# Roads Analysis Process (RAP)

# 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. These values and risks will be used in the Roads Analysis Process used in evaluating the roads for the 2011 MVUM Update.

**Road Related Values**

***Motorized 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. Data used for the evaluation of this category includes:

- Motor Vehicle Use Map Road Request Forms
- Road locations
- Analysis area reconnaissance notes from district staff

***Evaluation Criteria***

High Value (5): Road requested for open public access during the current comment period.

Moderate Value (3): Road requested for open public access during the comment period, but after district field review or internal knowledge of the road, was reduced because of low public use.

Low Value (0): Road requested for open public access during the comment period, but after district field review or internally knowledge of the road, was reduced because of existing closure such as a gate or berm.

***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.

Data used for the evaluation of this category includes:

- 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.).

***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.

Data used for the evaluation of this category includes:

- 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 (2): 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.

**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.

Data used for the evaluation of this category includes:

- Road Locations
- ELTP soil types

***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.

***Risk to Reference Areas***

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

Data used during the evaluation of this category includes:

- GIS Road Locations
- Reference Area Inventory

***Evaluation Criteria***

<u>No Risk (0):</u> Beyond 1 mile from a MA 8.

<u>Low Risk (1):</u> Between a ½ mile and 1 mile from a MA 8 and no motorized use road is between the Reference Area and the road under review.

Moderate Risk (3): Within ½ mile of a MA 8 and no motorized use road is between the Reference Area and the road under review.

High Risk (5): Located within MA 8

***Risk to Aquatic/Water Quality***

Aquatic and water quality risk rankings are developed based on procedures in FS-643, Roads Analysis: Informing Decisions about Managing the National Forest Transportation System, examples from western National Forests including the Olympic National Forest, prior aquatic risk ratings and road-aquatic data for the Chequamegon-Nicolet National Forest. A number of individual rankings are considered and combined to provide one ranking for aquatic species, water quality and hydrology. The percentage values for each rank are 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. The average number of road crossings, percent of roads in riparian management zones and percent of roads in wetlands are also used as a guide (see attached table). The rationale for each item is provided below.

**Stream Crossings:** At each location where a road crosses a stream, there is the potential for impacts to the aquatic ecosystem. The 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 increases, 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. The Forest-wide average for all roads is just below 0.2 crossings per mile. This number is determined by identifying the number of crossings for each road (from road-stream crossing inventory, aerial photos or quad maps, or GIS intersects of roads and streams) and dividing by the road length (miles).

**Riparian Zone:** Roads located in riparian areas can be sources of sediment and, where they parallel streams, can permanently remove riparian vegetation and encroach on 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 perennial streams and lakes or 35 feet of intermittent streams; RMZs) 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. About 1.4 percent of all roads in the Forest are located in RMZs. If there were one stream crossing per mile of road and the road crossed the RMZ at a right angle, there would be about 3.8 percent of the road in the

RMZ. This percentage of road or trail in RMZ is determined by creating a GIS buffer of 100 feet around all perennial water bodies and 35 feet around intermittent streams and intersecting that layer with the road and trail layer to determine length of each road or trail in the RMZ. For each road or trail, the RMZ length is divided by the total length of road and multiplied by 100.

**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. About 4.5 percent of all roads in the Forest are located in wetland. This percentage of road or trail in wetland is determined by intersecting the WI wetland layer with the road and trail layer to determine length of each road or trail in wetland. For each road or trail, the wetland length is divided by the total length of road and multiplied by 100.

**Hydrologic Connection:** 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 has a hydrologic connection. 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. This factor will generally not be used because of limitations with GIS data to accurately determine connectivity. It may be used on a case-by-case basis.

Data used for the evaluation of this category includes:

- Road locations based on the most recent GIS layer,
- 24K Hydro layer with buffers as described above,
- WI Wetland layer,
- Topographic and soil maps, and
- Road/stream crossing inventory

***Evaluation Criteria***

<u>Very Low Risk (0):</u> No stream crossings; or no length within riparian zone (within 100 ft of water body); or no length in wetland.

<u>Low Risk (1):</u> >0-0.25 stream crossings/mile; or >0-2% length within riparian zone (within 100 ft of water body); or >0-5% length in wetland.

<u>Moderate Risk (3):</u> >0.25-0.5 stream crossings/mile; or >2-4% length within riparian zone (within 100 ft of water body); or >5-10% in wetland.

High Risk (5): >0.5 stream crossings/mile; or >4% length within riparian zone (within 100 ft of water body); or >10% in wetland.

