



Forest Service

**Northeastern
Research Station**

General Technical
Report NE-309



Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide

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Abstract

The Recreation Opportunity Spectrum (ROS) is one of the most powerful recreation inventory tools ever devised. Originally formulated in the late 1970's for use on public lands in the Western United States, the ROS was quickly adopted by federal land-management agencies. However, its application to public lands in the East proved problematic, as did its extension to state lands, which often are smaller and closer to cities. Additionally, in the 25 years since its development, there have been major changes in technology for both recreation users and managers. We report results of an effort by the Vermont Department of Forests, Parks, and Recreation to adapt the ROS for use on public lands managed by state governments, regional authorities, and nongovernmental organizations, particularly in New England. The ROS tables have been updated, but the basic content of the spectrum remains the same. This guide outlines the steps involved in its application.

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Manuscript received for publication 13 January 2003

Published by:
USDA FOREST SERVICE
11 CAMPUS BLVD SUITE 200
NEWTOWN SQUARE PA 19073-3294

August 2003

For additional copies:
USDA Forest Service
Publications Distribution
359 Main Road
Delaware, OH 43015-8640
Fax: (740)368-0152

Executive Summary

Conserving scarce recreation resources requires an inventory of existing resources and potential opportunities that transcends traditional agency and political boundaries. While traditional inventories often focus on facilities or activities, the Recreation Opportunity Spectrum (ROS) is an experience-based inventory system that is spatially oriented and easily applied. Land types ranging from city open space to large, remote primitive areas can sustain different kinds of experiences. For example, the experience of hiking or hunting on primitive land far from the sights and sounds of people differs from an activity at a more developed location. Categorizing and mapping these lands according to ROS criteria can assist land managers in multiple ways:

- The ROS does not focus solely on activities; it is a holistic approach that examines the recreational experience based on the evidence of humans and their impacts on the natural environment.
- The ROS provides a rational and consistent basis for recreationally based land-management decisions. It identifies potential locations where specific uses may be allowed without degrading the type of recreational experience for that area.
- Using the ROS can bring recreation inventory information to the same level that currently is available for other resources in land-management planning and decisionmaking.
- The ROS places individual areas (such as state or county parks) in a broader, regional perspective and helps protect rare primitive lands in a larger, regional context.
- The ROS can identify supply shortfalls and excesses in various categories and help set acquisition priorities or guide management directions on specific public lands.
- The ROS can help determine “niche” opportunities in relation to what others provide, facilitating interagency cooperation. In Vermont, state lands provide few opportunities for primitive recreation experiences because state land units often are relatively small and close to roads. However, the Green Mountain National Forest is a larger land mass that provides primitive opportunities. Regionally, northern New Hampshire, Maine, and the Adirondack Park in New York provide additional opportunities for primitive experiences and opportunities.
- This implementation guide is intended for use on nonfederal lands. The USDA Forest Service, along with other federal land-management agencies, remains committed to retaining the preexisting ROS and its categories in the current round of forest planning. Many of the changes in this guide were required because states often manage smaller land parcels and those located closer to cities than federal agencies.

Introduction

The conservation of open space is about to become critical. The U.S. Census Bureau (2001) estimates that the population will double by 2050 (<http://www.census.gov/population/projections/nation/summary/np-t.pdf>). This suggests that we are entering an era of unprecedented development. More people will require more houses and more supporting infrastructure—offices, roads, malls, etc. Also, the demand for outdoor recreation of all kinds likely will increase—from the use of small parks in central cities to visits to wilderness areas on the distant horizon. There is a clear need for foresighted conservation to protect and preserve diverse recreation opportunities. Unfortunately, conservation could be impeded by the multiplicity of federal, state, and local agencies involved as well as nonprofit groups, each with its own mandates, goals and objectives, and definitions and procedures. Our efforts are likely to be incomplete until conservation efforts can be coordinated across governmental levels, involving both interested not-for-profits and the private sector.

