APPENDIX F  Trail Design, Construction, Maintenance, Signing, Visitor Information Tips

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APPENDIX F  Trail Design, Construction, Maintenance, Signing, Visitor Information Tips

Proper design and construction
The most important factors affecting trail maintenance are proper design and construction, using rolling grade techniques and the sustainable practices described in this manual. If a trail segment requires extensive maintenance each year to keep it sustainable, it should be redesigned. Refer to Guiding Principle #6 – Ensure that Trails Remain Sustainable and Section 3 – Principles of Ecological Sustainability of the ‘Trail Planning, Design & Development Guidelines’ for additional recommendations on dealing with trails that are proving to be unsustainable.

When planning, designing, and constructing OHV trails, a number of important factors come into play. That’s why all affected interests MUST be consulted early on during the project planning stage. For example, trails or trail systems are typically linked to provide for long-distance destination travel. Or, for a more isolated trail loop, a unique or challenging trail design should attract riders from afar. Because new construction can be both expensive and environmentally challenging, existing routes, both roads and trails, are almost always preferable to new trail construction.

A. Trail or trail system considerations

Environmental Issues:
Steep slopes, wet or sandy areas, heavily wooded areas, and agricultural lands can all pose special problems for off-road trails and travel. Summer-season OHV use compacts soils, leading to accelerated runoff and, in some cases soil erosion. Eroded soils carry dissolved sediment which can, in turn deposit in surface waters or wetlands. However, by properly siting and engineering trails, detrimental effects can be largely avoided or minimized. Seasonal or temporary trail closures make damage still less likely to occur during wet periods or spring thaw. Various other management controls can also be applied to ensure that OHV trails are both fun and sustainable.

Land-Use Conflict:
Every effort should be made to locate motorized trails and trail systems facilities in areas where such use is the existing condition. Traditionally non-motorized use areas, such as public parks, wilderness areas, game preserves, scientific or natural areas, hiking or ski trails, etc. do not make good neighbors! Conflict, annoyance and displacement can be minimized by spatially separating motor and non-motor recreation areas. A little forethought, in this regard, goes a long way towards defusing potential conflict and controversy.

OHV trails or trail systems:
OHV trails typically accommodate one or more of the three classes of vehicles: ATVs, ORVs, and OHMs. OHV trails generally consist of a defined series of roads and trails, typically within a state or county forest or other public lands. OHV trails accommodate recreational trail riders and long distance “tourers” who are most interested in riding for longer distances in a natural setting with varying levels of difficulty. These trails start at designated trailheads and may have multiple access points. The main trail can be either a loop or an “out-and-back” layout. Stacked loops of varying difficulty and length are optimally provided off a main, easier trail. The loops may be designed to accommodate either a variety or a specific type of OHV, depending on local demand. A mix of dedicated trails, trail conversions and on-road trails is often used to provide a diverse and interesting trail experience.
Other considerations

<table>
<thead>
<tr>
<th>Trail loops or point-to-point destination trails should provide for:</th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–26 miles for average rides, 26-40 for longer rides</td>
<td>18–35 miles for average rides, 35–80 for longer rides</td>
<td>12–20 miles for average rides, 20–40 for longer rides</td>
<td></td>
</tr>
<tr>
<td>Maximum full-day rides for OHV riders of all types can be 80–140 miles or more. Most, however, tend to ride average distances as defined above. ATVs commonly go 40–60 miles on a tank of gas.</td>
<td>Properly designed trails should allow for an average vehicle speed of up to 5 m.p.h. (e.g., easy, more difficult, most difficult or expert)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OHV recreation site or riding area.**

This is a designated area for the extensive or exclusive use of OHVs. Trails accommodate recreational riders who are seeking a more challenging series of trails and technical challenge riders wanting to test their skills and machine capabilities. Trails within a recreation site start at a designated and controlled check-in area or trailhead. There is typically only one access point. An easier core trail typically provides access to a series of designated stacked loops that are increasingly difficult. The core trail typically accommodates all OHV types, with the looped trails designed for a designated type of use (ATV, OHM, ORV).

Concentrated All-Terrain Vehicle (ATV), Off-Highway Motorcycle (OHM), and Off-Road Vehicle (ORV) trails and riding areas can present a number of advantages for riders, GIA clubs and sponsors. By limiting riders to smaller, more densely developed trail riding areas:

- Maintenance concerns are more concentrated and readily identifiable; Rules and regulations are easier to communicate, monitor and enforce; Hazards are easier to locate and identify; and, Trespass problems (ingress or egress) can be greatly reduced or eliminated.

Areas that might be suitable for use as a 'Recreational OHV Riding Area' include:

- Tracts of Vacant Land, particularly those located proximate to high-population areas, popular tourism destinations, major highways or interstates, etc. Such sites have the potential to draw riders from a broad area. Vacant lands may prove workable, if only on an interim basis pending commercial, industrial or residential development or re-development. These tracts can provide popular trail systems that are both fun and convenient.

Existing Off-Highway Vehicle Trails (on public land): Existing OHV trails located on federal, state or county forest lands may sometimes be ‘adopted’ by local clubs and managed more actively by mapping, signing, upgrading the trails, or by adding amenities (e.g., parking, rest rooms, campgrounds) to improve the rider’s experience. More intensive maintenance may also make these trails more attractive to riders. Trail adoption can also help forge partnerships between local trail organizations and public land managers. It provides welcome financial support and volunteer assistance for managing public trails.  

[Dedicated OHV funds may ONLY be used to maintain these trails if they are officially designated GIA trails.]
Design considerations will be reviewed on a case-by-case basis for all proposed recreational riding areas. The Area P&T Supervisor will work with Clubs and their Sponsors to develop proposals that are both fun and environmentally sustainable. They will also seek to minimize any potential conflict with non-motorized activities in the forest. Be sure to consult the Area P&T Supervisor about potential OHV Recreational Riding Areas as early as possible in your planning process to ensure that all bases are covered, and that all affected parties are meaningfully engaged in the discussions.

Example of OHV recreation site or riding area

![Map of Appleton Area Recreation Park](image1)

Example of OHV trails or trail systems

![Map of Nemadji State Trail Systems](image2)
## Accessibility

Facilities and programs funded by the trails assistance program must meet the design standards in the Americans with Disabilities Act (ADA) accessibility guideline. All sponsors must ensure compliance with applicable state and federal requirements for access. Considerations include:

- Protect the resource and environment and preserve the experience
- Provide for equality of opportunity
- Address safety
- Be based on independent use by persons with disabilities

The Americans with Disabilities Act (ADA) is a Federal civil rights law that prohibits the exclusion of people with disabilities from everyday activities. Minnesota is known for its tremendous outdoor recreational opportunities. Since 1972, the DNR has been updating its facilities and programs to meet state and federal accessibility standards, opening the outdoors to people with disabilities. Before constructing new facilities or upgrading existing ones consult the guidelines of the ADA to ensure compliance with applicable state and federal requirements for access.

The most common facilities on an OHV trail to which ADA requirements may apply are a trail shelter and toilets placed near a trailhead or parking lot. The path leading from an identified parking space to the shelter, the door width, door handle type, door handle height, and the height of any kiosk or informational signage, etc placed with regard to the ADA guidelines.

Facilities and programs funded by the trails assistance program must meet the design standards in the ADA accessibility guidelines.

