

**Forest Service Handbook
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**Forest Service Handbook 2309.18 – Trails Management Handbook
Zero Code**

Amendment: 2309.18-2022-1

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Responsible Staff:

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Digest: Following is an explanation of the changes throughout the directive by section.

Section 05: Adds new definitions for “bicycle,” “electric bicycle (e-bike),” “Class 1 e-bike,” “Class 2 e-bike,” and “Class 3 e-bike.”

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Use this Handbook to implement decisions regarding trail management (FSM 2350).

02 – Objectives

See FSM 2353.02.

05 – Definitions

All-Terrain Vehicle (ATV). A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

Area. A discrete, specifically delineated space that is smaller, and, except for over-snow vehicle use, in most cases much smaller, than a Ranger District (36 CFR 212.1).

Bicycle. A pedal-driven, solely human-powered device, with two wheels attached to a frame, one behind the other.

Clearing Limit. The area over and beside the trail tread that is cleared of trees, limbs, and other obstructions.

1. Clearing Height. The height of the clearing limit measured vertically from the trail tread.

2. Clearing Width. The width of the clearing limit measured perpendicular to the trail.

Climbing Turn. A reverse in direction of the trail grade without a level landing that is used to change elevation on a steep slope.

Cross-Country Skiing. Skiing on unmarked routes or marked trails that may be packed and groomed with set tracks.

Cross Slope. The percentage of rise to length when measuring the trail tread from edge to edge perpendicular to the direction of travel.

Design Clearing. The clearing limit determined to be appropriate to accommodate the Managed Uses of a trail.

1. Design Clearing Height. The minimum clearing height determined to be appropriate to accommodate the Managed Uses of a trail.

2. Design Clearing Width. The minimum clearing width determined to be appropriate to accommodate the Managed Uses of a trail.

3. Design Shoulder Clearance. The minimum horizontal and vertical clearance of obstructions (for example, removal of bicycle pedal or motorcycle peg bumpers) immediately adjacent to the trail tread that is determined to be appropriate to accommodate the Managed Uses of a trail.

Design Cross Slope. The cross slope determined to be appropriate to accommodate the Managed Uses of a trail.

1. Target Cross Slope. The cross slope that is determined to be appropriate over most of a trail to accommodate its Managed Uses.
2. Maximum Cross Slope. The steepest cross slope that is determined to be appropriate based on the Managed Uses of a trail and that exceeds the target cross slope of the trail.

Design Grade. The trail grade determined to be appropriate to accommodate the Managed Uses of a trail.

1. Target Grade. The trail grade that is determined to be appropriate over most of a trail to accommodate its Managed Uses.
2. Short Pitch Maximum. The steepest grade that is determined to be appropriate based on the Managed Uses of a trail, that generally occurs for a distance of no more than 200 feet, and that does not exceed the maximum pitch density.
3. Maximum Pitch Density. The maximum percentage of a trail with grades that exceed the Target Grade and that are less than or equal to the short pitch maximum, which is determined to be appropriate based on the Managed Uses of the trail.

Design Parameters. Technical guidelines for the survey, design, construction, maintenance, and assessment of a trail, based on its Designed Use and Trail Class.

Design Surface. The trail tread surface, defined in terms of surface type, surface protrusions, and surface obstacles, that is determined to be appropriate to accommodate the Managed Uses of a trail.

1. Surface Type. A characteristic of the design surface expressed in terms of material type, grading, compaction, and roughness of the trail tread.
 - a. Native. A surface composed of soil, rock, or other naturally occurring materials found on or near the trail.
 - b. Firm. A surface that is not noticeably distorted or compressed during the seasons for which it is managed, under normally occurring weather conditions, by the passage of a device that simulates a trail user in a wheelchair.

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- c. Stable. A surface that is not permanently affected by normally occurring weather conditions and able to sustain normal wear and tear caused by the uses for which the trail is managed between planned maintenance cycles.
2. Surface Protrusions. Trail tread imperfections, such as rock, roots, holes, stumps, steps, and structures, that are within the acceptable range of tread roughness and challenge level for the trail and that do not obstruct the Managed Uses of the trail.
3. Surface Obstacles. Trail tread imperfections, such as rocks, roots, holes, stumps, steps, downed logs, and structures, that are beyond the acceptable range of tread roughness and challenge level for the trail and that obstruct one or more Managed Uses of the trail.

Design Tread Width. The tread width determined to be appropriate to accommodate the Managed Uses of a trail.

Design Turn Radius. The minimum horizontal radius required for a Managed Use to negotiate a curve (for example, a switchback, climbing turn, or horizontal turn) in a single maneuver.

Designed Use. The Managed Use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable Trail Class, determines which Design Parameters will apply to a trail.

Difficulty Level. The degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and loss of elevation, and amount and kind of natural barriers that must be crossed, and which may temporarily change due to the weather.

1. Easiest. A trail requiring limited physical ability and skill to travel.
2. More Difficult. A trail requiring some physical ability and skill to travel.
3. Most Difficult. A trail requiring a high degree of physical ability and skill to travel.

Electric Bicycle (E-Bike). Also referred to as an electric mountain bike (eMTB), a type of motor vehicle with two or three wheels, fully operable pedals, and an electric motor of not more than 750 watts that meets the requirements of one of the following three classes:

1. Class 1 E-Bike. An e-bike equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the e-bike reaches the speed of 20 miles per hour.