The first step in the conservation process is a sound inventory. Recreation inventories typically enumerate specific facilities—picnic tables, benches, playgrounds, ball fields, etc. Often, too, there are activity-specific inventories—numbers of campgrounds, hunting areas, hiking trails, and so on. But inventories and inventory methods can differ across agencies, organizations, and levels of government. To avoid duplication of effort and to optimize the use of scarce resources, those involved in the providing recreation opportunities need to develop a common inventory language based on shared categories and concepts. One step in this direction occurred in the late 1970's when the Forest Service developed the Recreation Opportunity Spectrum (ROS) (Clark and Stankey 1979). The original ROS was a map-based inventory system that recognized the need to maintain a spectrum of opportunities supporting a variety of experiences. The key term is “experiences” and the crucial assumption is that different kinds of land (or landscapes) can support different kinds of experiences. For example, the experience of primitive hiking or camping differs from the experience of hiking or camping in more developed areas. Such differences need to be recognized in an inventory system.

The original ROS classified lands as primitive, semiprimitive, nonmotorized; semiprimitive motorized; roaded natural; and urban. These categories should not be confused with wilderness, which is a special, legally designated category that can cross classes. At the primitive end of the scale are landscapes that support wilderness-like experiences. However, such experiences can be easily intruded upon by human activity, so evidence of people was the key factor in differentiating among classes. This evidence generally was operationalized for mapping purposes as distance from different types of roads. Using this criterion, Forest Service recreation planners developed maps of the different categories for inventory purposes (much like a timber-type map) that provided baseline information with which professionals and the public could assess proposed management actions. For example, if a road was proposed in a particular location, the ROS map could easily illustrate its impact on the distribution of land across various experience categories.

In general, the ROS system proved robust and was quickly adopted by other federal land-management agencies, but problems emerged over time. Most importantly, the ROS was suited primarily to applications on the vast public lands of the American West rather than the Eastern States where public lands are smaller and landscapes are more intimate. Consequently, in 1985, the Forest Service issued an Eastern Regional Supplement to facilitate ROS application on eastern national forests (USDA For. Serv. 1985).

Unfortunately, the Eastern Regional Supplement also has proven problematic. Lynch and Nelson (1996) identified three major difficulties:

- Vague, poorly defined standards that are not specific, measurable parameters.
- Direct inconsistencies and contradictions.
- Absence of standards and guidelines for selected recreation facilities.

For example, much of the application of the ROS depends on the presence or absence of roads, but specific guidelines are needed for particular kinds of roads in certain ROS classes. Similarly, there is a lack of specific standards for facilities such as boat launches, cross-country ski trails and horse trails, and the Eastern Regional Supplement was issued prior to the mountain biking trend. Such difficulties can lead to ambiguous opportunity settings that fail to meet user expectations, resulting in conflict between managers and the public.

As stated earlier, the ROS system was designed for the needs of large federal land-management agencies. It is less well adapted to the needs of states, counties, and municipalities where properties tend to be smaller and more diverse, and may be located near or within, major metropolitan areas. Thus, the ROS is more finely differentiated at the primitive end of the spectrum than at the urban end. This greater diversity at the urban end necessitates the development of more finite categories.

These difficulties with the ROS are understandable given the needs and interests of the Forest Service as the originating agency. Unfortunately, despite its revisions, the current ROS remains unsuited to multiagency, cross-jurisdictional planning. We need to develop an inventory system that accounts for diversity in both activities and experiences, that reveals deficits in specific experience categories, and that identifies potential areas for conservation based on the kind of experience they are capable of sustaining. For example, a ROS inventory might identify a shortfall in semiprimitive, nonmotorized areas, or identify a primitive area that should be conserved. Here we report results of an interagency effort to extend the existing ROS to include both federal and state lands planning in the Northeast. While our effort centered on Vermont state lands, the results should be applicable to other Northeastern states and eventually to county and municipal-level planning.

Our priority was to construct a manual that will be helpful in training field personnel in the application of the ROS to nonfederal land planning. We begin with a description of the original ROS and the changes we initiated. This is followed by a set of implementation guidelines that include a general description of inventory goals, key concepts (Appendix I), and instructions for implementing the guidelines. Explicit descriptions of the ROS categories and standards are presented in Tables 1-8 in Appendix II.

Background: The ROS Old and New

The original ROS inventory system (and the one currently used by federal land-management agencies) embodies six land classes: primitive; semiprimitive, nonmotorized; semiprimitive, motorized; roaded, natural; rural; and urban. Each class is described by a “typical” setting based on factors such as size, naturalness, and the presence or absence of motorized vehicles and other sights and sounds of humans. The different settings prompt experiences that range from a sense of isolation, self-reliance, and closeness to nature at the primitive end of the scale to social experiences in highly structured environments at the urban end. Both the setting and experience scales associated with each ROS class are described in the original ROS Users Guide (USDA For. Serv. 1982).