The ADA has developed guidelines for outdoor developed areas, buildings and facilities. The Federal Access Board has these guidelines available at [www.access-board.gov](http://www.access-board.gov) for Recreation and for Outdoor Developed Areas.

Or contact the Great Lakes ADA Center at [www.adagreatlakes.org](http://www.adagreatlakes.org). DBTAC - Great Lakes ADA Center (MC 728) · Room 405 · 1640 W. Roosevelt Road · Chicago, IL 60608 · 800-949-4232 (V/TTY) · 312-413-1407 (V/TTY) · 312-413-1856 (Fax)
For signs minimum character height shall comply with Table 703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I". Visual characters shall be 40 inches (1015 mm) minimum above the finish floor or ground.

<table>
<thead>
<tr>
<th>Height to Finish Floor or Ground from Baseline of Character</th>
<th>Horizontal Viewing Distance</th>
<th>Minimum Character Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)</td>
<td>less than 72 inches (1830 mm)</td>
<td>5/8 inch (16 mm) plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 72 inches (1830 mm)</td>
</tr>
<tr>
<td>Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)</td>
<td>less than 180 inches (4570 mm)</td>
<td>2 inches (51 mm) plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 180 inches (4570 mm)</td>
</tr>
<tr>
<td>Greater than 120 inches (3050 mm)</td>
<td>less than 21 feet (6400 mm)</td>
<td>3 inches (75 mm) plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)</td>
</tr>
<tr>
<td>Greater than 21 feet (6400 mm)</td>
<td>21 feet (6400 mm) and greater</td>
<td>3 inches (75 mm) plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)</td>
</tr>
</tbody>
</table>

The figure on this page shows typical doorway clearances to ensure accessible widths for access.

ALWAYS CONSULT THE MOST CURRENT GUIDELINES. See contacts above.

Excerpt from Updated ADA regulations issued by the Department of Justice.
### B. Trail specific design suggestions

<table>
<thead>
<tr>
<th>Design Parameters</th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tread width.</strong></td>
<td>For OHV trails, tread widths vary considerably with type of use and level of difficulty. Trail width must also be based on a solid understanding of how a trail will be used since over time it will take the shape users give it irrespective of how it was originally designed. Note also that trail widths are only one aspect of difficulty levels for OHV trails. Grades, curve radius, clearances, tread surface, and other characteristics are other factors in establishing a trail difficulty rating.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum tread width</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject to local site conditions and limitations.</td>
<td>Single-track or one-way trail</td>
<td>Approximately fifty inches (50”)</td>
<td>Not less than fifty inches (50”) at handlebar height, and not less than twenty-four inches (24”) at ground level.</td>
</tr>
<tr>
<td>Two-track or two-way trail</td>
<td>approximately six feet (6’')</td>
<td>Approximately eight feet (8’)</td>
<td>Approximately twelve feet (12’)</td>
</tr>
<tr>
<td><strong>Level of Difficulty minimum tread width</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easiest (green circle)</td>
<td>72 “ to 96”</td>
<td>18” to 30”</td>
<td>120” to 144”</td>
</tr>
<tr>
<td>More difficult (blue square)</td>
<td>60” to 84”</td>
<td>18” to 24”</td>
<td>96” to 120”</td>
</tr>
<tr>
<td>Most difficult (black diamond)</td>
<td>56” to 72”</td>
<td>12” to 24”</td>
<td>80” to 102”</td>
</tr>
</tbody>
</table>
Minimum clearance of branches and obstacles hanging above the trail
An additional one-foot (1') should also be cleared on each side of the trail treadway to facilitate construction and future maintenance. This extra space may be allowed to brush-in over time to narrow the corridor. Terrain should be challenging and varied, and traverse scenic, hilly and wooded landscapes if possible.

### Design Parameters

<table>
<thead>
<tr>
<th></th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>height of approximately</td>
<td>six feet (6')</td>
<td>Six feet (6&quot;)</td>
<td>ten feet (10&quot;)</td>
</tr>
</tbody>
</table>

### Sight Distance

Managing sightlines is one of the major tools for controlling speed and promoting safety. Unlimited sightlines can actually pose more of a safety concern than those that are more constricted because they encourage excessive speed. Finding the right amount of sightline to maximize safety is a key design challenge.

### Vegetation Management

Vegetation along the trail must be managed to maintain an acceptable clearance zone and preserve the integrity of the trail surface. This includes removal of encroaching vegetation by cutting and/or spraying of an approved herbicide by a licensed applicator. Cutting is the preferred method whenever possible, and the only acceptable approach in ecologically sensitive areas. Where erosion has taken out vegetative cover, the cause should be addressed prior to restoration. Guiding Principle #5 – Provide Ongoing Stewardship of the Trail and Adjoining Natural Systems in Section 3 of the ‘Trail Planning, Design & Development Guidelines’ provides additional information related to managing and restoring vegetation along trails.

### Sight Distance – Vertical and Horizontal Sight Distances from the Trail Treadway should be:

<table>
<thead>
<tr>
<th>Subject to local site conditions</th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum of twenty feet (20&quot;)</td>
<td></td>
<td>minimum of fifteen feet (15&quot;)</td>
<td>minimum of fifteen feet (15&quot;)</td>
</tr>
</tbody>
</table>

*Trim or remove brush at road and trail crossings to provide good visibility in all directions. Warning signs should also be installed and set-back a sufficient distance along trails before road and trail crossings to enable riders to decelerate safely and come to a full stop before the actual crossing itself.*

### Desired Minimum Sightlines

#### Two-Track or Two-Way Trail

<table>
<thead>
<tr>
<th></th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>100’</td>
<td>110’</td>
<td>120’</td>
</tr>
<tr>
<td>More Difficult</td>
<td>60’</td>
<td>70’</td>
<td>75’</td>
</tr>
<tr>
<td>Most Difficult</td>
<td>35’</td>
<td>40’</td>
<td>45’</td>
</tr>
</tbody>
</table>

#### Single-Track or One-Way Trail

<table>
<thead>
<tr>
<th></th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>70’</td>
<td>80’</td>
<td>90’</td>
</tr>
<tr>
<td>More Difficult</td>
<td>35’</td>
<td>40’</td>
<td>40’</td>
</tr>
<tr>
<td>Most Difficult</td>
<td>20’</td>
<td>20’</td>
<td>15’</td>
</tr>
</tbody>
</table>

All distances are in feet and measured from the driver’s eye to a spot 12 inches above the trail ahead. For shared-use trails, use the longest sightline of any approved use. Note that these distances are general guidelines and not a substitute for site specific determination of safest sightline distances.
Invasive Species Management

Preventing the spread of invasive plants is a major concern of resource managers. Those involved in monitoring and maintaining trails should become familiar with these species and contemporary practices for controlling spread. Species that have been introduced, or moved, by human activities to a location where they do not naturally occur are termed "exotic," "nonnative," "alien," and "non-indigenous." Nonnative species are not necessarily harmful, in fact the majority have beneficial purposes. When nonnative species cause ecological or economic problems, they are termed "invasive" or "harmful exotic species."

Standard Practices for Invasive Species Prevention on Grant-in-Aid Trails

The practices outlined below are to be applied before any work is completed on a particular site and during maintenance/management and construction activity planning. This includes activities performed by the PAT, contracts and grants, such as natural communities restoration grants/contracts or grant-in-aid that are administered by the division.

