

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

Chapter 10 - Trail Planning

Amendment: 2309.18-2008-3

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Responsible Staff:

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

Notice of issuance of this directive was published in the Federal Register on October 16, 2008 (73 FR 61600).

Recodes chapter from 1 digit to 2 digits to conform to proper format for Forest Service directives.

11: Changes caption from “Relationship of Forest Land Management Planning” to “Relationship of Trail Planning to Land Management Planning.” Revises and clarifies direction.

12: Changes caption form “Planning Concept” to “Trail Planning.” Revises and clarifies text to include Trail Management Objectives (TMOs).

13: Reorganizes and revises entire section for clarity.

13.2: Removes reference to USDA Agriculture Handbook 483 pertaining to guidelines for location and design of trails.

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14: Changes caption from “Analysis Process” to “Trail Fundamentals.” Analysis process direction has been recoded to section 16.

14.1 through 14.5: Establishes new codes and captions, and sets forth direction for “Trail Type,” “Trail Class,” “Managed Use,” “Designed Use,” and “Designed Parameters.”

14.2: Adds exhibit 01, “Trail Class Matrix.”

14.3: Adds exhibit 01, “Potential Appropriateness of Trail Classes for Managed Uses.”

15: Changes caption from “Information Needs” to “National Quality Standards for Trails,” and sets forth policy in accordance with FSM 2353.15. Adds new exhibit showing all National Quality Standards for Trails. Recodes direction formerly set forth in sections 15 through 15.8 to new codes and captions in 17 through 17.8.

16: Changes caption from “Establishment of Priorities and Management Requirements” to “Priorities and Management Requirements,” and recodes to new section 18 direction formerly set forth at this code.

17: Changes caption from “Example of Planning Decisions in One Trail Plan” to “Information Needs,” and recodes direction formerly set forth at 15 through 15.8. Removes Exhibit 02 and Exhibit 03.

18: Establishes new code and caption, “Priorities and Management Requirements,” and recodes to this section direction formerly set forth at 16. Adds new exhibit, “Trail Operation and Maintenance Considerations.”

19: Establishes new code and caption, and recodes direction formerly set forth at 17. Adds exhibit 01, “Trail Planning and Inventory.”

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11 - Relationship of Trail Planning to Land Management Planning

Plan and develop trails based on decisions documented in the applicable land management plan. Tier the supporting environmental analysis for trails to the applicable land management plan. For guidance regarding environmental analysis and compliance with the National Environmental Policy Act (NEPA), refer to FSM 1950 and FSH 1909.15.

12 - Trail Planning

Many of the general objectives for trails are in the applicable land management plan or in more detailed travel management decisions.

1. Consider trail management in the context of an administrative unit or Ranger District. Establish and document Trail Management Objectives (TMOs) and associated management requirements by assessing the interaction of resource use, recreation opportunities, and constraints of the area.
2. Recognize the need for more detailed analysis when resource conditions change, new recreation opportunities are discovered, conflicts among uses arise, or new public issues emerge.
3. Identify trail maintenance schedules and priorities for trail construction and reconstruction based on TMOs, anticipated funding, and established priorities

13 - Recreation Opportunity Spectrum Considerations

1. Use the Recreation Opportunity Spectrum (ROS) as part of land management planning to ensure National Forest System (NFS) trails offer a suitable diversity of outdoor recreation opportunities (FSM 2310).
2. Each management area prescription provides for one or more ROS classes. The location, design, and use of trails play a critical role in determining whether the physical, social, and managerial settings are consistent with the ROS class of the management area through which the trail passes (see the ROS Users Guide and FSM 2311.1).
3. Trail users' experience depends in part on how well the social, physical, and managerial settings of the trail match their expectations.

13.1 - Social Setting

Two conditions apply to trail planning regarding the social setting of an ROS class:

1. The type of use, specifically the mode of travel and mix of uses. An important consideration is the relationship between motorized and non-motorized trail uses.

2. The volume of use. The volume of use refers to the number and frequency of encounters between different user groups.

Provide for the appropriate types of use, such as motorized or non-motorized use, and the volume of use for the ROS class in the management prescription for each management area. Design trailheads and trail structures to accommodate the intended volume of use within the management area and to minimize potential use conflicts.

13.2 - Physical Setting

In trail planning, consider the following aspects of the physical setting of trails in each ROS class:

1. Location and design of the trail and associated structures, including trailhead facilities.
2. Maintenance or enhancement of scenic and other resources along the trail.
3. Visual impact of the trail as it is viewed from a distance.
4. Proximity of the trail to the sights and sounds of other human activity.

Use the Scenery Management System (SMS) to resolve the potential impacts of trails on the physical setting (FSM 2380 and Landscape Aesthetics: A Handbook for Scenery Management, USDA Agriculture Handbook 701).