The ROS produces a set of inventory maps based on multiple criteria: remoteness, area size, evidence of humans, and social and managerial settings. With the remoteness criterion, primitive lands must be at least 3 miles from all roads, railroads, etc. and roaded natural lands are within one-half mile of roads that are better than primitive; there is no distance criterion for rural or urban lands. For the size criterion, primitive lands generally must exceed 5,000 acres and semiprimitive lands, both motorized and nonmotorized, must exceed 2,500 acres; there is no size criterion for roaded natural, rural, or urban lands. These criteria are fully described in the ROS Users Guide and, as noted, are combined to produce inventory maps much like timber-type maps. These maps are a useful tool for organizing baseline information to assess the potential effects of future recreation management and policy alternatives.

We attempted to adapt the ROS to nonfederal land planning in New England. There have been many recreation developments in the nearly 25 years since the ROS was first implemented,

particularly in equipment such as mountain bikes and trail rollerblades. An initial difficulty was accommodating these developments while retaining the integrity of the original ROS system without affecting existing federal inventories.

Our changes fell into five general categories. First, we tried to clarify the language of the existing ROS, resolving contradictions to make the guidelines easier to understand and implement. For example, the experience character of the rural class in the original ROS states that the “probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities.” This was reworded to: “Encounters with other individuals and groups are common. Site and activity access is convenient.”

Second, we wanted to clarify the more general or vague guidelines and increase the consistency of interpretations. For example, the primitive setting guidelines state that the area appears to be an essentially unmodified natural environment that is relatively large in size. Because managers experienced difficulty interpreting which management actions were consistent with an area that is an “essentially unmodified natural setting,” we added the following language: “Timber harvesting and most other vegetation management techniques usually are not compatible with this class. Management techniques such as prescribed burns and other vegetative treatments using highly specialized treatments may be acceptable on a limited basis but must be evaluated relative to this class” (Table 1, Appendix II).

Similarly, we included uses that were not mentioned in the original ROS (cf. Lynch and Nelson 1996). Rather than relying on managers to interpret where such uses are appropriate, we added language to clarify when and where mechanized uses are most appropriate within the spectrum.

Third, the original ROS allowed modifications to some guidelines (e.g., remoteness and size criteria) during implementation based on site-specific features. For example, while the remoteness criteria states that a primitive area is at least 3 miles from all roads, railroads, and trails with motorized use, it allows for modification to conform to natural barriers, screening, topography, and vegetative cover. We did not change the original remoteness criteria but clarified how conditions in New England could be accounted for in modifications. In the case of primitive remoteness, we added the statement: “In New England, a 2-mile distance may be appropriate due to the nature of topography and other features.”

Fourth, the most obvious change was renaming some classes. As various categories were discussed, we encountered conundrums like: Can there be rural areas in a city? Eventually we realized that we were dealing with both a continuum of development and a range of naturalness, so we renamed the classes accordingly:

- roaded natural was changed to semideveloped natural;
- rural became developed natural; and
- urban became highly developed.

Note that the basic content of each class remains unaltered; our goal was simply to show a continuous scale of development.

Fifth, the most substantive change is the addition of characterizations and guidelines for the (now) “highly developed” class. In adapting the ROS to all lands in Vermont and potentially New England, we had to capture the experience characteristics for those who use highly developed areas for recreation. Highly developed recreation experiences are as wide ranging as the settings in which they occur. For example, we discussed the variety of experiences supported by a large park like New York City’s Central Park compared to small “pocket” parks or athletic fields devoted to facilities like ball fields or tennis courts. Each of these entailed obvious differences in setting, user motivation, and the

nature of the experience. It is much easier to experience a limited sense of solitude in a large park where the street is out of view than in a small park where the surrounding city is constantly in evidence. Such differences are obvious but we also identified differences in user motivation and experience by subdividing the urban classification into two primary categories:

- Settings in which facilities are dominant and exist to support a particular recreation activity. Here the experience is about the activity, e.g., a baseball diamond.
- Settings that are naturalistic and are not developed to meet the needs of particular activities. The experience here is about escaping an urban landscape to participate in unstructured activities—strolling, sunbathing, or simply sitting under a tree. The naturalistic category was divided into two subcategories—large (more than 15 acres) and small—since we expected that each category would sustain different kinds of experiences.