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2. Class 2 E-Bike. An e-bike equipped with a motor that may be used exclusively to propel the e-bike and that ceases to provide assistance when the e-bike reaches the speed of 20 miles per hour.

3. Class 3 E-Bike. An e-bike equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the e-bike reaches the speed of 28 miles per hour.

Forest Trail. A trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (36 CFR 212.1).

Four-Wheel Drive Vehicle Greater Than 50 Inches in Width. An off-highway vehicle greater than 50 inches in width that operates on four wheels and with a drive train that allows all four wheels to receive power from the engine simultaneously.

Full Bench. A trailbed constructed entirely on undisturbed material.

General Forest Area. National Forest System lands available for recreational use, other than wilderness areas, developed recreation sites, and administrative sites.

Managed Use. A mode of travel that is actively managed and appropriate on a trail, based on its design and management.

Motorcycle. A two-wheeled motor vehicle on which the wheels are situated in a line, rather than side by side.

Motor Vehicle. Any vehicle which is self-propelled, other than:

1. A vehicle operated on rails; and
2. Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motor Vehicle Use Map (MVUM). A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the NFS (36 CFR 212.56 and FSM 7711.3).

National Forest System Trail. A forest trail, other than a trail which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (36 CFR 212.1).

National Quality Standards for Trails. National criteria that establish the level of quality in terms of health and cleanliness, resource setting, safety and security, responsiveness,

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and condition of facilities for National Forest System trails managed at a full-service level.

Off-Highway Vehicle (OHV). Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).

Over-Snow Vehicle. A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (36 CFR 212.1).

Over-Snow Vehicle Use Map. A map reflecting roads, trails, and areas designated for over-snow vehicle use on an administrative unit or a Ranger District of the NFS (36 CFR 212.81 and FSM 7711.4).

Pack Clearance. The area on either side of the center line of a trail, measured 30 inches above the trail tread, that is cleared of trees, limbs, and other obstructions that would interfere with passage by a loaded pack animal.

Side Slope. The natural slope of the ground, usually expressed as a percentage.

Snowmobile. An over-snow vehicle that operates on a track, uses one or more skis for steering, and has handle-bar steering and a seat designed to be straddled by the operator.

Switchback. A reverse in direction of the trail grade with a level landing that is used to change elevation on a steep slope and that usually involves special treatment of approaches, barriers, and drainages.

Trail. A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

Trail Class. The prescribed scale of development for a trail, representing its intended design and management standards.

Trail Fundamentals. The five concepts that are the cornerstones of Forest Service trail management, including Trail Type, Trail Class, Managed Use, Designed Use, and Design Parameters.

Trail Grade. The ascent or descent of a trail segment expressed as a percentage of its length.

Trail Management Objective. Documentation of the intended purpose and management of a National Forest System trail based on management direction, including access objectives.

Trail Type. A category that reflects the predominant trail surface and general mode of travel accommodated by a trail.

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1. Standard Terra Trail. A trail that has a surface consisting predominantly of the ground and that is designed and managed to accommodate use on that surface.
2. Snow Trail. A trail that has a surface consisting predominantly of snow or ice and that is designed and managed to accommodate use on that surface.
3. Water Trail. A trail that has a surface consisting predominantly of water (but may include land-based portages) and that is designed and managed to accommodate use on that surface.

Trailhead. The transfer point between a trail and a road, water body, or airfield, which may have developments that facilitate transfer from one mode of transportation to another. For purposes of the FSTAG (FSM 2353.27), a trailhead is a site designed and developed to provide staging for trail use and does not include:

1. Junctions between trails where there is no other access; or
2. Intersections where a trail crosses a road or users have developed an access point, but no improvements have been provided beyond minimal signage for public safety.

Trailway. The portion of a trail within the limits of the excavation and embankment.

1. Trailbed. The surface on which the base course or surfacing may be constructed and which for trails without surfacing serves as the trail tread.
2. Trail Tread. The portion of a trail upon which traffic moves.

Wheelchair or Mobility Device. A device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion; that is suitable for use in an indoor pedestrian area; and that may be used by a person whose disability requires its use anywhere that foot travel is permitted (Title V, sec. 507c, of the Americans With Disabilities Act and 36 CFR 212.1).

06 – References

The following references apply to the Forest Service’s trail program:

1. U.S. Department of Agriculture, Forest Service. EM 7100-15, Sign and Poster Guidelines for the Forest Service.
2. U.S. Department of Agriculture, Forest Service. EM 7720-103, Standard Specifications for Construction and Maintenance of Trails.
3. U.S. Department of Agriculture, Forest Service. EM 7720-104, Standard Drawings for Construction and Maintenance of Trails.

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4. U.S. Department of Agriculture, Forest Service. Forest Service Trail Accessibility Guidelines, <http://www.fs.fed.us/recreation/programs/accessibility>.
5. U.S. Department of Agriculture, Forest Service. Forest Service Trail Motor Vehicle Use Map (MVUM) Production Guide, <https://apps.fs.usda.gov/gtac-tools/MVUM/index.php> or Over-Snow Vehicle Use Map (OSVUM) Production Guide.