13.3 - Managerial Setting

The managerial setting reflects the amount and kind of restrictions that apply to an area of the NFS. Three considerations apply to trail planning regarding the managerial setting of an ROS class:

1. Management of Trail Use. Management of trail use may involve little or no restrictions or may be more apparent through the issuance of orders under 36 CFR Part 261, Subpart B, installation of signs and physical barriers, and patrolling by agency employees or volunteers. Often the need for and amount of trail management are reduced through effective trail location, design, and education.
2. Stewardship of the Trail Facility. Effective stewardship of trail facilities is reflected in the quality of trail construction and the frequency of trail maintenance. Sound trail construction and appropriate and timely maintenance promote good stewardship on the part of trail users.
3. Compatibility of Resource Management With the Intended Use of Trails. The management prescription for an area should integrate resource management so as to minimize use conflicts. Carefully conceived trail location and design help prevent or minimize use conflicts. Application of the SMS and adherence to scenic quality objectives also help prevent or minimize use conflicts. Timing resource management

activities, such as tree and other hazard removal or seasonal restrictions, to avoid known periods of high use can prevent or minimize use conflicts.

14 - Trial Fundamentals

1. The Trail Fundamentals are five concepts that are the cornerstones of Forest Service trail management, including Trail Type, Trail Class, Managed Use, Designed Use, and Design Parameters.
2. Use the Trail Fundamentals to promote consistency in identifying, communicating, and implementing the TMOs for each NFS trail.
3. For each NFS trail or trail segment, identify and apply the Trail Fundamentals in accordance with FSM 2353.13 and sections 14.1 through 14.5 of this handbook.

14.1 - Trail Type

A Trail Type is a category that reflects the predominant trail surface and general mode of travel accommodated by a trail. There are three Trail Types for NFS trails: Standard Terra Trail, Snow Trail, and Water Trail.

1. Inventory trails and identify the appropriate Design Parameters, management needs, and management costs for NFS trails using the Trail Types.
2. Identify only one Trail Type per trail.
3. Identify the Trail Type for each NFS trail based on applicable land management plan direction, travel management decisions, trail-specific decisions, and other related direction.
4. Inventory both trails and Trail Types in the Infra Trails Module when two National Forest System trails overlap, for example, when a Snow Trail overlaps a Standard Terra Trail.

14.2 - Trail Class

The Trail Class is the prescribed scale of development for a trail, representing its intended design and management standards. Trail Classes are general categories reflecting trail development scale, arranged along a continuum.

There are five Trail Classes, ranging from the least developed (Trail Class 1) to the most developed (Trail Class 5):

1. Trail Class 1: Minimally Developed
2. Trail Class 2: Moderately Developed
3. Trail Class 3: Developed
4. Trail Class 4: Highly Developed
5. Trail Class 5: Fully Developed

Use Trail Classes to inventory NFS trails and to identify the applicable Design Parameters and costs for meeting the National Quality Standards for Trails.

1. Identify only one Trail Class per trail or trail segment.
2. Class descriptors reflect typical attributes of trails in each class. Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.
3. There is a direct relationship between Trail Class and Managed Uses (sec. 14.3): generally, one cannot be determined without consideration of the other.
4. Identify the appropriate Trail Class for each NFS trail or trail segment based on the management intent in the applicable land management plan, travel management decisions, trail-specific decisions, and other related direction. Apply the Trail Class that most closely reflects the management intent for the trail or trail segment, which may or may not reflect the current condition of the trail.

For specifics on each Trail Class, refer to the Trail Class Matrix (ex. 01).

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14.2 - Exhibit 01

TRAIL CLASS MATRIX

Trail Classes are general categories reflecting trail development scale, arranged along a continuum. The Trail Class identified for a National Forest System (NFS) trail prescribes its development scale, representing its intended design and management standards.¹ Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Identify the appropriate Trail Class for each NFS trail or trail segment based on the management intent in the applicable land management plan, travel management decisions, trail-specific decisions, and other related direction. Apply the Trail Class that most closely reflects the management intent for the trail or trail segment, which may or may not reflect the current condition of the trail.

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Tread & Traffic Flow	<ul style="list-style-type: none"> ♦ Tread intermittent and often indistinct. ♦ May require route finding. ♦ Single lane, with no allowances constructed for passing. ♦ Predominantly native materials. 	<ul style="list-style-type: none"> ♦ Tread continuous and discernible, but narrow and rough. ♦ Single lane, with minor allowances constructed for passing. ♦ Typically native materials. 	<ul style="list-style-type: none"> ♦ Tread continuous and obvious. ♦ Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass. ♦ Native or imported materials. 	<ul style="list-style-type: none"> ♦ Tread wide and relatively smooth, with few irregularities. ♦ Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass. ♦ Double lane where traffic volume is high and passing is frequent. ♦ Native or imported materials. ♦ May be hardened. 	<ul style="list-style-type: none"> ♦ Tread wide, firm, stable, and generally uniform. ♦ Single lane, with frequent turnouts where traffic volume is low to moderate. ♦ Double lane where traffic volume is moderate to high. ♦ Commonly hardened with asphalt or other imported material.

