Lower North Fork Flambeau River	1
Bayfield Peninsula Southeast	0
Tamarack Pioneer River	0
Thornapple River	1
Bayfield Peninsula Northwest	0
Somo River	0
Wolf River/Langlade and Evergreen Rivers	0
Total Number	**94**
Total Percent	**14**

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. The Roads Analysis Matrix identified 938 road/stream crossings throughout the forest. 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 emerald, and zebra 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. In Table 4-9, the river location and sensitive species are identified. The comments illustrate specific locations that contribute to habitat degradation.

Table 4-9. Sensitive Species Habitat Degradation Location

River	Species	Comments
South Fork Flambeau River	lake sturgeon and extra striped snaketail	There are two road/stream crossings on tributaries to the river that have been rated as moderate. No road segments directly linked to the river ranked higher than 1 in the Roads Analysis Matrix.
Yellow River	ellipse mussel	There are several road/streams crossings ranked severe and moderate on tributaries to the Yellow River that may be contributing to habitat loss. Major road segments ranked higher than 1 were not found directly linked to the river.
East Fork Chippewa River	lake sturgeon and greater redhorse	Two of the bridge crossings have been ranked as moderate for erosion. Major road segments ranked higher than 1 were not found directly linked to the river.
West Fork Chippewa River	lake sturgeon and greater redhorse	One road/stream crossing has been ranked severe. Several short segments of road have aquatic rankings of 2 to 3.
North Branch Pine and Pine Rivers	Pygmy snaketail and zebra clubtail	There are several road/stream crossings on tributaries that are rated as major problems. One crossing on the mainstem has a rank of moderate. Major road segments ranked higher than 1 were not found directly linked to the river.
North Branch Oconto River	Pygmy snaketail and zebra clubtail dragonflies	At least one road/stream crossing ranked as moderate. Several road segments have aquatic rankings of 2.
Pestigo River	Pygmy snaketail and zebra clubtail	No comments

The crossings and road segments identified all contribute to habitat degradation for aquatic species. If the roads are not going to be obliterated or rerouted it is recommended that the problems identified as part of this analysis be corrected.

AQ (13) How and where does the road system 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.

4.1.3 Terrestrial Wildlife (TW)

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

The road system causes fragmentation of terrestrial species habitat due to tree removal and road construction. Fragmentation affects an area's suitability for species such as wolves and goshawks that are sensitive to human disturbance. Loss of trees creates canopy gaps, which affects those species sensitive to changes in canopy cover. Species such as certain interior neotropical migratory birds, are negatively affected by roads either directly or indirectly because they avoid fragmented habitats or are subject to nest predation and parasitism within road edges. For other species that prefer 'edge effects', roads can create or

enhance their habitat. However, roads can negatively affect their habitat as well, because roads are used as hunting corridors by wildlife predators and human hunters. The roadway width also directly affects terrestrial species, because their travel distance and probability of being inured increases as the roadway width increases.

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

Roads provide access for wildlife managers and researchers who inventory, monitor, and manipulate habitat for the benefit of wildlife. However, the road system also improves access for recreationists who may use off-road vehicles in sensitive habitats, trample vegetation and litter.

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 effects on wildlife species?

Roads provide access for legal and illegal human activities to occur. Straight and wide roads that are well maintained may entice drivers to travel at greater speeds, thus increasing the potential for road kills to occur. Roads that are interconnected with others aid in potential illegal hunting activities. Snow plowing extends this illegal activity into winter.

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

Existing roads can positively affect communities and special habitat features by providing access for monitoring and enhancement management. However, the building of new roads or improvements to existing roads can negatively affect special areas by directly altering them with construction activities, or indirectly, by changing the character of the area due to improved access.

4.1.4 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 were completed on all Maintenance Levels 3, 4, and 5 roads for the analysis area in 1999. These roads are considered the primary portion of the transportation network and are constructed and maintained to the highest standards. The basis of these surveys was to identify and determine road maintenance costs for the forest. Since the majority, if not all, higher standard roads are in place, it is anticipated that any addition of classified roads will be at a lower standard (Maintenance Levels 1 and 2) where maintenance costs are the lowest. All maintenance, deferred maintenance and reconstruction needs on Maintenance Level one through five roads are funded by one or more of the following sources: direct project, appropriated Federal funds, Federal aid to States, Federal Highway funds, and State gas tax revenue.