Management activities that may lead to the introduction and spread of invasive species include maintenance, construction and visitor activities.

- Consider these Best Management Practices to prevent the introduction and spread of invasive species on GIA trails. When planning maintenance or construction activities, contacting the land owner or state land manager before proceeding to control invasive species on or adjacent to the trail is strongly encouraged.

  State forest lands have a list of PROHIBITED HERBICIDES that cannot be used in the forests. County or industrial land managers may have a similar list.

  Excerpts from the MN DNR invasive species standard guidelines:

  These Guidelines reflect the notion that invasive species management is a part of doing business every day. It is something that all of us can do in the course of our every-day business. And if we are to protect our natural resources, it is something that we need to incorporate into our thinking in much the same way that we think about safety for ourselves.

- Consider how to educate trail maintenance staff to:
  * Provide invasive species identification training
  * Recruit volunteers to help identify and control small infestations before they get out of hand
  * Monitor and control continually to reduce new outbreaks.

  Note: It is prohibited by law to move invasive species listed under M.R.1505 without a permit from the County Agricultural Inspector (CAI). See [http://www.dnr.state.mn.us/eco/invasives/laws.html](http://www.dnr.state.mn.us/eco/invasives/laws.html) for more information. For complete current information on state statutes and rules regarding harmful invasive species, call the DNR Invasive Species Program at (651) 259-5100, or visit the invasive species [statutes](http://www.dnr.state.mn.us/eco/invasives/statutes.html) and [rules](http://www.dnr.state.mn.us/eco/invasives/rules.html) at the Office of the Revisor of Statutes.
**All-Terrain Vehicle (ATV) Trails**

**Off-Highway Motorcycle (OHM) Trails**

**Off-Road Vehicle (ORV) Trails**

- **Before work projects consider:**
  - Mapping locations of invasive plants and learn about their life cycle, for best time of control and prevention of spread.
  - Come to a site with clean equipment, tools and clothing; clean means free of soil, mud, plant fragments and clean again before leaving a site.
  - Minimize the import of materials/organisms, and if you have to import, require certified weed-free materials and source as close as possible, inspect borrow sites, top inches often contain weed seeds.
  - Try to ensure that disposal of excess material does not introduce invasive species to new areas.
  - Minimize extent and time of soil disturbance/exposure, soil compaction
  - Re-vegetate newly developed sites with appropriate native species.

- **Consider Guidelines for the Movement of Equipment** (including trucks, trailers, heavy equipment, off highway vehicles, equipment, tools, and personal clothing and gear):
  - Before getting into or moving vehicles or equipment, visually inspect for and remove caked mud, dirt clods, plants, plant parts, bark, and debris from vehicles, equipment, tools and personal gear. Power washing is recommended, but not required.
  - Avoid moving through existing patches of invasive species going to and from the work site.
  - Again before leaving a work site, visually inspect for and remove caked mud, dirt clods, plants, plant parts, bark and debris from all vehicles, equipment, tools and personal gear.
  - Before leaving an aquatic work site (or water source), drain water from any equipment, tanks or water-retaining components.

- **After work projects consider:**
  - Post-work inspections to control new infestations before they develop a seed bank.
  - Closing perennially wet trails
  - Closing trails into and out of infested areas until control actions are implemented.
  - Avoiding travel thru infested sites during seed production cycles.

- **Consider Guidelines for Intentional Movement of Organisms and Materials** (including organic and inorganic materials as well as water, fish, plants, mulch, soil, gravel, rock, etc):
  - At least once annually, inspect all sites where materials are stored for signs of invasive plants, animals, insects, or disease organisms.
  - Where possible, treat any infestations identified prior to utilizing any stored materials.
  - Where not possible, restrict access to the storage site until such time as all infestations can be controlled.
  - Only use materials that are pest-free or have a very low likelihood of containing invasive species.
  - When moving materials from one site to another, follow the protocols above for all vehicles and equipment used.

**Invasive species programs and links**

**DNR programs** [Invasives Species Program](#) - Established in 1991. Monitors and manages invasive species of aquatic plants and wild animals.
All-Terrain Vehicle (ATV) Trails
Off-Highway Motorcycle (OHM) Trails
Off-Road Vehicle (ORV) Trails

Forest Stewardship Council’s highly hazardous pesticide list. The DNR, and its cooperators and contractors, may not use any of the following pesticides on the certified state forests and WMAs it manages; all other pesticides can be used. All of the DNR’s certified lands lie within the following ECS Ecological Provinces: Laurentian Mixed Forest, the Eastern Broadleaf Forest, and the Tall-grass Aspen Parklands. Contact DNR Forestry for more information – 651-259-5261.

<table>
<thead>
<tr>
<th>Acrolein</th>
<th>Dimethoate</th>
<th>Methiocarb</th>
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</thead>
<tbody>
<tr>
<td>Aldicarb</td>
<td>Dinoterb</td>
<td>Methomyl</td>
</tr>
<tr>
<td>Aldrin</td>
<td>Diphacinone</td>
<td>Methoxychlor</td>
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<td>Allyl alcohol</td>
<td>Diquat dibromide</td>
<td>Methylylarsenic</td>
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<tr>
<td>Alpha-cypermethrin</td>
<td>Disulfoton</td>
<td>acid (monosodium</td>
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<tr>
<td>Aluminium phosphide</td>
<td>Diuron</td>
<td>methanesenati</td>
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<td>Amitrole</td>
<td>DNOC</td>
<td>MSMA)</td>
</tr>
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<td>Azinphos-ethyl</td>
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<td>Fampuru</td>
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<td>Fenamiphos</td>
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<td>Fentrothion</td>
<td>Parathion</td>
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<td>Flocoumanfen</td>
<td>Paris green</td>
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<td>Gamma-HCH, lindane</td>
<td>Propaquizafo</td>
</tr>
<tr>
<td>Chlorothalonil</td>
<td>Hexachlorobenzene</td>
<td>Propetamphos</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>Hexazinone</td>
<td>Propyzamide</td>
</tr>
<tr>
<td>Coumaphos</td>
<td>Hydramethinol</td>
<td>Quintozene</td>
</tr>
<tr>
<td>Coumatetrayl</td>
<td></td>
<td>Simazine</td>
</tr>
<tr>
<td>Cylthrin</td>
<td></td>
<td>Sodium arsenite</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td></td>
<td>Sodium cyanide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sodium fluoroacetate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sodium fluoroacetate, 1060</td>
</tr>
<tr>
<td>DDT</td>
<td>Isocashen</td>
<td>Strychnine</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>Isoxatrin</td>
<td>Sulfluramid</td>
</tr>
<tr>
<td>Demeton-S-methyl</td>
<td>Lambda-cyhalothrin</td>
<td>Sulfotep</td>
</tr>
<tr>
<td>Diazion</td>
<td>Lead arsenate</td>
<td>Tebufenozide</td>
</tr>
<tr>
<td>Dicamba, dma salt</td>
<td>Manezoxeb</td>
<td>Tebupirimfos</td>
</tr>
<tr>
<td>Dichlorvos</td>
<td>Mecarbam</td>
<td>Telluthrin</td>
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<tr>
<td>Dicofol</td>
<td>Merciric chloride</td>
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<tr>
<td>Dicofos</td>
<td>Mercic oxide</td>
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</tr>
<tr>
<td>Dieldrin</td>
<td>Metam sodium</td>
<td></td>
</tr>
<tr>
<td>Dicnecoum</td>
<td>Methamidophos</td>
<td></td>
</tr>
<tr>
<td>Difethialone</td>
<td>Methidation</td>
<td></td>
</tr>
<tr>
<td>Diflubenzuron</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### All-Terrain Vehicle (ATV) Trails