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14.2 - Exhibit 01--Continued

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Obstacles	<ul style="list-style-type: none"> ♦ Obstacles common, naturally occurring, often substantial, and intended to provide increased challenge. ♦ Narrow passages; brush, steep grades, rocks and logs present. 	<ul style="list-style-type: none"> ♦ Obstacles may be common, substantial, and intended to provide increased challenge. ♦ Blockages cleared to define route and protect resources. ♦ Vegetation may encroach into trailway. 	<ul style="list-style-type: none"> ♦ Obstacles may be common, but not substantial or intended to provide challenge. ♦ Vegetation cleared outside of trailway. 	<ul style="list-style-type: none"> ♦ Obstacles infrequent and insubstantial. ♦ Vegetation cleared outside of trailway. 	<ul style="list-style-type: none"> ♦ Obstacles not present. ♦ Grades typically < 8%.
Constructed Features & Trail Elements	<ul style="list-style-type: none"> ♦ Structures minimal to non-existent. ♦ Drainage typically provided without structures. ♦ Natural fords. ♦ Typically no bridges. 	<ul style="list-style-type: none"> ♦ Structures of limited size, scale, and quantity; typically constructed of native materials. ♦ Structures adequate to protect trail infrastructure and resources. ♦ Natural fords. ♦ Bridges as needed for resource protection and appropriate access. 	<ul style="list-style-type: none"> ♦ Structures may be common and substantial; constructed of imported or native materials. ♦ Natural or constructed fords. ♦ Bridges as needed for resource protection and appropriate access. 	<ul style="list-style-type: none"> ♦ Structures frequent and substantial; typically constructed of imported materials. ♦ Constructed or natural fords. ♦ Bridges as needed for resource protection and user convenience. ♦ Trailside amenities may be present. 	<ul style="list-style-type: none"> ♦ Structures frequent or continuous; typically constructed of imported materials. ♦ May include bridges, boardwalks, curbs, handrails, trailside amenities, and similar features.

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14.2 - Exhibit 01--Continued

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Signs²	<ul style="list-style-type: none"> Route identification signing limited to junctions. Route markers present when trail location is not evident. Regulatory and resource protection signing infrequent. Destination signing, unless required, generally not present. Information and interpretive signing generally not present. 	<ul style="list-style-type: none"> Route identification signing limited to junctions. Route markers present when trail location is not evident. Regulatory and resource protection signing infrequent. Destination signing typically infrequent outside wilderness areas; generally not present in wilderness areas. Information and interpretive signing uncommon. 	<ul style="list-style-type: none"> Route identification signing at junctions and as needed for user reassurance. Route markers as needed for user reassurance. Regulatory and resource protection signing may be common. Destination signing likely outside wilderness areas; generally not present in wilderness areas. Information and interpretive signs may be present outside wilderness areas. 	<ul style="list-style-type: none"> Route identification signing at junctions and as needed for user reassurance. Route markers as needed for user reassurance. Regulatory and resource protection signing common. Destination signing common outside wilderness areas; generally not present in wilderness areas. Information and interpretive signs may be common outside wilderness areas. Accessibility information likely displayed at trailhead. 	<ul style="list-style-type: none"> Route identification signing at junctions and for user reassurance. Route markers as needed for user reassurance. Regulatory and resource protection signing common. Destination signing common. Information and interpretive signs common. Accessibility information likely displayed at trailhead.
Typical Recreation Environments & Experience³	<ul style="list-style-type: none"> Natural and unmodified. ROS: Typically Primitive to Roaded Natural. WROS: Typically Primitive to Semi-Primitive. 	<ul style="list-style-type: none"> Natural and essentially unmodified. ROS: Typically Primitive to Roaded Natural. WROS: Typically Primitive to Semi-Primitive. 	<ul style="list-style-type: none"> Natural and primarily unmodified. ROS: Typically Primitive to Roaded Natural. WROS: Typically Semi-Primitive to Transition. 	<ul style="list-style-type: none"> May be modified. ROS: Typically Semi-Primitive to Rural WROS: Typically Portal or Transition. 	<ul style="list-style-type: none"> May be highly modified. Commonly associated with visitor centers or high-use recreation sites. ROS: Typically Roaded Natural to Urban. Generally not present in Wilderness areas.

¹ For National Quality Standards for Trails, Potential Appropriateness of Trail Classes for Managed Uses, Design Parameters, and other related guidance, refer to FSM 2353 and FSH 2309.18.

² For standards and guidelines on the use of signs and posters on trails, refer to the Sign and Poster Guidelines for the Forest Service (EM-7100-15).

³ The Trail Class Matrix shows combinations of Trail Class and Recreation Opportunity Spectrum (ROS) or Wilderness Recreation Opportunity Spectrum (WROS) settings that commonly occur, although trails in all Trail Classes may and do occur in all settings. For guidance on the application of the ROS and WROS, refer to FSM 2310 and 2353 and FSH 2309.18.

14.3 - Managed Use

Managed Uses are the modes of travel that are actively managed and appropriate on a trail, based on its design and management.