These changes led us to retain a six-class ROS with the highly developed category comprising three subclasses. Thus, we were able to preserve the content of the original ROS so that existing inventories would not be compromised while offering finer differentiation at the urban end of the spectrum.

Implementing the Recreation Inventory and ROS

To determine appropriate recreational opportunities, experiences, and uses of public lands, land managers need a systematic and consistent inventory and assessment of these items as part of the long-range planning process. We recommend following this implementation guide both for newly acquired parcels and existing parcels that are due for plan revision. The resulting consistent protocol can be used in management planning on both federal and state public lands. Such coordination will facilitate consistent messages given to the public on the types of recreation experiences to expect in various areas, regardless of the agency that provides the opportunity. The guide is the first attempt to ensure interagency consistency at multiple governmental levels.

The steps outlined in this guide are not the only methods by which recreational resources can be inventoried and mapped. In fact, future revisions and improvements are likely as experience is gained at the developed end of the spectrum.

General Goals of Recreation Resources Inventory and Mapping Process

- Provide the most current recreation resources information available on parcels of nonfederal lands for long-range management planning.
- Emphasize outdoor recreation management and establish standards and guidelines for specific management areas based on other resource data layers.
- Use the outcomes of the recreation inventory and assessment in conducting tradeoff analyses for various management activities or areas for protection.
- Provide current information with respect to day-to-day management decisions, future projects, and public requests related to recreational uses and activities.
- Separate incompatible managerial and user activities to provide facilities and settings that are consistent with user expectations (i.e., minimize user conflicts).
- Identify inappropriate uses and activities for various areas to protect for specific opportunities and experiences.
- Produce maps with digital information that meets the National Map Accuracy Standards for positional accuracy.

Using the Implementation Guide

The process that follows is designed to produce at least two maps: an Existing Recreational Resources Map, and an Existing ROS Inventory Map. After integrating the ROS with other resource data layers during the planning process, a third map—of potential opportunities—could be produced if the current recreation situation needs to be revised. Before applying the ROS, managers should review the key concepts listed in Appendix II.

Information Gathering and Mapping for Existing Recreation Facilities, Activities, and Uses

The purpose of gathering existing information is to document what people are doing, where they are doing it, how many people are using various areas, and the facilities and infrastructure that are available for these activities. This process also will help explain why people go where they go and do what they do, and identify key attraction sites, activity areas, and “hot spots”.

The following steps are required:

1. Identify a team with expertise related to recreation on the parcel (e.g., foresters, planners, GIS specialists, and wildlife biologists.) Designate individuals on the team to conduct the inventory and mapping process.
2. Determine what information exists, including concurrent mapping or inventory efforts. Collect all pertinent existing data including information from discussion with knowledgeable individuals, and from preliminary site visits. Important information includes:
 - Trails and roads. Use established databases and protocols in collecting information. Include data on roads on and around the property, trail locations, trail heads, parking areas, and shelters and lean-tos associated with trails.
 - Buildings/structures/facilities. Use established databases and protocols to collect information. Include data on park structures, lean-tos, maintenance shops, parking areas, campgrounds, beaches, access areas, toilet buildings, and utility corridors.
 - Special features. Identify point locations for items that attract people, e.g., vistas, viewpoints, waterfalls, swimming holes, cliffs, gorges, cellar holes, historic sites, and apple trees, etc. During the planning process it may be decided that people should be directed away from such areas.
 - Identify appropriate activities. Identify appropriate activities such as hiking, cross-country skiing, viewing scenery, snowmobiling, and camping.
 - Activity nodes. Identify areas where certain activities are concentrated, e.g., trailheads, swimming holes, and shelters, as well as areas where various activities tend to occur (legally or illegally), e.g., hiking, skiing, snowmobiling, and camping.
3. Review the legal and political constraints on the property, e.g., deed restrictions, conservation easements, funding requirements, and political promises, to determine their impact on recreational use of the property.
4. Map existing information on the land parcel using an appropriate map base and scale (paper or digital orthophoto, USGS topo sheet, color infrared, digital maps) by plotting on Mylar overlays. If accurate locations cannot be determined from existing information, collect accurate field data with global positioning system equipment.