### Off-Highway Motorcycle (OHM) Trails

### Off-Road Vehicle (ORV) Trails

<table>
<thead>
<tr>
<th>Design Parameters</th>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum turning radius</strong></td>
<td>Subject to local conditions or limitations. * May be less if specifically signed to indicate ‘Caution: Sharp Turn’</td>
<td>Twenty-five feet (25')</td>
<td>Twenty feet (20')</td>
</tr>
<tr>
<td><strong>Grades / Slopes, Hills / Contours</strong></td>
<td>In most cases, ATV and ORV trails should cross contours at right angles. However, careful consideration should be given to soil type, grade and slope, and vegetative cover in order to control surface water runoff and minimize the potential for soil erosion. Safety too, is a major consideration when traversing hillsides or steep slopes. Consult with your Area P&amp;T Staff for advice and additional information.</td>
<td>Percent not exceed 30%.</td>
<td>up to 40%</td>
</tr>
<tr>
<td>On trails where mechanized maintenance equipment can be used:</td>
<td>Allowable slopes may be increased to 40%</td>
<td>May be greater than 40% on ORV, or where slopes are rocky and non-erosive.</td>
<td></td>
</tr>
<tr>
<td>Bypasses should be provided for all grades exceeding 25%</td>
<td>exceeding 25%, EXCEPT for those trails designated for advanced operators only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**In most cases,**
- Trail should cross contours at right angles (90 degrees).
- Routing trails along side slopes should be avoided.
- Approaches should be straight for at least the distance of the slope.

Use properly designed and constructed bench cuts and switchbacks as reasonable alternatives for climbing steep hills. Rolling dips and climbing turns are also good ways to control surface water runoff when working with significant elevation change. Predictably, less erosion is likely then trail grades are less steep. Tread should traverse slopes with a grade that is ideally less than one-fourth of the fall-line slope grade, with up to one-third being acceptable if soil conditions allow. For example, on a 36 percent slope, the ideal tread grade would be 9 percent or less. This ratio helps ensure that the tread is not following the fall-line and that side drainage without excessive erosion is possible. As tread grade increases, native soil treads need to be drained more frequently to prevent accumulation of erosive flow volumes. This is most often accomplished by placing tread crests closer together. Consult with your Area P&T staff for advice and additional information.
All-Terrain Vehicle (ATV) Trails
Off-Highway Motorcycle (OHM) Trails
Off-Road Vehicle (ORV) Trails

Example of a good trail layout
This trail is rolling grade on side-slope. Very desirable and easily sustained (downhill is to the left). Much of the roadway, cut-slope and fill-slope are overgrown, increasing both sustainability and trail experience.

Example of a poor trail layout
Excess clearance, excess sightlines. Too much clearance enables higher speeds with longer sightlines. This resulted in rapid tread displacement, as seen in the foreground. Having shrubs and trees next to the tread would improve the situation.

Erosion Control

Rolling grade
“Rolling grade” is the primary design pattern used for developing sustainable natural surface trails. This pattern is best described as a series of dips, crests, climbs, drainage crossings, and edge buffers that are intrinsically linked and purposefully designed to form a sustainable trail. The basic concept behind rolling grade is that a sustainable trail must be able to drain to somewhere lower than itself at all times. Instead of hardening the tread to withstand these forces, rolling grade is used to manage water flows down or across the trail. By using a series of dips and crests like a roller coaster, the tread is divided into a series of small watersheds that drain into a dip. A tread watershed consists of the tread surface plus any uphill area where runoff flows onto the trail and down to a dip between two crests. The only way to prevent erosion is to form tread watersheds so they will not produce enough water to seriously erode the trail. Every dip must also drain to somewhere lower than itself.

![Diagram of Rolling Grade](image)
Broad-based dips are gentle waves on the surface of trails. They minimize erosion by directing water movement off the trail. Water flows into the bottom of the dip and drains into stable, vegetated areas at the side of the trail. Broad-based dips can serve two functions: 1) to divert surface flow off a traffic surface, and 2) to permit water to drain across it. They are best suited for grades of less than about 10 percent. Include broad-based dips in the initial construction of a road, trail, or landing. The basic idea is to excavate a dip, build up a berm, and make sure there is an outlet for the water. If possible, use the assistance of a qualified engineer. When building a broad-based dip:

- Excavate at a 30- to 45-degree angle to the road.
- Allow at least 150 feet for the entire dip.
- Build the top of the berm at least 18 inches higher than the bottom of the dip.
- Dig the outlet of the dip at least 3 inches lower than the upper end.

Water will flow across it and out into the adjoining vegetated area instead of pooling in the bottom of the dip. Space broad-based dips the same as cross-drainage culverts. Where rutting is a concern, use gravel or other crushed stone on the berm and dip of the structure to protect the surface. Broad-based dips work well on actively used roads or trails. They require less maintenance than water bars and culverts. They do not inhibit normal vehicle traffic. Broad-based dips require more advanced planning than water bars or open-top culverts. They should not be used for grades of more than 10 percent or where large or frequent water flows are expected. Make sure side drainage areas are vegetated, and that water does not drain directly into streams, lakes, or wetlands. See http://www.extension.umn.edu/distribution/naturalresources/DD6975

Correct rolling grade drainage crossing
The trail crosses the channel in a tread dip. Since the drainage is usually dry and the soil is sandy water can cross directly on native tread without extensive erosion. The tread climb out of the drainage is visible in both directions.

Incorrect rolling grade drainage crossing
This trail is intercepting and diverting water from the site drainage crossing behind the photographer, sending it down the tread. If the tread had a rolling grade on the slope at left, this diversion could be prevented.
Selecting a Seed Mix: Standard seed mixtures used by Mn/DOT, BWSR, and some divisions of the DNR have been revised and consolidated into one list of State Seed Mixes. Standards for the mixes have also been combined, with both BWSR and Mn/DOT requiring that mixes be sold as pure live seed (PLS), Source Identified (Yellow Tag) when available, and specific labeling requirements. Requirements for local origin seed will vary depending on the project goals and seed availability. Mixes are available to meet the most commonly encountered erosion control and restoration needs. Seed mix numbers provide information about the use and content of the mix. This numbering system can be used to guide the user in choosing the right mix for a given project. A full list of the State Seed Mixes and guidelines about their function and intended planting areas is available on the MnDOT website by searching for “Seed Mixes” or by going to: http://www.dot.state.mn.us/environment/erosioncontrol/seedmixes.html. A new manual, “Native Seed Mix Design Manual”, is available; it provides methodology for choosing mixes or creating a custom mix. http://www.dot.state.mn.us/environment/pdf_files/native-seed-mix-dm.pdf

Stormwater pollution prevention. When stormwater drains off a construction site, it carries sediment and other pollutants that harm lakes, streams and wetlands. According to the 1996 National Water Quality Inventory, stormwater runoff is a leading source of water pollution. The U.S. Environmental Protection Agency (EPA) estimates that 20 to 150 tons of soil per acre is lost every year to stormwater runoff from construction sites. Who Needs an NPDES/SDS Permit? You need an NPDES/SDS permit if you are the owner or operator for any construction activity disturbing:

- One acre or more of soil.
- Less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre.
- Less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

Most construction activities are covered by the general NPDES stormwater permit for construction activity, but some construction sites need individual permit coverage. Owners and operators are both responsible for submitting the permit application. For full details of the permit requirements, a copy of the NPDES/SDS construction stormwater permit is available online at: http://www.pca.state.mn.us/water/stormwater/stormwater-c.html

Develop a Storm Water Pollution Prevention Plan to address interim and final erosion control needs, specific measures, and how to implement or install those measures. P&T staff can provide technical assistance to locate typical drawings for sediment traps, sediment fences, brush barriers, ground cover, check dams, armored ditches, and biotechnical measures. County highway staff may be able to help also.
The NPDES/SDS construction storm water permit identifies slope and site stabilization requirements that, if followed properly, can control erosion and sediment problems on a construction site.