1. Managed Use indicates management intent to accommodate a specific use.
2. There can be more than one Managed Use per trail or trail segment.
3. The Managed Uses for a trail are usually a small subset of all the allowed uses on the trail, that is, uses that are allowed unless specifically prohibited. For example, on a trail that is closed to all motorized use but open to all non-motorized use, the Managed Uses could be Hiker/Pedestrian and Pack and Saddle. The allowed uses, however, would also include bicycles and all other non-motorized uses.
4. Identify the Managed Uses for each NFS trail or trail segment based on applicable land management plan direction, travel management decisions, trail-specific decisions, and other related direction.
5. There is a direct relationship between Managed Use and Trail Class: generally, one cannot be determined without consideration of the other. Not all Trail Classes are appropriate for all Managed Uses. For guidance on the potential appropriateness of each Trail Class to each Managed Use, see exhibit 01, Potential Appropriateness of Trail Classes for Managed Uses. The combinations presented in this matrix are generally applicable throughout the NFS, although local deviations may occur.

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14.3 - Exhibit 01

POTENTIAL APPROPRIATENESS OF TRAIL CLASSES FOR MANAGED USES

This matrix shows the potential appropriateness of each of the Trail Classes for the Managed Uses of National Forest System (NFS) trails. These combinations are generally applicable throughout the NFS, although local deviations may occur.

Managed Use		Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Standard Terra Non-Motorized	Hiker/ Pedestrian	Yes	Yes	Yes	Yes	Yes
	Bicycle	Yes	Yes	Yes	Yes	Yes
	Pack and Saddle	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
Standard Terra Motorized	Motorcycle	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
	All-Terrain Vehicle	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
	4WD Vehicle > 50"	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
Snow Trail	Cross-Country Ski	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
	Snowshoe	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
	Snowmobile	No, although may be allowed	Yes	Yes	Yes	No, although may be allowed
Water Trail	Motorized Watercraft	[Trail Class and Managed Use guidance to be developed]				
	Non-Motorized Watercraft	[Trail Class and Managed Use guidance to be developed]				

¹ Trail Class 1 includes the least developed and most challenging NFS trails. Trails in this category are typically very rugged and steep, with little or no defined tread or clearing and many or continuous obstacles.

² Trail Class 5 includes the most highly developed and least challenging NFS trails. Trails in this category are typically wide, paved, and heavily used and are also often fully accessible.

14.4 - Designed Use

Designed Use is 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 apply to a trail.

1. There is only one Designed Use per trail or trail segment. Although a trail or trail segment may have more than one Managed Use and numerous uses may be allowed, only one Managed Use is identified as the design driver or Designed Use.
2. Determine the Designed Use for a trail or trail segment from the Managed Uses identified for that trail. When making this determination, consider all Managed Uses that occur during all seasons of use of the trail or trail segment. Assess any essential or limiting geometry for the Managed Uses of the trail or trail segment to determine whether any trail-specific adjustments are necessary to the applicable Design Parameters.
 - a. In some situations, when there is more than one Managed Use identified for a trail, the Designed Use may be readily apparent. For example, on a trail that is actively managed for all-terrain vehicle and motorcycle use, all-terrain vehicle use would be the Designed Use because it requires wider tread widths and has a lower tolerance for surface obstacles and steep trail grades.
 - b. In other situations involving more than one Managed Use, the Designed Use may not be readily apparent, as is often the case when there are fewer differences between the applicable sets of Design Parameters than in the example above. For example, on a trail that is actively managed for hiker and pedestrian, pack and saddle, and bicycle use, pack and saddle use would likely be the Designed Use because of the three Managed Uses, pack and saddle use generally has the most limiting design requirements. While the Bicycle Design Parameters are very similar to the Pack and Saddle Design Parameters, the Design Parameters for this trail may need to be adjusted to accommodate bicycles.

14.5 - Design Parameters

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

1. Design Parameters reflect the design objectives for NFS trails and determine the dominant physical criteria that most define their geometric shape. These criteria include:
 - a. Design Tread Width. Design Tread Width is expressed in terms of single lane, double lane, and the minimum tread width on trail structures.
 - b. Design Surface. Design Surface is expressed in terms of surface type, protrusions, and obstacles.

- c. Design Grade. Design Grade is expressed in terms of Target Grade, Short Pitch Maximum Grade, and Maximum Pitch Density.
 - d. Design Cross Slope. Design Cross Slope is expressed in terms of Target Cross Slope and Maximum Cross Slope.
 - e. Design Clearing. Design Clearing is expressed in terms of width, height, and shoulder clearance.
 - f. Design Turns. Design Turns are expressed in terms of the turning radius.
2. Local deviations from any Design Parameter may be established based on trail specific conditions, topography, or other factors (for example, mitigation of site-specific safety concerns and adjustments to accommodate other Managed Uses), provided that the deviations are consistent with the general intent of the applicable Trail Class.
3. Identify the Design Parameters for a NFS trail or trail segment based on its Trail Class and Designed Use. For a Design Parameter such as Design Tread Width, Design Clearing Width, and Design Turns that is expressed as a range of values, identify a specific value for each trail or trail segment.