5. Develop a preliminary Existing Recreational Resources Map at an appropriate scale for use in field work. Using digital orthophotos, one can produce field maps that include the GIS data layers for a particular parcel. Refer to field map protocols for natural community mapping.
6. Design and conduct field work to confirm mapped facilities and to make necessary additions or changes to the map.
7. Develop final Existing Recreational Resources Map using GIS standards and attributes as adopted by the agency.
8. Identify other recreational facilities and uses in a regional context, including comparable lands managed by other state and federal agencies. Develop a separate GIS map at an appropriate scale that identifies the regional context.

Conducting the ROS Inventory

Providing opportunities for a range of visitor experiences is an important part of planning for most public lands as most people use them for different and sometimes conflicting reasons. A diversity of settings and opportunities allows visitors to select the experience(s) most closely matching their reason for using public lands. Planning for a diversity of experiences also helps avoid conflicts among visitors who want different things from their visits.

After inventorying and mapping existing recreational facilities and uses, conduct the ROS inventory for recreational opportunities using the tables in Appendix II, the ROS Eastern Region Supplement (USDA For. Serv. 1985), and other supporting information.

The following are general criteria used in delineating ROS class:

1. Each class is defined with respect to its combination of activity, setting, and experience opportunities (Table 1). Three criteria are used to delineate the setting component for mapping: physical, social and managerial. The mapping criteria for the physical setting are remoteness, size, and evidence of humans. User density is the criterion for the social component, and (managerial) regimentation and notifiability are the criteria for the managerial setting.
2. Use the Existing Recreation Resources Map as the base map to conduct the ROS. Use Mylar overlays, trace paper, or the GIS Existing Recreation Resources Map to draw ROS categories on the map. A GIS-based program can be developed to prepare the Remoteness and Size of Area overlays as the first step in defining the Physical Setting Overlay. Otherwise, this must be done manually on the base map. If the map is “busy” or difficult to read, adjust the base map scale for developing the ROS class designation. Seasonal maps—one for summer and one for winter—are highly recommended as activities, setting, and experience can change significantly with the season.

Physical Setting

The physical setting (ROS Users Guide, p. 16) is defined by the absence of human sights and sounds, size, and amount of environmental modification caused by human activity. Three criteria are combined:

- Remoteness. Determine class boundaries using distance from roads, railroads, and trails with motorized use under the criteria in Table 3.
- Size of area. Adjust class boundaries based on size criteria for each ROS class from Table 4.

- Evidence of humans. Apply criteria from Table 5 to determine whether the impact of human modification on the landscape is appropriate for each class designation on the inventory overlay. Adjust class boundaries if necessary and reevaluate size criteria.

This will create the Physical Setting Map Overlay.

Social Setting

The social setting (ROS Users Guide, p. 25) reflects the amount and type of contact between individuals and groups, indicating opportunities for solitude, or interactions with selected individuals or within large groups.

- User density. Apply criteria from Table 6 to the class boundaries and adjust as necessary. This will create the Social Setting Map Overlay (for less complex land parcels, this overlay can be combined with the Physical Setting Map Overlay).

Managerial Setting

The managerial setting (ROS Users Guide, p. 27) reflects the amount and kind of restrictions placed on people's actions by the administering agency or private landowner, which, in turn, affect recreation opportunities.

- Managerial regimentation and noticeability. Apply criteria from Table 7 to the class boundaries and make further adjustments as needed. This will create the Managerial Setting Map Overlay which can be combined with Physical Setting and Social Setting Map Overlays.

Resolving Setting Inconsistencies

Take the following steps to resolve setting inconsistencies (ROS Users Guide, p. 29) for the current situation:

- Map the ROS class that best reflects current management direction.
 - Emphasize the physical setting.
 - Average the differences if emphasizing the physical setting yields unrealistic results.
 - If averaging is necessary, it is easier to shift from primitive to highly developed along the spectrum than from highly developed to primitive.
3. Prepare the Existing ROS Inventory Map. The ROS class delineations should be digitized to develop a GIS data layer. Use the Existing Recreation Resources Map as the base and place the ROS classifications on top of the base map. If the map is too difficult to read, use an appropriate base map to depict existing ROS class delineations.
 4. At this point you may be able to develop a preliminary Potential ROS Inventory Map based on your knowledge of the parcel and if there are areas with no management conflicts. This map need not be completed if there are no areas for which you want to change management strategies or the ROS classification. If it is not possible to complete the map at this time, prepare it when you enter into the decisionmaking process for a specific parcel.