- Prior to construction, areas not to be disturbed should be clearly flagged, staked or identified with signs and noted on the plan sets.

- All exposed areas must be stabilized no later than 14 days after the construction activity in that area is temporarily or permanently completed.

- The normal wetted perimeter of any temporary or permanent drainage ditch must be stabilized within 200 feet from the property edge.

- Drainage ditches and conveyance systems must be inspected for evidence of erosion and sediment deposition. All deltas and sediment deposited must be removed and the areas must be re-stabilized where sediment removal results in exposed soil.

- In order to maintain sheet flow and minimize rills and gullies, there shall be no unbroken slope lengths of greater than 75 feet for slopes with a grade of 3:1 or steeper.

If the construction site is within 1 mile of a special or impaired water, the following revised and additional requirements are listed in Appendix A of the permit:

- All exposed areas must be stabilized no later than 7 days after the construction activity in that area has temporarily or permanently ceased.

- An undisturbed buffer zone of not less than 100 feet from special waters shall be maintained at all times.
All-Terrain Vehicle (ATV) Trails
Off-Highway Motorcycle (OHM) Trails
Off-Road Vehicle (ORV) Trails

Water Crossings  NOTE: Permits to work in public waters are required for most water crossings. Information and permit applications are available from the DNR's Division of Ecological and Water Resources:  www.mndnr.gov/permits/water

Projects that affect Minnesota's water resources are regulated by a variety of state, local, and federal agencies. In many cases, a permit is required from one or more of these agencies before proceeding with the project. Projects constructed below the ordinary high water (OHWL) level, which alter the course, current, or cross section of public waters or public waters wetlands, will require a public waters work permit. Your local County zoning officials and local Soil and Water Conservation District or the local DNR Area Hydrologist can assist in evaluating which permits are required and in recommending methods to avoid, minimize or mitigate potential impacts.

OHV trails may NOT be routed through lakes, streams, flowages or other bodies of water. When stream crossings are unavoidable, consultation with County zoning officials and local Soil and Water Conservation District staff is recommended to determine the appropriate crossing method, which may range from a hardened stream crossing, to an appropriately sized culvert or a bridge to span the water crossing. Traditionally, culvert design was based on hydrologic and hydraulic models that predict peak runoff from a watershed, with the culvert sized to pass a specified design storm. Fish passage was not always addressed with these designs. Several alternative design methods have been developed that focus on matching the natural stream characteristics, and consider sediment transport and fish passage requirements. These recent improvements to hydraulic design practices may also reduce the frequency of scour at pipe outlets in many areas. Other potential benefits include lower maintenance costs, longer life span, and better sediment and erosion control. Alternative designs or simulation techniques inherently take fish passage into account by addressing issues of low flow, hydraulic variability and sediment transport. Currently a variety of design techniques are increasingly being implemented in Minnesota, commonly where fish passage is a concern.

<table>
<thead>
<tr>
<th>All-Terrain Vehicle (ATV) Trails</th>
<th>Off-Highway Motorcycle (OHM) Trails</th>
<th>Off-Road Vehicle (ORV) Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Width</strong></td>
<td>minimum of six (6) feet wide</td>
<td>minimum of eight (8) feet wide</td>
</tr>
<tr>
<td></td>
<td>minimum of 3 feet wide</td>
<td></td>
</tr>
</tbody>
</table>

Railings are required on all bridges. Bridge width may be dictated by the need for maintenance equipment access, and all bridge designs must have the approval of the Area P&T Supervisor.
### Sensitive Areas
To the extent possible, trail alignments should avoid State Parks, Wildlife Management Areas, Scientific and Natural Areas, National Parks, Wilderness Areas or wetlands and other environmentally sensitive areas. Motorized trails may be prohibited altogether in some of these designated areas. Where practical, consider separating motorized trails from designated non-motorized trails or other traditionally non-motorized recreation areas.

### Examples of an Area of Environmental Sensitivity:
Not all Areas of Environmental Sensitivity (AES) are equal. Many may have stringent levels of regulatory protection on their own, such as Threatened and Endangered Species. Typical examples are:
- Wetlands that are not permitted for construction activities.
- Trout Lakes and Streams along with their source springs.
- Calcareous Fens.
- MPCA Outstanding Resource Value Waters (Stormwater Special Waters).
- Specimen Trees or wooded areas designated to be preserved.
- Prairie remnants, such as identified Railroad Rights-of-Way Prairies.
- ‘Sites of Significant Biodiversity’ areas designated by the DNR County Biological Survey. These sites contain varying levels of native biodiversity such as high quality native plant communities, rare plants, rare animals, and/or animal aggregations.
- Federal or State listed species, and their habitat.
- Historical sites
- Geological features

### Best Practices:
- Design the project to avoid impacts to identified Area of Environmental Sensitivity.
- Walk the perimeter of a sensitive area with the grading foreman so that all personnel understand and agree on the hard edge of the sensitive area.
- Redundant sediment/erosion control Best Management Practices (BMP’s) may be required for protection of areas of environmental sensitivity. “Redundant BMP’s” are any multiple series of erosion/sediment control BMPs used with each other to provide maximum down-slope protection.
- Re-vegetate disturbed soils with native species suitable to the local habitat.
- Relocate plants if harm is unavoidable (Contact the P&T staff for assistance).
- Install temporary fence to prevent damage due to vehicle movement or supply storage.
- Place erosion control or a construction limit barrier for a buffer to areas of environmental sensitivity.
- Leaving existing vegetation until the final riprap placement or final grading phase is an inexpensive BMP that, where possible, should be utilized as part of ‘Redundant BMPs’.