For the complete set of Design Parameters, refer to section 23.11, exhibit 01, through section 23.33, exhibit 01, of this handbook.

15 - National Quality Standards for Trails

In accordance with FSM 2353.15, apply the National Quality Standards for Trails in planning, constructing, and managing NFS trails and related trail projects.

- 1. The National Quality Standards for Trails establish desired outcomes for NFS trails managed at a full-service level. These standards also form the baseline for estimating the cost of managing NFS trails. The National Quality Standards for Trails consist of five key measures: health and cleanliness, safety and security, condition of facilities, responsiveness, and resource setting.
- 2. The complete set of National Quality Standards for Trails is contained in exhibit 01 of this section.
- 3. Critical National Quality Standards for Trails are identified with an asterisk. If any of these standards is not met, the resulting conditions pose a high probability of immediate and permanent injury to persons or property. If any of the critical standards cannot be met due to budget or other constraints, take action as soon as practicable to correct or mitigate the problem. Corrective or mitigating measures may include closing the trail, portions of the trail, or associated trail structures to public use.
- 4. Take mitigating steps if conditions, facilities, or services addressed by noncritical standards decline to the point where visitor's health or safety is threatened. Examples

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include repairing the trail, portions of the trail, or associated trail structure or removing trail structures that are in disrepair and no longer needed.

5. The National Quality Standards for Trails apply to NFS trails and associated trail structures. The National Quality Standards for Trails do not apply to trailheads. Trailheads, which are constructed with the primary purpose of providing visitor amenities, are typically considered developed sites. Trailheads constructed with the primary purpose of resource protection are typically considered concentrated use areas within General Forest Areas.

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15 - Exhibit 01

NATIONAL QUALITY STANDARDS FOR TRAILS

Key Measure: HEALTH AND CLEANLINESS

1. Visitors are not exposed to human waste along trails.
2. The trail and trailside are free of litter.
3. The trail and trailside are free of graffiti.

Key Measure: RESOURCE SETTING

1. *Effects from trail use do not conflict with environmental laws (such as the Endangered Species Act, National Historic Preservation Act, and Clean Water Act).¹
2. Resource management adjacent to and along the trail corridor is consistent with ROS objectives and desired conditions of adjacent management areas.
3. Trail opportunities, trail development, and trail management are consistent with the Recreation Management System (Recreation Opportunity Spectrum, Scenery Management System, and Benefits Based Management) objectives and the applicable land management plan.
4. The trail, use of the trail, and trail maintenance do not cause unacceptable damage to other resources.
5. Trail use does not exceed trail capacity.

Key Measure: SAFETY & SECURITY

1. *Hazards do not exist on or along the trail.¹
2. Applicable laws, regulations, and special orders are enforced.

Key Measure: RESPONSIVENESS

1. *When a trail is signed as accessible, it meets current agency policy and accessibility guidelines.¹
2. Information is posted in a clear and professional manner.
3. Visitors are provided opportunities to communicate their expectations for and satisfaction with NFS trails.

Key Measure: CONDITION OF FACILITIES

1. Annual/Routine Maintenance. The trail and its structures are serviceable and in good repair throughout their designed service life.
2. Deferred Maintenance. Trails that are in disrepair due to lack of scheduled maintenance, are in violation of applicable safety codes or other regulatory requirements (such as applicable accessibility guidelines), or are beyond their designed service life are repaired, rehabilitated, replaced, or decommissioned, as appropriate.
3. Capital Improvement. New, altered, or expanded trails meet Forest Service design standards and are consistent with standards and guidelines in the applicable land management plan.

¹ Indicates a Critical National Quality Standard. If it cannot be met, action must be taken as soon as practicable to correct or mitigate the problem. Refer to FSH 2309.18, section 15.

16 - Environmental Analysis for Trail System Management

1. Follow applicable NEPA procedures and guidance in conducting the requisite environmental analysis (36 CFR Part 220, FSM 1950, and FSH 1909.15) for trail system management decisions.
2. For purposes of trail planning, the requisite environmental analysis should support management of an area-wide trail system. The analysis also must:
 - a. Address objectives and criteria for trail design, development, and operation to meet the intended recreation experience for the management area.
 - b. Identify and address concerns associated with specific trails in the management area.
 - c. Evaluate current conditions and projected changes and trends, public issues, and management concerns with regard to trail use in the management area.
 - d. Identify recreation and resource management opportunities enhanced by trails in the management area.
 - e. Establish priorities for implementation of the decisions.

17 - Information Considerations

Typical information needed for trail system analysis includes:

1. Trail management objectives for the management area;
2. Applicable ROS classes;
3. Public concerns;
4. Trail opportunities and constraints;
5. Relationship of the trail system to other Forest Service facilities;
6. Use data;
7. Other resource data;
8. Cost-effectiveness; and
9. Priorities and management requirements.