Entering into Management Decisionmaking

After the inventory and mapping process is complete for existing recreation resources and ROS, the recreation component for management mapping is complete unless a Potential ROS Inventory Map is required. The existing ROS inventory map should be used as one data layer for management and

planning. Other data layers may include special constraints (deed and legal), natural resource information such as wildlife and timber data, natural communities map, cultural/historic resources, and existing recreational resource information and ROS. GIS data layers and maps are helpful in determining:

- The appropriateness of existing activities, facilities, experiences, and opportunities.
- Areas in which current facility development, use, and activity is inappropriate or potentially inappropriate.
- Areas suitable for specific types of new recreational activities.

Conclusion

If the U.S. population doubles by 2050 as expected, increasing public demand will necessitate interagency and cross-jurisdictional planning to preserve increasingly scarce recreation opportunities. The inventory process is basic to such planning and the ROS is one of the most powerful recreation inventory and analysis tools ever devised. As currently formulated, ROS is best applied on the large public tracts in the Western United States. Several modifications were required before it could be applied in the East. These included adding clarifying language and management/implementation guidelines, adapting ROS to accommodate the New England landscape, renaming certain classes, and developing the urban category more completely. ROS mapping has been applied successfully to state lands in Vermont and we hope that other states will be interested in adopting it for their inventory and planning. The problems we encountered are hardly unique to Vermont, and the goal of broad-based, integrated planning is in the general public interest.

No doubt, additional changes will be required as we delve further into the urban end of the spectrum. Moreover, there are questions about the public's ability to discriminate across classes at the primitive end (Dawson et al. 2002) and questions about the experiential basis of this technique. Still, the ROS is the best available inventory technology for planning a highly problematic future, and is increasingly important that it be applied at governmental levels.

Acknowledgment

We thank Floyd Thompson, USDA Forest Service, and Herbert Echelberger, USDA Forest Service (retired), for their reviews of an earlier draft of this report.

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Appendix I

Key Concepts

“Managing for recreation requires different kinds of data and management concepts than do most other activities. While recreation must have a physical base of land or water, the product—recreation experience—is a personal or social phenomenon. Although, the management is resource based, the actual recreation activities are a result of people, their perceptions, wants, and behaviors” (Final Report of the Committee of Scientists for Implementation of Section 6 of the National Forest Management Act of 1976, February 22, 1979, as published in the Federal Register, Part V, May 4, 1979, p. 26628).

Visitor (social) carrying capacity is defined as “the type and level of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of the park (land base).” It is intended to safeguard the quality of the natural, aesthetic, and cultural resources and of the visitor experience. It is primarily a prescription of resource and social conditions, and secondarily a prescription for the appropriate number of people.

Recreation opportunity is “the availability of a real choice for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired.” (ROS User Guide, p. 4).

The Recreation Opportunity Spectrum (ROS) is an inventory system built on the premise that people expect certain types of recreational experiences on public land, and that land managers should be able to direct people to appropriate places. ROS allows the land manager to provide recreational opportunities across a spectrum, or continuum, of six land-use classes so that the user may find satisfying recreational experiences in a variety of recreation activities.

ROS separates incompatible managerial and user activities and helps managers provide facilities and settings in keeping with user expectations. For example, visitors seeking a remote camping opportunity in areas with little evidence of humans or contact with other users might be disturbed to find themselves in what they consider crowded, socially oriented, developed campgrounds or in an area currently undergoing timber harvest. Conversely, users seeking experiences with high social contact, numerous facilities, and other evidence of human activity may be fearful or uncomfortable in remote, completely natural settings.

The entire spectrum of ROS classes need not be present on each land parcel. In fact, only large tracts of land are likely to have more than one ROS class present.

Appendix II

Table 1a.—ROS classes for New England—setting characterization and clarifications