For more information:
- MnDOT Highway Project Development Process (HPDP): [http://www.dot.state.mn.us/planning/hpdp/environment.html](http://www.dot.state.mn.us/planning/hpdp/environment.html)
- MnDOT 2005 Standard specifications: [http://www.dot.state.mn.us/pre-letting/spec/](http://www.dot.state.mn.us/pre-letting/spec/)
- DNR Natural Heritage Information System: [http://www.dnr.state.mn.us/eco/nhnrp/nhis.html](http://www.dnr.state.mn.us/eco/nhnrp/nhis.html)
- DNR Rare Species Guide: [http://www.dnr.state.mn.us/rgs/index.htm](http://www.dnr.state.mn.us/rgs/index.htm)

*Excerpt from Best Practices for Meeting DNR GP 2004-0001 (September 2010 Edition) Chapter 1, Page 10*
## Construction Permits
### Permitting agency and area of coordination and/or approval

<table>
<thead>
<tr>
<th>Agency</th>
<th>Area of Coordination and/or Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Natural Resources (DNR)</td>
<td>Any project or work affecting public waters. Reference: Minnesota Statutes, Chapters 103A and 103G.</td>
</tr>
<tr>
<td>Watershed Districts</td>
<td>&quot;Regulate improvements of the beds, banks, and shores of lakes, streams, and marshes...to preserve the same for beneficial use.&quot; Reference: Minnesota Statutes, Chapter 103A and 103B.</td>
</tr>
<tr>
<td>County Commissions and Joint County Ditch Authorities</td>
<td>Drainage ditch systems located respectively: (1) completely within county limits or, (2) in two or more counties or servicing more than one county. Reference: Minnesota Statutes, Chapter 103F. Note: In some cases Watershed Districts have begun representing the county commissions and Joint County Ditch Authorities on these matters.</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>Section 10 permits: &quot;for all work in, over or under navigable waters of the United States.&quot; Reference: River and Harbor Act of 1899. Section 404 permits: &quot;for work affecting the waters of the United States.&quot; Reference: Federal Water Pollution Act of 1972. Note: Nationwide permits by the Department of the Army were granted in 1977 for certain noncontroversial, environmentally insignificant activities.&quot; These permits exempt certain activities from further involvement in the Sections 10 and 404 permit process.</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>Bridges, causeways, overhead pipelines, and work affecting Coast Guard navigational aids.</td>
</tr>
</tbody>
</table>

NPDES Permit: The Technical Memorandum, or subsequent issues, describes the process to obtain the permit. The current TM has expired, clicking on the link will let you access the old TM. Once a new TM has been drafted, the link will be updated. The following link provides information about the NPDES program and guidance from the MPCA. This also links you the the permit and application forms. [http://www.pca.state.mn.us/water/stormwater/stormwater-c.html](http://www.pca.state.mn.us/water/stormwater/stormwater-c.html)

NPDES Permit Changes: [http://www.pca.state.mn.us/publications/wq-strm2-42.pdf](http://www.pca.state.mn.us/publications/wq-strm2-42.pdf)
C. Signage

**Trail Signing:**

Posted and printed information should be clear, concise and readily available (or visible) to trail users. Locational signing should identify trail corridors, land ownership boundaries, hazardous areas, emergency numbers, and the location of any associated support facilities (e.g., rest rooms, camping, parking or staging areas). Environmentally-sensitive areas and non-motorized trails or use areas should also be clearly marked. Some clubs direct trail users to gas, food, lodging via trail signing and/or printed visitor maps. All signing must meet state and federal guidelines regarding sign color, sizing and trail classification. Consult your P&T Area Staff for signs and signing details.

**Safety Hazards**  

NOTE: It is the responsibility of the local trail club and its’ sponsor to ensure that any potential safety hazards are appropriately signed and mapped. The trail should be located in such a manner as to avoid cliffs, rock falls, steep hills, heavily populated or congested areas, steep ditches or sharp curves, or other hazards.

**General sign placement guidelines**

DNR Sign Manual and Forest Access – Signing and Placement of Guidelines are the primary references for placement of natural trail signs and should be referred to for in depth information on signage.

Official signage, identifying the trail as a grant-in-aid trail should be placed at parking areas, staging areas or trailheads, and other high-visibility areas along the trail system.

**Multiple messages**

When more than one message is posted on one post, the primary message is to be at the top.

Signing for informational purposes and for traffic control and safety are important to a successful trail.

a. **Informational Signing**: Most commonly placed at trail heads, access points and resting areas.

b. **Traffic Control & Safety Signing**: Typically placed along the trail including reassurance blazers, caution signs, ‘Do Not Enter’ signs, ‘Stop’ and ‘Stop Ahead’ signs, directional arrows, and ‘Stay on Trail’ reminder signs. Directional signs include trail junction signs, directional blazers, and reassurance blazers. There should always be directional signs in open or cut-over areas where the trail is indistinct, or where trail users could become confused. The color of DNR-issued signs are:

1. Directional blazers or trail junction signs - black on yellow
2. Reassurance blazers - motorized trails: red decal on tan sign
3. Permitted Vehicle Use Decals - motorized trails: white on red
4. Snowmobile - black on orange.
Information signing

- General Information -- Located and designed to provide information to trail users to assist or improve their ability to safely and enjoyably use the trail.
- Use Designation -- Should be located at all intersections where incompatible users may enter the trail.
- Interpretive -- Located at points of interest along trail. Consult P&T for recommendations concerning interpretive signs.

A number of kiosk and information board design and construction plans have been prepared by the DNR. Existing plans may be a good starting point to design and include various open three-sided display boards, rectangular kiosks with storage inside and variations on two-sided information boards. All installations should have accessible pathways and approaches as well as signage height to meet state federal guidelines for accessibility. Contact P&T staff for assistance.

Regulatory traffic signing

Regulatory traffic signs (e.g., Stop, Yield, Do Not Enter) should be located a minimum of 6 feet back from an intersection. For motorized uses, advance warning signs should be located approximately 300 feet from upcoming intersections or other hazards.

Many roads are considered to be in the "Conventional Road" category as described in the Minnesota Manual on Uniform Traffic Control Devices (MMUTCD). It is recommended that the trail manager meet with their County Highway Department or local MnDOT officials to receive assistance when a county or state highway is on the trail route. Appropriately sized signs required by MMUTCD may be obtained from County Highway Departments or MnDOT. These signs should be consistent with the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), as appropriate. The MN MUTCD contains the standards as adopted by the Commissioner of Transportation for traffic control devices that regulate, warn, and guide road users along all roadways within the State of Minnesota.

The electronic version posted on the MN MUTCD website is the official Minnesota publication.
http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html

Printed versions of this manual are available from the MN/DOT Map and Manual Sales Unit, Mail Stop 260, 395 John Ireland Blvd., St. Paul, Minnesota 55155-1899, phone 651-296-2216. Print out a copy of the order form and mail it to the address above with payment.
Traffic Control & Safety Signing

**Stop (NRM 8.4.1):** Locate at every traveled public road, rail crossing or recreational trail intersection.

**Stop Ahead (NRM 8.4.2):** Locate approx. 300' prior to all stop signs, allowing adequate setback distance for trail users to decelerate safely and come to a complete stop at the road/trail/rail intersection.

**Yield (NRM 8.4.3):** Locate at junction with other trails. May also be used at trail crossings of small private roads.

**Caution (NRM 8.4.5):** One or more signs with the first approximately 300 feet prior to all potential hazards (e.g., cliff edges, rock falls, steep hills, heavily populated or congested areas, bridges, steep ditches, sharp curves or drainages, etc.).

**Do Not Enter (NRM 8.4.4A):** Locate at trail intersections to denote incompatible uses, one-way trails, prohibited areas.

**Trail Junctions (NRM 8.4.8xx):** (directional) Locate at trail junctions with directional arrows placed prior to sharp curves or turns. Set-back depends upon anticipated speed of trail users.