17.1 - Area-Wide Objectives

1. If available, consult the approved plan for the management area to determine the management intent for NFS trails.
2. Consult standards and guidelines in the applicable land management plan to determine general and specific management intent for the NFS trails in the management area and other resource activities that are likely to take place in the vicinity of the trail system.
3. Determine which standards and guidelines might affect the identification of trail-specific Trail Management Objectives (TMOs) and design, operation, and administration of the trail system.

17.2 - ROS Classes

1. Determine which ROS classes are provided within the management area.
2. Determine the factors influencing recreational activities in the management area, such as physical features, usable area, capacity, and seasons of use.
3. Identify the transportation and recreational facilities in the management area based on information in maps, updated with inventory data.
4. Determine the recreation opportunities that the area is intended to provide and the trails and setting attributes that are important for these opportunities.

17.3 - Public Concerns

1. Determine the relationship of the trail system and its uses to nearby non-federal lands.
2. Identify any public concerns regarding issues such as trespassing, littering, parking, and traffic congestion that have arisen regarding the trail system.

17.4 - Trail Opportunities and Constraints

Determine:

1. Whether a suitable location exists in the management area to provide the proposed activity and recreation experience.
2. Whether a right-of-way is needed across private property to connect NFS lands to provide the best trail location and opportunity.
3. Whether the potential exists to provide supplementary facilities and appurtenances, such as trailhead parking, corrals, shelters, water and sanitation facilities, major stream crossings, registration, information, and educational facilities, and road and trail signs.

4. Whether little-used or deteriorated facilities can be renovated in lieu of new construction to offer the planned trail opportunity.
5. Whether overuse or misuse of a facility can be mitigated or eliminated by relocation, rehabilitation, or development of a new facility.
6. Whether additional resources are needed to enforce applicable regulations and restrictions.
7. The long-range impacts from trail system operation and maintenance.
8. Whether adequate resources (such as funds, personnel, volunteers, and equipment) are available for trail development and maintenance.
9. Whether the necessary elements of trail operation and maintenance are enumerated in a trail management analysis for the management area.
10. Whether staged construction can be used to compensate for funding constraints.
11. Whether impacts from use of the trail system or other resources can be tolerated or effectively mitigated.
12. Which Trail Classes and Managed Uses apply to the trail system.
13. Whether a variety of recreation experiences can be provided on trails in the system.

17.5 - Relationship of the Trail System to Existing Forest Service Facilities

Determine:

1. The current location, length, and condition of trails in the management area.
2. The relationship between trails and other facilities in the management area, such as roads, trailheads, and campgrounds.
3. How the trails in the management area are managed, for example, by use restrictions, barriers, signs, or other means of communication.
4. Whether accessible trails are needed and provided in the management area.
5. Whether interpretive trails are needed and provided in the management area.
6. Whether the trails in the management area match the ROS experience objectives.

17.6 - Use Data

Determine:

1. How the trails in the management area are used, for example, by hikers, snowmobilers, or skiers.
2. How heavily the trails in the management area are used.
3. What types of individuals use the trails, for example, families, the elderly, people with disabilities, local residents, or tourists.
4. The past and projected trends in use, for example, increases, decreases, or changes in use and introduction of new technologies in trail use.
5. Whether use conflicts occur in the management area, and if so, whether the conflicts are increasing.
6. Whether the management area is suitable for the intended trail uses.

17.7 - Other Resource Data

Determine:

1. The relationship between trail location and trail use and trail location and wildlife habitat.
2. Whether roads, timber sales, grazing, or special uses are planned or likely to occur in the management area.
3. The relationship of proposed uses to the current trail system and trail uses.
4. How proposed uses can be configured to complement the trail system.
5. Whether special planning is required to protect cultural resources, habitat of threatened or endangered species, fragile soil, or vegetation and to diminish fire hazards.
6. Whether there are special conditions affecting trail construction and maintenance, such as heavy rainfall, shallow soils, or riparian areas.

17.8 - Cost-Effectiveness

Assess:

1. Whether the trail system in the management area maximizes social and economic objectives, such as maximizing recreation benefits and reducing administrative costs.

2. Whether the trail system in the management area complies with the National Quality Standards for Trails.
3. Whether the trail system in the management area is designed and constructed to minimize environmental damage, such as soil erosion and degraded water quality.
4. How the trail system's objectives are weighted in importance.
5. How cost-effectiveness is used to rank trail projects.
6. Whether a cost-benefit analysis justifies development of a trail or trail system in the management area.
7. Whether other programs, such as timber sale road construction, fulfill part of the need for access.
8. Whether volunteers are available for development and operation of the trail system in the management area.