Funds to maintain roads have substantially declined in the last 10 years. It is no longer possible to maintain the existing road network to the maintenance levels expected by the public. Continuing to maintain the road system as efficiently as possible within current budget levels will eventually result in roads that are neither environmentally sound nor maintained to a level safe for users. Some opportunities may exist to increase road maintenance funding through Recreation Fee DEMO for developed campgrounds, and to ensure that special-use permit holders pay their fair share of road maintenance fees, when appropriate. An obvious approach to reduce road maintenance costs while increasing revenue would be to more intensely manage the suitable timber base that currently has road access. Timber purchasers would be required to perform road maintenance on the roads they use, and the Forest would collect surface rock replacement funds from the purchasers to help keep these access roads better maintained to standard.

Additional dollars received from any of these funding sources would help to provide better maintenance for these roads.

The Forest Service shares maintenance and administration responsibilities for most Maintenance Level 3,4,and 5 roads with the local township governments across the forest. These roads are maintained under cooperative agreements with the appropriate townships and are gas tax roads for which the local township governments collect state tax revenue for maintenance cost. The townships are important stakeholders in the Forest Service's primary transportation network because the gas tax roads generate revenues for the townships to use in maintaining roadways under their jurisdiction.

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 priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The road user groups in the analysis area 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 decommissioning 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 short-term displacement of individual users may occur as a result of project related road activities.

EC (3) How does the road system affect the distribution of benefits and cost 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.

4.1.5 Commodity Production

Commodity production includes timber management, minerals management, range management, water production, and special forest products.

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.

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 Maintenance Level 3, 4, and 5 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 Maintenance Level 3, 4, and 5 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.

Range Management (RM)

RM (1) How does the road system affect access to range allotments?

Range Management on the CNNF is minimal. In 1984, twenty-seven acres were used to harvest hay and four acres were used for grazing on CNNF lands (USDA FS 1986a).

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. At least one other non-Forest Service dam serves as water storage for the local fire department and road access is necessary for this function.

WP (2) How does road development and use affect the water quality in municipal watersheds?

See WP1

WP (3) How does the road system affect access to hydroelectric power generation?

See WP1

Special Forest Products (SP)

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

The road system provides access for collection of special forest products such as maple sap, firewood, birch bark and Christmas trees. Improvements in the road system would increase access and could increase the pressure on these special forest products.

The road system provides access for collecting special forest products. Those who harvest special products use many of the roads available for access. They may not want to see any of the roads they currently use be decommissioned.

The use of forest system roads for collection of special forest products is somewhat evenly distributed over the CNNF, but is usually based on a particular time of the year. For example, balsam boughs are collected in the fall, mosses are collected from spring through fall, birch twigs and poles are collected during the winter, mushrooms may be gathered in the spring and fall, and berry picking may occur during the summer months.

The majority of road use for forest product collections is for fuel wood and balsam boughs. To the user, the more roads that are open and available for collections, the easier and more economical it is for them. As a result, closing and decommissioning any existing classified and unclassified roads may be a concern by users of the National Forest who may perceive that the cost of collecting miscellaneous forest products would increase as a result.

4.1.6 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)?

Many of the special-use permittees utilize motorized vehicles and the Forest Service road network for access to the permit sites. The same road(s) enables Forest Service personnel to administer Forest Service operations.

4.1.7 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. (See Figures 4A – 4F).

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

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 large blocks of land in other ownership, such as State, County, private, and corporate ownership. The forest has a legal obligation to provide current and future access to all private inholdings, which are completely surrounded by National Forest System lands.

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 Service has historically worked cooperatively with local, County, and State government agencies 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).

4.1.8 Administrative Uses (AU)

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

The CNF *Forest Plan* states that the road density for management areas 1.1, 2.1, 3.1, and 4.1 will not exceed an average of 3.6 miles of forest system road per square mile. In management areas 1.2, 2.2, 3.2, 4.2, 8.1, 8.2, and 8.5 will not exceed an average of 2 miles of forest system road per square mile. In management areas 5, 6, 8.3, 8.4, 8.6, 8.7, and 9 additional roads will not be developed.

The NNF *Forest Plan* states that the road density for the forest as a whole should have an average density of approximately 3 miles of all roads per square mile. In management areas 1 through 4 and 6.2, the total average density will be up to 4 miles of forest system road per square mile. In management areas 6.3, 9.1 and 9.2 the density will be only as needed for access to adjacent areas or to protect resources.

These road density levels adequately satisfy access needs for forest research, inventory, and monitoring.

The WDNR uses the existing road system to monitor winter track counts, black bear bait transects, and fisher bait transects. These transects have been monitored for many years using the existing road system. If the WDNR were not able to use the existing road system for monitoring purposes, long-term wildlife population trend monitoring would be hindered.