**Truck Hauling (NRM 8.4.9):** Locate caution signs wherever logging or other trucks will cross or share the road or trail treadway. Be sure to post in both travel directions, and allow sufficient distance for riders to slow or stop if necessary.

**‘Stay On Trail’ (NRM 8.2.20):** Locate in areas where departures from the trail are especially problematic or likely, such as in open areas, lowland or otherwise wet areas, or in areas where the trail traverses unique or outstanding natural resources, or lies adjacent posted private property.

Trail use symbols or decals

<table>
<thead>
<tr>
<th>Class I and Class II ATV</th>
<th>OHM</th>
<th>ORV</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRM 8.4.22BI</td>
<td>NRM 8.4.22C</td>
<td>NRM 8.4.22D</td>
</tr>
<tr>
<td>NRM 8.4.22BII</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Trail Difficulty:**
Whenever a trail is rated anything other than “easy”, trail difficulty-level signs should be posted at every access point and throughout the trail system at key intersections and along the trail whenever the level of difficulty changes. The mileage associated with a particular segment of rated trail should also be provided.

- **Green Circle – ‘Easiest Trail’** Denote ‘beginner’ trails with gentle curves and wide, smooth tread that are a minimum of two vehicles in width. Such trails feature no more than 10% grade, side slopes of 10 to 35%, and they typically are no longer than about 10-miles with no significant obstacles.

- **Blue Square – ‘More Difficult Trail’** Denote ‘intermediate’ trails with frequent sharp curves, trail width of about 1½ vehicles, with partially rough treadway surface, which may be 30-miles or more in length. Such trails feature grades up to 30%, side slopes up to 50%, including moderate switchbacks, with some moderate obstacles.

- **Black Diamond – ‘Most Difficult Trail’** Denote ‘expert’ trails featuring sharp curves and switchbacks on steep grades exceeding 30%, side slopes of up to 100%, with very rough, loose tread surfaces. Obstacles may be 10-inches in size or greater.
## Temporary and/or Special Signage

The following special and/or temporary signs should be posted near parking areas, trailheads, facilities, or at strategic junctions, trail difficulty level change, temporary trail hazards or closures.

### Use Sign blanks:
Locate as necessary, use decals and text as appropriate and the **OHV Symbol Decals** for trail use to make the following:

<table>
<thead>
<tr>
<th><strong>Symbol Decals</strong></th>
<th><strong>ATV, OHM, ORV Trail</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATV, OHM, ORV Trail</td>
<td></td>
</tr>
</tbody>
</table>

### Reassurance Blazer:
Locate as necessary, but principally in open or cut-over areas, at road or access route crossings, and at little-used road or trail intersections.

Note: reflective reassurance blazers serve as corridor markers and should be placed on the right side of the trail on posts at reasonable intervals.

<table>
<thead>
<tr>
<th><strong>Reassurance Blazer</strong></th>
<th><strong>No ATV, OHM, ORVs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassurance Blazer</td>
<td>No ATV, OHM, ORVs</td>
</tr>
</tbody>
</table>

### Mileage Markers (optional) (No number available):
Locate at intervals of one-mile or kilometer. Work with your local emergency response and sheriff’s office to determine the best grid or waypoint markings for trail user safety. NOTE: Mileage markers and “you are here” signs can be very helpful to the trail user and manager. They let trail users know the distance they have traveled or must travel to return to the trailhead. They can also help the manager easily identify maintenance problem areas and can also be useful to help locate injured or stranded trail users.

<table>
<thead>
<tr>
<th><strong>Mileage Markers</strong></th>
<th><strong>Accessibility Decal (Handicapped Accessible - No number available)</strong></th>
</tr>
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</table>

### Grant-In-Aid (NRM 8.5.7):
Locate at trailheads, crossings facilities and major road or trail intersections to indicate trail is supported by state funds.

<table>
<thead>
<tr>
<th><strong>Grant-In-Aid (NRM 8.5.7)</strong></th>
<th><strong>Trail Closed (NRM 8.4.4D)</strong></th>
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</thead>
<tbody>
<tr>
<td>Grant-In-Aid</td>
<td>Trail Closed</td>
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</table>

### Trail Closed (NRM 8.4.4D):
at potential access points where unauthorized users could enter to indicate trail closure.

<table>
<thead>
<tr>
<th><strong>Trail Closed (NRM 8.4.4D)</strong></th>
<th><strong>Dirt Alert (NRM 8.2.44)</strong></th>
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<tbody>
<tr>
<td>Trail Closed</td>
<td>Dirt Alert</td>
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</table>

### Dirt Alert (NRM 8.2.44)
Interpretive sign encouraging responsible riding.
Visitor maps & public information

The production and printing of Visitor Maps, which explain and depict the trails or trail systems, is reimbursable. The MN Trails Assistance Program will reimburse up to 65% of actual production and printing costs, so long as the maps are made available to the public free of charge. Advances in geographical information systems (GIS) allow DNR staff to assist with many trail mapping needs quickly. The DNR provides print and electronic pocket maps, brochures and web information for OHV trails at no charge.

Accurate and detailed visitor maps of the trail system should be created for free distribution at key locations. These maps should be available at the trailhead, Area DNR Offices, local business establishments, and other locations convenient to potential trail users.

Maps should include the following detail:
- **Trail System Name** – Include any trail (sub) segment names or nicknames.
- **Trail Location** – Provide driving directions to the trailhead and/or primary parking area from the nearest town and major access route. A small inset state map showing the trails’ general location within the state is desirable.
- **Trail Length** – List the number of miles/km for each major trail segment or trail loop.
- **Trail Use** – Identify loops or segments designated for specific uses, as well as those segments closed to specific trail users, particularly where potential conflicts might arise (e.g., motor vs non-motor trails).
- **Trail Connections** – Identify any other recreational trails or other facilities the trail connects to (e.g., federal state or county parks, forests, GLA trails, municipal parks or trails, etc.).
- **Trail Information** – Provide a name and contact information for the Club’s Trail Administrator, and perhaps a back-up contact (or the local Chamber of Commerce in some cases) in case the primary contact is unavailable. The 24-hour phone number of the local DNR Conservation Officer should also be listed.
- **Bridges** – Show all surface water features and associated trail bridge crossings.
- **Roads** – Identify all designated state and county forest roads, noting portions that double as trails. Also identify any roads or routes which are not maintained, but are open for legal OHV use and have corresponding signs posted on trails to help trail users know where they are at all times.
Map Features – Mark and/or list on the map locations where the following are available:

- Gas, Food, Lodging, Groceries.
- Vehicle Towing & Repair Services
- 911 Medical or Police Emergency (or Zenith)
- Nearest DNR Office & Contact Information (Including local Conservation Officer’s 24 hr phone number)
- Other helpful info (e.g., nearby medical facilities, local visitor’s bureau or chamber of commerce)
- Locational Grid – Depict the system for locating spots along the trail, and for general search and retrieval operations, if such a system exists. Explain briefly the system and how it works.
- Basic Safety Tips – Statements regarding trail etiquette and prudent use of the trails should also be included on the map. Safety messages regarding speed and alcohol are especially important.
- Publication Date – It is helpful to clearly date all maps (lower right-hand corner for consistency) so that current, accurate versions replace older versions already in circulation.