**Background Information for Aquatic Risk Ratings for Roads**
**Chequamegon-Nicolet National Forest**
**September 16, 2009**

| Maint. Level | Length (mi) | Stream Crossings | | RMZ | | Wetland | |
|---|---|---|---|---|---|---|---|
| | | # | #/mi | mi | % | mi | % |
| T/O | 707 | 170 | 0.24 | 22 | 3.1 | 52 | 7.4 |
| 1 | 2,713 | 301 | 0.11 | 25 | 0.9 | 97 | 3.6 |
| 2 | 4,922 | 452 | 0.09 | 39 | 0.8 | 148 | 3.0 |
| 3 | 472 | 112 | 0.24 | 11 | 2.3 | 25 | 5.3 |
| 4 | 1,432 | 487 | 0.34 | 34 | 2.4 | 109 | 7.6 |
| 5 | 885 | 326 | 0.37 | 29 | 3.3 | 67 | 7.6 |
| Total | 11,131 | 1,848 | 0.17 | 160 | 1.4 | 498 | 4.5 |

Note: # of stream crossings is based on gis intersect is probably an over-estimate
Source of data: GIS analyses conducted for 2008/2009 TMR
Prepared by: Dale Higgins, Hydrologist

***Non-Native Invasive Species (NNIS) Risk***

This risk rating is based on the propensity for transportation corridors to facilitate the introduction and spread of non-native invasive plants (weeds) that may cause ecological impacts. The potential for impact is dependent on the type of weed species present and plant community of adjacent lands. In addition, roads with higher use levels tend to be at higher risk for introduction.

Risk rating for weeds will factor in the species of weed present in conjunction with the surrounding plant communities. The presence and spread of weeds along a road is not a risk to the road but the adjacent plant community. As an example, forested plant communities with roads through them harboring sun-loving weeds are at a lower risk than an open plant community (such as barrens) with a similarly infested road. This is because sun-loving weeds such as spotted knapweed will not move into the shade of a surrounding forest while they likely will into barrens.

Data used for the evaluation of this category includes:

- Road Locations
- NNIS location inventories
- FS type of adjacent land (if known)

***Evaluation Criteria***

Low Risk (1): No weeds present.

Moderate Risk (3): Weeds present. Limited ecological effects anticipated within existing clearing only. Surrounding area unlikely to support NNIS plants present (see table 1).

High Risk (5): Weeds Present. Serious ecological threat beyond the road clearing. Surrounding area highly likely to be invaded by weed plants present (see table 1). *As an example, garlic mustard along a road through hardwood forest is a High Risk (5).*

Weed species Qualifiers for RAP -- weed risk analysis - 2009

| | Species qualifiers | | | |
|---|---|---|---|---|
| NNIS A-List | Forest | Open | Wetland | Notes |
| Asiatic honeysuckles | 5 | 5 | 1 | grows in sun or shade |
| Buckthorn, Common | 5 | 5 | 1 | grows in sun or shade |
| Buckthorn, Glossy | 5 | 3 | 5 | prefers wet areas |
| Garlic mustard | 5 | 3 | 1 | grows in sun or shade |
| Japanese barberry | 5 | 3 | 1 | grows in sun or shade |
| Oriental bittersweet | 5 | 3 | 1 | grows in sun or shade |
| Brittle-stem hemp-nettle | 5 | 1 | 1 | prefers shade |
| Forget-me-not | 5 | 3 | 3 | grows in sun or shade |
| Siberian pea | 3 | 3 | 1 | not highly aggressive |
| *NNIS adapted to sun* | | | | |
| European Marsh thistle | 3 | 5 if wet | 5 | can persist under canopy |
| Autumn olive | 1 | 5 | 1 | prefers sun |
| Bull Thistle | 1 | 5 | 1 | disturbed, open |
| Canada Thistle | 1 | 5 | 1 | disturbed, open |
| Common Reed | 1 | 1 | 3 | wet, open |
| Japanese knotweed | 1 | 5 | 3 | prefers sun |
| Leafy Spurge | 1 | 5 | 1 | prefers sun |
| Purple Loosestrife | 1 | 1 | 5 if open | wetlands, open |
| Reed canary grass | 1 | 3 | 5 if open | prefers sun |
| Spotted knapweed | 1 | 5 | 1 | prefers sun |
| Wild parsnip | 1 | 5 | 3 | prefers sun |
| Common mullein | 1 | 5 | 1 | disturbed, open |
| (Curly Pondweed) | | | | aquatic |
| (Eurasian water milfoil) | | | | aquatic |

***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.

Data used for the evaluation of this category includes:

- 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 or within 1320 feet but a motorized road is between the occurrence and the road under review.

Moderate Risk (3): Road lies within 1320 feet of nesting, denning, or breeding site for TES wildlife or within 660 feet but a motorized road is between the occurrence and the road under review.

High Risk (5): Road lies within 660 feet of a nesting, denning, or breeding site for TES wildlife and no motorized road lies between the road and the occurrence.

***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.

Data used for the evaluation of this category includes:

- 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 or within 1320 feet but a motorized road is between the occurrence and the road under review.

Moderate Risk (3): Road lies within 1320 feet of a documented TES plant occurrence or within 660 feet but a motorized road is between the occurrence and the road under review.

High Risk (5): Road lies within 660 feet of a documented TES plant occurrence and no motorized road lies between the road and the occurrence,

***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, an ML 1 or ML 2 road's distance from a recorded cultural resource is assumed to be the appropriate measure of risk factor.

Data used for the evaluation of this category includes:

- 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.