18 - Priorities and Management Requirements

1. In addition to Trail Class, Managed Uses, Designed Use, Design Parameters, and the National Quality Standards for Trails, consider the following when establishing priorities and management requirements for trail projects:
 - a. Safety hazards to users.
 - b. Potential or occurrence of resource damage.
 - c. Intensity of trail use.
 - d. Whether the trail is located in such a way as to affect or benefit from other resource activities.
 - e. Preliminary cost estimates for construction or reconstruction.
 - f. Preliminary requirements for additional trailhead and other trail-related facilities.
 - g. Funding, availability of volunteer support, and scheduling of work.
 - h. Public desires.
2. The Trail Operation and Maintenance Considerations matrix in exhibit 01 contains general guidelines for developing trail prescriptions and managing, operating, and maintaining NFS trails. The considerations in the matrix are a starting point and likely will need to be adapted to reflect local financial capability and other circumstances.

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Exceptions to the Trail Operation and Maintenance Considerations may occur at the trail-specific, district, forest or grassland, or regional level.

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18 – Exhibit 01

TRAIL OPERATION AND MAINTENANCE CONSIDERATIONS

Trail Operation and Maintenance Considerations are general guidelines for developing trail prescriptions and managing, operating, and maintaining National Forest System trails. The considerations are a starting point and likely will need to be adapted to reflect local financial capability and other circumstances. Exceptions to the Trail Operation and Maintenance Considerations may occur at the trail-specific, district, forest or grassland, or regional level.

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Trail Management	Typically managed to accommodate: <ul style="list-style-type: none"> Low use levels Highly skilled users who are comfortable off-trail Users with high degree of orienteering skill Some travel modes and ability levels may be impractical or impossible and may not be encouraged Water Trails: users with high level of navigation/orientation and paddling skills 	Typically managed to accommodate: <ul style="list-style-type: none"> Low-to-moderate use levels Moderately to highly skilled users, capable negotiating obstacles Users with moderate orienteering skill Many types of uses, but challenging and requires advanced skills Water Trails: users with moderate to high level of navigation/orientation and paddling skills 	Typically managed to accommodate: <ul style="list-style-type: none"> Moderate to heavy use Users with intermediate skill level and experience Users with minimal orienteering skills Moderately easy travel by Managed Uses Water Trails: basic to moderate navigating and paddling skills required Random potential for accessible use	Typically managed to accommodate: <ul style="list-style-type: none"> Very heavy use Users with minimal skills and experience Users with minimal or no orienteering skills Easy travel by Managed Uses Water Trails: basic navigating and paddling skills required May be or has potential to be made accessible	Typically managed to accommodate: <ul style="list-style-type: none"> Intensive use Users with limited skills and experience Typically meets agency requirements for accessibility
Maintenance Indicators	<ul style="list-style-type: none"> Resource protection Safety commensurate with targeted recreation experience 	<ul style="list-style-type: none"> Resource protection Safety commensurate with targeted recreational experience 	<ul style="list-style-type: none"> Resource protection User convenience Safety commensurate with targeted recreation experience 	<ul style="list-style-type: none"> User comfort and ease Resource protection Safety commensurate with targeted recreation experience 	<ul style="list-style-type: none"> User comfort and ease High level of accessibility for Managed Uses Safety commensurate with targeted recreation experience
Routine Maintenance Frequency and Intensity ¹	<ul style="list-style-type: none"> Infrequent or no scheduled maintenance Typically, maintenance conducted every 5 or more years or in response to reports of unusual resource problems requiring repair 	<ul style="list-style-type: none"> Maintenance scheduled to preserve the trail and its location Typically, maintenance conducted every 3-5 years or in response to reports of unusual resource problems requiring repair 	<ul style="list-style-type: none"> Trail cleared for availability early in its season of use and for preservation of its integrity Typically, maintenance conducted every 1-3 years or in response to reports of trail or resource damage or significant obstacles to Managed Use and experience level 	<ul style="list-style-type: none"> Trail cleared at earliest opportunity to make it available for season of use Typically, maintenance conducted at least annually 	<ul style="list-style-type: none"> Typically, maintenance conducted at least annually, or as needed to meet posted conditions Typically, major damage or safety concerns corrected or posted within 24 hours of discovery

¹ Maintenance in this category does not include routine trail condition assessment surveys.

19 - Trail Planning and Results

Trail planning and results vary widely in purpose, scope, and complexity

The Trail Planning and Inventory example (ex. 01) summarizes consideration of several key factors for trail planning involving multiple trails and decisions, inventory, and management results associated with that planning effort.

19 – Exhibit 01

Trail Planning and Inventory

The trail planning summaries below show how safety, protection of wilderness values, availability of resources, need for preconstruction, and anticipated availability of trails to users influence trail priorities, scheduling, and management requirements.

Big Rock Trail

This trail is managed for use by motorcycles, with a Designed Use of Motorcycle. Motorcycle use on the trail is high and increasing. The lower 5.36 miles meet the Motorcycle Design Parameters, other than needing clearing of brush. The upper 5.18 miles do not meet the National Quality Standards for Trails and would require major reconstruction to meet the Motorcycle Design Parameters. The trail is classified as Trail Class 3. The area is managed for a roaded natural experience. There are limited opportunities for motorcycle trails in the area.