SETTING CHARACTERIZATION		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Area appears to be an essentially unmodified natural environment of relatively large size. It may contain evidence of past human activities and historical-cultural sites, but these are subordinate to its natural state.	Area appears to be a predominantly natural or natural appearing environment of relatively medium-to-large size.	Area appears to be a predominantly medium-to-large size natural or natural appearing environment.
Interaction between users is very low, and evidence of other users is minimal.	Interaction between users is low, but there is often evidence of other users.	Interaction between users is low, but there is often evidence of other users.
The area is essentially free from evidence of management restrictions and controls.	The area is managed so that minimum on-site controls and restrictions, if needed, are subtle.	The area is managed so that minimum on-site controls and restrictions, if needed, are subtle.
Motorized or mechanized use is not permitted.	Nonmechanized uses predominate. Mechanized uses may be permitted. Motorized use is not permitted.	Mechanized uses may be permitted.
SETTING CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>Dispersed (low density) pedestrian recreation is the primary management goal.</p> <p>Saddle, pack, and draft animal use could be compatible if trails are designed and maintained to a primitive standard, (e.g., trail construction should avoid structures).</p> <p>Timber harvesting and vegetation management are not compatible with this class. Other management techniques such as proscribed burns should be evaluated relative to the class.</p>	<p>The area is managed for dispersed (low-density), pedestrian recreation.</p> <p>Trail uses are managed in designated, maintained corridors. The impacts of mechanized use on the semiprimitive recreation experience must be considered in locating mechanized trails.</p> <p>Saddle, pack, and draft animal use may be permitted.</p> <p>Timber harvesting and vegetation management may occur on a short-term basis if effects are minimized or mitigated to maintain class consistency (seasonality, scheduling harvest, aesthetics, road placement). Sights and sounds associated with skidder and chain saw use generally are not consistent with this class.</p>	<p>All mechanized and motorized uses are restricted to designated corridors. Primary* motorized travel corridors are not permitted. Designated secondary, ** local, or loop motorized use is permitted within designated corridors.</p> <p>*Primary trails are typically two-lane, long-distance, high-speed travelways designed for heavy use.**Secondary “or connecting” trails are typically one lane, shorter distance, and slower speed, designed for low to moderate use.</p> <p>Timber harvesting and vegetation management are compatible.</p>

Table 1b.—ROS classes for New England—setting characterization and clarifications

SETTING CHARACTERIZATION				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
Area is a natural appearing environment. Evidences of the sights and sounds of people are moderate. Such evidences usually harmonize with the natural environment.	Area is a substantially modified natural environment. Resource modification and utilization practices enhance specific recreation activities and maintain vegetative cover and soil. Sights and sounds of people are readily evident.	The setting contrasts with the surrounding cityscape, but urban elements are common and readily apparent. Vegetation often is exotic and manicured. The design enables users to choose amongst solitude and social experiences in a naturalistic setting (e.g., there may be footpaths, benches, and social focal points).	The setting contrasts with the surrounding cityscape, but urban elements are common and readily apparent. Sights and sounds of people are expected and desired.	Area is characterized by a substantially developed environment. The setting is highly structured to fit the activity being provided.
Interaction between users may be low to moderate, but evidence of other users is prevalent.	Interaction between users often is moderate to high.	Large numbers of users can be expected, both onsite and in nearby areas.		Social encounters are expected and often programmed.
Resource modification and utilization practices are evident but harmonize with the natural environment. Construction standards and facility design accommodate conventional motorized and mechanized uses.	Many facilities are designed for use by a large number of people. Density levels decline with increasing distance from developed sites. Facilities often are provided for special activities. Facilities for intensified motorized and mechanized uses and parking are available.	Facilities are designed to serve individuals or small groups but can accommodate high use. Facilities accommodate access by a variety of means, including pedestrian, motorized, mechanized, and mass transit.	The design facilitates social encounters in a naturalistic setting.	Design is dictated by the requirements of the particular activities involved. Facilities are designed for large groups typical of sports and special events.
SETTING CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
Motorized and mechanized uses are permitted. Trail uses are managed in designated, maintained corridors. Strive to maintain a spectrum of development levels in this class. Sites that are farther from asphalt roads and that provide access to more remote areas should be managed toward the semiprimitive (more rustic) end of the spectrum. Many timber harvesting and vegetation management practices are compatible.	All trail uses may be permitted. Recreationists may pass through various landscape types, including developed and natural appearing. Many timber harvesting and vegetation management practices are compatible.	Organized/structured uses are not necessarily incompatible with individual/small group uses, depending on design. Most types of recreational experience are consistent with this class, but emphasis is on generally unstructured activities (e.g., gardens, open trails, beaches, picnic areas).	“Naturalistic” may include highly designed environments that incorporate noninvasive, exotic species.	Most types of recreational experience are consistent with this class, but facilities tend to be designed and managed for specific activities (e.g., skate parks, tennis courts, ball fields).