County base maps are available from the DNR that show trail alignments. These base maps are available for most counties from the P&T. Check with the Area P&T Supervisor for your county. County highway maps are available through the Minnesota Department of Transportation, or through your Area P&T Supervisor for most counties. These serve as ideal base maps for depicting most OHV Trail alignments.

NOTE: All maps or public information purchased with grant funds must minimally acknowledge

“Funding for this project was provided by the Minnesota Natural Resources Fund [insert appropriate account name(s) here such as All-terrain Vehicle and/or Off-highway Motorcycle and/or Off-road Vehicle] Account as recommended by the Minnesota Department of Natural Resources Grant-in-Aid Program (MN DNR GIA program).”

Or

“GIA Trails funded through the Minnesota Trails Assistance Program”

NOTE: If advertising sales were used to raise matching funds for maps, etc the following text is required to be prominently displayed:

“This publication is partially funded through advertising revenue. The State of Minnesota and the Department of Natural Resources can neither endorse the products or services advertised nor accept any liability arising from the use of these products or services.”
The DNR provides print and electronic pocket maps, brochures and web information for OHV trails at no charge.
D. Maintenance

Maintenance guidance The following provide general recommendations for maintaining natural surface trails. [Note that the guidelines are generic and not a substitute for trail-specific maintenance procedures that respond to local site conditions, soils, types and levels of use, and other factors.] Guidelines for general maintenance practices for natural surface trails fall into a number of basic categories.

Routine maintenance
Routine maintenance should be performed on natural trails to prevent simple problems from becoming unsustainable conditions. Staying on top of user behavior issues and taking care of problems at an early stage may help keep the trail on private and public lands.

Look at Trail Conditions
- Regularly monitor your trail for debris, fallen limbs, washouts, rutting, and vegetative growth, and complete maintenance to address issues and findings. It is also important to monitor trail signage and other support structures and related facilities to ensure that they are all in good condition and functioning properly.
- Predict and avoiding future problems through preventive maintenance.
- Close trails during spring break-up, following major precipitation events, and other times when saturated soil conditions exist.

Look at User behaviors
- Protect the trail tread from overuse and misuse (i.e., uses the trail is not designed to accommodate). It’s important to monitor the extent to which trails and trailheads are being used to determine whether demand and user expectations are being adequately met. It is also useful in documenting trail usage and monitoring to ensure that closed trails are not being used illegally.
- Control unauthorized travel. Off-trail travel is not normally permitted or encouraged. Prompt attention to off-trail travel can help to minimize adjacent landowner complaints and keep the trail open for public use. Always carefully note the point of departure from the trail, and report this information to the landowner, trail manager and/or DNR enforcement or county sheriff’s office.
- The objective is to keep the trails sustainable and minimize adverse impacts such as compaction, displacement, and erosion and control inappropriate user behavior.
Complete inspections
Trail inspection should occur throughout the year to detect potential maintenance issues before unsustainable conditions or safety concerns arise. A routine inspection schedule is crucial to staying on top of maintenance issues and taking care of problems at an early stage. Locating, identifying, and correcting problems when they are still small will prevent simple problems from becoming big problems.

**Typical Inspection Schedule**

<table>
<thead>
<tr>
<th>Season</th>
<th>Inspection Focus</th>
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<tbody>
<tr>
<td>Spring</td>
<td>Inspect for damage due to winter seasonal uses and freeze-thaw cycles. Check for erosion, plugged culverts, user- and maintenance vehicle-caused damage, unauthorized uses, and other visible signs of tread imperfections. Record all occurrences and schedule maintenance on a priority basis. Also clear debris from the trails as soon as possible in the spring.</td>
</tr>
<tr>
<td>Summer</td>
<td>Conduct ongoing inspections to keep trail in a safe, usable condition. In addition to items listed for spring, also inspect vegetation growth and encroachment. Pay special attention to erosion issues, drainage-ways, and ditches that may have received heavy spring runoff. Record all problems and schedule maintenance on a priority basis.</td>
</tr>
<tr>
<td>Fall</td>
<td>Conduct ongoing inspections to keep the trail in a safe, usable condition. Focus on maintenance issues that should be taken care of before winter to avoid more damage during spring thaw. Special attention should be given to tread dips, drainage crossings, culverts, and drainage-ways that must be operational for spring runoff.</td>
</tr>
<tr>
<td>Winter</td>
<td>This is a good time of year to check low areas and drainages that cannot be easily accessed during the summer. This includes culverts, ditches, and beaver ponds.</td>
</tr>
</tbody>
</table>

Severe weather events may require additional monitoring to ensure trail conditions allow the safe, environmentally responsible operation of off-highway vehicles (OHVs).

**Immediate Action Recommended**

**NOTE:** If any of the following conditions are found to exist – you are advised to take immediate action:

1. The main trail route is impassable, and riders have created an unofficial ‘bypass’ or ‘short-cut’ around the obstacle. This is commonly termed: “Trail Braiding”.

2. Travel into sensitive areas is causing rutting, erosion or damage to surface waters or wetlands.

3. The primary tread surface is seriously rutted making the main route impassable to regular trail traffic.

4. The “Splash out” of soils beyond the tread surface has resulted in soil movement beyond the trail tread and into adjacent wetlands or surface waters.

5. Unauthorized off-trail travel is occurring.
**Enforcement**

Enforcement is the presence of officers with authority to enforce local and state ordinances, rules and statutes to ensure user compliance, safety and resource protection. The Off Highway Vehicle (OHV) Safety Enforcement Grant Program is available to be used by counties to assist the state in OHV enforcement activities, including training local staff, holding ATV safety classes, and field enforcement activity. Talk to your county about their participation.

Good communications with county and municipal enforcement as well as the local DNR Conservation Officer is important to a successful trail system. **Enforcement communication** is encouraged to occur at the seasonal opening and closing of a trail system as well as when violations are observed.

**Trail Ambassadors** (OHV Safety and Conservation Volunteer Program)

In 2007, the State Legislature authorized the ‘Off-Highway Vehicle (OHV) Safety and Conservation Program’ *(MS 84.9011)* to promote safe, environmentally responsible Off-Highway Vehicle (OHV) operations in Minnesota. OHVs include All-Terrain Vehicles (ATVs), Off-Highway Motorcycles (OHMs) and Off-Road Vehicles (ORVs), such as jeeps and four-wheel-drive trucks.

The "Minnesota DNR Volunteer Trail Ambassador Program" was established by the DNR Divisions of Enforcement, P&T and Forestry. Trail Ambassadors are specially trained volunteers, sponsored by qualifying organizations, who play a critical role in assisting land managers’ efforts to provide a recognizable presence on the lands they enjoy while providing a positive and informative role model for fellow OHV trail users.

Trail Ambassadors are not licensed peace officers. They cannot arrest or detain suspected offenders. The program exists to **promote safe, environmentally responsible operation of OHVs** through informational and educational contacts, and through volunteer monitoring efforts.

Trail Ambassadors are required to fill out a ‘Daily Trail Log’. The DNR regularly receives these daily logs at a central location. From that point, the information and observations are shared with affected MN DNR divisions. Enforcement issues, for example are forwarded to local Conservation Officers. Trail issues are forwarded to Area P&T Staff, and state forest land issues are forwarded to Division of Forestry field offices. Trail issues forwarded to Area P&T Staff will be communicated to the GIA Trail Administrator and/or Sponsor to resolve issues identified by the volunteers out on the trail system.