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

The road density levels, as listed above, provide adequate access for law enforcement activities. However, the density of interconnected open roads does make enforcement difficult.

4.1.9 Protection (PT)

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

The road system serves as a firebreak for prescribed burns and wildfires. Roads provide access for fire personnel and serve as a ‘safe zone’ in an emergency. They also provide access for other means of reducing fuels such as timber harvest and firewood collection.

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. The following *Forest*

Plan standards and guidelines for Management Areas 5A and 5B address the capacity of the Forest Service and cooperators to suppress wildfires:

> **Management Area 5A Standard:** Suppress all wildfires. Initial attack for wilderness fires will normally be by fire crews using hand tools and other non-motorized equipment. The Forest Supervisor has approved, in advance, the use of water pumps and chainsaws for initial attack when the staffing class is very high or extreme. Use of other mechanized equipment, including aerial drops, require Forest Supervisor (or acting Forest Supervisor) approval on a case-by-case basis.
>
> **Management Area 5A Standard:** Wilderness area motorized use will only be permitted for private land access and emergency situations with prior Forest Supervisor approval.
>
> **Management Area 5A and 5B Guideline:** Restore all decommissioned roads to some level of landscape restoration, or convert them to trails.
>
> **Management Area 5A and 5B Guideline:** Coordinate with local governments to manage boundary roads for "High Scenic Integrity Objectives, and where appropriate, at the lowest possible standard to complement adjoining wilderness and wilderness study areas. If possible, close boundary roads that may separate adjoining wilderness or wilderness study areas.

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?

The road system contributes to airborne dust emissions generally when the surface type is gravel or a non-asphalt material. The potential for airborne dust emissions increases when rainfall is low or if there is a closed tree canopy over the road that intercepts precipitation before it reaches the road surface. 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.

4.1.10 Recreation

Recreation includes unroaded recreation and road-related recreation.

Unroaded Recreation (UR)

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?

Ranger District opportunity area plans; site-specific project Environmental Assessments, and Environmental Impact Statements identify future CNNF road construction, closure, and decommissioning within areas inventoried for roadless conditions. Any changes in the quantity, quality, and type of recreation opportunities within unroaded areas would also be identified and analyzed in opportunity area plans, Environmental Assessments, and (or) Environmental Impact Statements.

UR (3) What are the 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 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 study areas, SPNM areas, and other designated closed road areas in the general forest zone. Hunters traditionally have strong attachments to 'their hunting location', and may be reluctant to change locations. However, it is difficult to identify the participants' attachments to the area without specific survey information being completed.

Road Related Recreation (RR)

RR (1) Is there now 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. Individual project Environmental Assessments or Environmental Impact Statements will make these determinations."

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

Ranger District opportunity area plans; site-specific project Environmental Assessments, and Environmental Impact Statements identify future forest road construction, maintenance, and decommissioning within areas inventoried for roadless conditions. Any changes in the quantity, quality, and type of recreation opportunities within unroaded areas would also be identified and analyzed in opportunity area plans, Environmental Assessments, and (or) Environmental Impact Statements.

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.

RR (4) Who participates in roaded recreation in the areas affected by road constructing, maintaining, or 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. 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. However, it is difficult to identify the participants' attachments to the area without completion of a survey for specific information.

4.1.11 Passive-Use Value (PV)

PV (1) Do areas planned for road entry, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered (T&E) 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

28 animals and 52 plants that are listed as RFS species. Some examples 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?

Ranger District opportunity area plans and site-specific project Environmental Assessments and Environmental Impact Statements identify future forest road construction, closure, and decommissioning; and evaluate potential impacts to significant cultural, traditional, symbolic, sacred, spiritual, and religious activities.

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

Specific cultural, symbolic, spiritual, sacred, traditional, and religious values for proposed road closure areas are not known at this time. Native American communities may have specific concerns about some of these areas. Site-specific Environmental Assessments or Environmental Impact Statements will address each proposed road closure area for these and other issues of concern.

PV (4) Will road construction, closure, or decommissioning significantly affect passive-use values?

Considering the extent of roads on the CNNF, some changes to the road system from construction, closing or decommissioning 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 road construction, closure, or decommissioning 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.

4.1.12 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?

Perceived needs and values for access vary across a wide spectrum from those who feel they need improved, increased access to those who value other characteristics of the forest more and favor decreasing the density of 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?

The 1996 Notice of Intent to prepare an Environmental Impact Statement to revise the *Forest Plans* indicated:

"Access for people to use the Forests has become an increasingly controversial topic in recent years as a result of increasing (numbers) of visitors, changes in land use, costs of road management, and impacts on fish and wildlife habitat…More people visiting the Forests has resulted in greater conflict between motorized and non-motorized users…Changes in Plan direction are needed in order to improve the quality of recreation experiences while providing access for all users."