Analysis resulted in a decision to reconstruct the upper trail segment and complete needed brushing on the lower segment to meet the National Quality Standards for Trails and the Motorcycle Design Parameters for Trail Class 3. This work will provide a high-volume yet sustainable motorcycle trail consistent with the roaded natural character of the area. Preconstruction is necessary for the reconstruction.

Kawishiwi Trail

This is an unauthorized four-wheel drive trail in a wilderness area. Use includes low-volume use by four-wheel drive and all-terrain vehicles, a moderate level of pack and saddle use, and a relatively high level of use by hikers. The management goal for the area is to eliminate illegal motorized use in this wilderness area and to naturalize sections of the unauthorized four-wheel drive route. Inadequate parking at the minimally developed trailhead is also a problem. An opportunity exists to share a trailhead with the Moraine Trail.

Analysis resulted in a decision to close the route to motor vehicles; to add the route to the forest transportation system as a trail with Managed Uses of Hiker/Pedestrian and Pack and Saddle; and to allow the route to revert to a moderate-volume trail in Trail Class 3. Barriers to close the route and informational and regulatory signs are needed. Actions were identified to hasten the return of this trail to a more primitive character. A short (0.3-mile) trail connecting the Kawishiwi Trail with the Moraine Trailhead will be constructed to allow shared use of the trailhead, and the minimally developed trailhead will be decommissioned. The planned use is consistent with the area's semi-primitive character and wilderness designation.

Moraine Trail

This trail is used for cross-country skiing and snowshoeing in the winter. Cross-country skiing on the trail is increasing rapidly, but users complain of a 1.25-mile trail segment classified as Trail Class 2, with a rating of most difficult, on this 13.81-mile trail that is otherwise classified as Trail Class 3, with a rating of more difficult. Preliminary reconnaissance indicates that minimal clearing of brush and small trees has occurred and that trail marking is necessary. A local Nordic club has volunteered to help with the project. This is one of a few areas in this drainage where plowed roads provide winter access.

Analysis of the situation resulted in a decision to change the Trail Class of the 1.25-mile section from Trail Class 2 to Trail Class 3. Construction of a 0.67-mile rerouting of the trail to reduce the grade, as well as clearing of brush and trail marking, will be necessary. Space has been identified for expansion of the parking area at the Moraine Trailhead to provide adequate winter parking. The desired recreation experience is consistent with the semi-primitive, non-motorized character of the area.

Meadows Trail

The Ranger District identified a need and opportunity to construct a relatively short, interpretive hiking trail to provide day hiking near a major campground.

Analysis based on estimated use resulted in a decision to construct a high-volume, trail in Trail Class 4 with a Managed and Designed Use of Hiker/Pedestrian. Other uses will be prohibited. The planned use is consistent with the roaded natural character of the area.

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19 – Exhibit 01--Continued

Trail Inventory Summary

Summit Ranger District, Big Rock Basin

Last Updated: dd/mm/yyyy

This matrix illustrates a summarized comparison of the current condition, the desired condition identified in the TMOs, and the work needed to achieve the TMOs. Trail inventory summaries can be useful for program planning, management, and prioritization. Additional factors that are often included in this type of summary are estimated costs, funding sources, needed clearances, and timelines.

Trail Name Trail Type (Location)	Trail Number	Current Condition			TMO				Work Needed to Meet TMO (Summarized)		
		Current Length (miles)	Trail Uses	Relative Use Levels	TMO Length (miles)	Trail Class	Managed Uses	Designed Use	Trail Improvement	Deferred Maintenance	Routine Maintenance
Big Rock Trail Standard Terra Trail (Sec. 32, T58N, R12E)	13	10.74	Motorcycle Hiker/ Pedestrian	High Low	10.74	TC3	Motorcycle	Motorcycle	-----	5.18 miles	5.56 miles
Kawishiwi Trail Standard Terra Trail (Sec. 6, T57N, R12E)	123	5.37	4WD, ATV Pack & Saddle Hiker/ Pedestrian	Low Moderate High	5.37	TC3	Pack & Saddle Hiker/ Pedestrian	Pack & Saddle	Install barriers. Install signing. Decommission trailhead.	-----	5.37 miles
Kawishiwi Link Trail Standard Terra Trail (Sec. 6, T57N, R12E)	123-19	-----	-----	-----	0.33	TC3	Pack & Saddle Hiker/ Pedestrian	Pack & Saddle	0.33 miles	-----	0.33 miles
Moraine Trail Snow Trail (Sec. 31, T58N, R12E)	19	13.81	Cross-Country Ski Snowshoe	High Low	14.48	TC3	Cross-Country Ski Snowshoe	Cross-Country Ski	0.67 miles	-----	13.81 miles; install markers.
Meadows Trail Standard Terra Trail (Sec. 32, T58N, R12E)	27	-----	-----	-----	0.72	TC4	Hiker/Pedestrian only	Hiker/Pedestrian	0.72 miles; install signing.	-----	-----
Total Miles		29.92			31.64				1.72	5.18	25.07