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

Through 25 years of cultural resource surveys, over 2,200 archaeological and historic sites and districts (i.e., cultural, or heritage resources) have been recorded within, or immediately adjacent to, the boundaries of the CNNF. These surveys, which continue on an annual basis, are done in accordance with Sections 106 and 110 of the National Historic Preservation act. Cultural resource locations are confidential, exempt from Freedom of Information Act disclosure. The locations of cultural resources are sometimes revealed for interpretive purposes. However, site locations generally remain confidential in an attempt to avoid their vandalism or looting.

The CNNF's road system improves access to cultural resource locations, and for this reason, access may, in some instances, be construed as an 'indirect,' possibly adverse effect on certain cultural resources. Conversely, the road system facilitates monitoring and protection of cultural resources by Forest Service employees.

No paleontological sites have been recorded on the CNNF, largely due to the geologically recent nature of the forest's landscape.

There are no general area road closures proposed for Management Area 8F (special management areas with paleontological, archeological, historical and

other values). Excluding affected areas from proposed projects would protect these types of resources and values.

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?

The road system offers both positive and negative effects regarding Native traditional practices, such as gathering, hunting, and participation in religious practices that may take place on NFS lands. For example, the forest contains an area utilized for traditional Native religious practice, though this same area is truncated by a developed hiking trail that includes parking. Forest Service staff have been told by Native participants that the parking area and trail allows elders ease of access. However, since it is a developed recreation area, it lacks solitude desired by those who participate.

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

Some forest transportation features can be categorized as historic, because they were developed prior to the establishment of the CNNF. They include old railroad grades abandoned in the early 20th century, and roads that once linked 19th century communities. The Forest Service has not formally designated any of these roads as cultural resources. Historic transportation features that have been improved for contemporary use have, no doubt, been adversely affected. However, most of the development that has affected historic transportation features occurred prior to the time legislation directed the Forest Service to protect these features.

The following *Forest Plan* standards and guidelines for Management Area 8F (special management areas) address the above issue:

Do not construct new roads or motorized trails unless they protect or contribute to special management area values.

- Manage National Forest development of interior roads at the lowest traffic service and maintenance levels possible.
- Restore all decommissioned roads to some level of landscape restoration.

Many of the existing roads are old railroad grades from the turn of the century. “Improvement” of these roads by widening changes their “narrow gage rail” character.

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

Many social and economic values are associated with a forest road network that provides access for maintenance and protection of soils, water, minerals,

vegetation, wildlife and fish, recreation, heritage resources, visual resources, and public health. Forest roads also provide access for fire management and controlling undesirable species.

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?

CNNF designated wilderness and wilderness study areas are very small by western National Forest standards and are almost always surrounded by NFS roads. Area integrity, natural appearance, and opportunities for solitude and recreation can be significantly affected by how perimeter roads are managed; how and when interior roads are decommissioned; and how well decommissioned road entryways (from perimeter roads) are obliterated, blocked, and obscured.

The management of roads that border or cross wilderness areas certainly affect wilderness attributes. Scaled down maintenance, such as allowing tree canopies to grow over the roads, improves the adjacent wilderness appeal.

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

The forest road network provides motorized access for hunting (primarily big game including white-tailed deer and small game including upland game birds), fishing, fur-bearing animal trapping, and wildlife viewing. Forest roads also provide motorized access for gathering special forest products such as conifer boughs, maple syrup, and mushrooms.

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

The majority of people, who recreate on the forest, utilize motor vehicles to travel to their destinations that include campgrounds, boat landings, picnic areas, swimming beaches, trailhead parking areas, and private cabins. Quality transportation system planning and road maintenance provides for visitor safety, but also contributes to how well people value their experiences. A rutted road with a washboard surface and poor visibility will likely detract from a visitor's experience.

4.1.13 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)?

The revised *Forest Plan* provides standards and guidelines for prohibiting or restricting motorized activities and obliterating roads within wilderness, wilderness study areas, SPNM areas, and research natural areas. Some Native American groups desire relatively unrestricted motorized access for gathering traditional use special forest products within many of these areas. Also, some disabled individuals (mostly hunters) want to use ATVs for motorized access within the same areas.

4.2 Risks and Benefits of Entering Unroaded Areas

Unroaded areas are not part of the Roads Analysis process, per FSM 7712.16 and will be addressed in the *Forest Plan* revision process.