Table 2a.—ROS classes for New England—experience characterization and clarifications

EXPERIENCE CHARACTERIZATION		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>Extremely high probability of experiencing isolation from human development, use, and impact.</p> <p>Extremely high probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers a high degree of challenge and risk.</p>	<p>Moderately high probability of experiencing isolation from human development, use, and impact.</p> <p>High probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers challenge and risk.</p>	<p>Moderate probability of experiencing isolation from human development, use, and impact.</p> <p>Opportunity for high degree of interaction with the natural environment. Moderate probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers challenge and risk.</p> <p>Opportunity to use motorized equipment.</p>
EXPERIENCE CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>This class does not change seasonally.</p>	<p>ROS class may change seasonally, but the character of the area must remain unchanged. For example, a summer foot trail could become a winter motorized trail.</p>	<p>ROS class may change seasonally, but the character of the area must remain unchanged.</p>

Table 2b.—ROS classes for New England—experience characterization and clarifications

EXPERIENCE CHARACTERIZATION				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>About equal probability of encountering other user groups and isolation from sights and sounds of people.</p> <p>Opportunity for a high degree of interaction with the natural environment. Challenge and risk opportunities generally are not important. Practicing and testing outdoor skills might be important.</p>	<p>Encounters with other individuals and groups are common. Site/activity access is convenient. The physical setting is not as important as the activity opportunity.</p> <p>Wildland challenges, risk taking, and testing of outdoor skills generally are unimportant except for specific activities in which challenge and risk-taking are important elements, e.g. mountain skiing.</p>	<p>Design generally offers users a choice between social encounters and solitude in an urban setting.</p> <p>Observing natural appearing elements is important. Nature-related challenge and risk opportunities generally are not important</p>	<p>The presence of other people often is expected and desired.</p> <p>Observing natural appearing elements is important. Nature-related challenge and risk opportunities generally are not important.</p>	<p>Social encounters are expected. Site/activity access is convenient. The physical setting is not as important as the activity opportunity.</p> <p>Challenge and risk opportunities are not important, except for specific activities in which challenge and risk taking are important elements, e.g., sports competition.</p>
<p>Opportunities for both motorized and nonmotorized forms of recreation are possible.</p>		<p>Opportunities for unstructured uses of highly human influenced parks and open spaces are common.</p>		<p>Opportunities for competitive and spectator sports and organized events in highly human-influenced parks and open spaces are common.</p>
EXPERIENCE CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>Strive to maintain a spectrum of development levels in this class. Sites with limited road noise that are located away from developments like concessions, stores, towns, and cities should be managed toward the semiprimitive (more rustic) end of the spectrum.</p>	<p>Amenities for user convenience are appropriate, e.g., telephones, camp store.</p>			

Table 3a.—ROS classes for New England—remoteness criteria and clarifications

REMOTENESS CRITERIA		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Area is at least 3 miles from all maintained roads, railroads, or trails with designated motorized or mechanized use. In New England, a 2-mile distance may be appropriate due to the nature of topography and other features.	Area is at least 0.5 mile (but not farther than 3 miles or perhaps 2 miles in New England) from all maintained roads, railroads, or trails with designated motorized or mechanized use; can include unimproved roads and trails if usually closed to motorized use.	Area may contain unimproved roads or secondary trails but is at least 0.5 mile from any improved, maintained roads, railroads, or primary motorized or mechanized trails.
REMOTENESS CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>The criteria can be modified to conform to natural barriers and screening, or other relevant features of local topographic relief, vegetative cover, land-use history, and adjacent privately conserved lands. This fits the criteria into the context of the surrounding landscape.</p> <p>Topographic guideline: 1000 vertical feet elevation change may be considered roughly equivalent to 1 mile horizontal distance.</p> <p>Planning maps should be comprehensive, displaying all known roads.</p>	<p>The criteria can be modified to conform to natural barriers and screening, or other relevant features of local topographic relief, vegetative cover, land-use history, and adjacent privately conserved lands. This fits the criteria into the context of the surrounding landscape.</p> <p>Unimproved roads are not constructed to an improved standard, are temporary, and are not maintained. They typically are used by vehicles not intended primarily for highway use. These include skid trails, temporary log truck roads, abandoned roads, and town trails.</p> <p>Planning maps should be comprehensive, displaying all known roads.</p>	<p>The criteria can be modified to conform to natural barriers and screening, or other relevant features of local topographic relief, vegetative cover, land-use history, and adjacent privately conserved lands. This fits the criteria into the context of the surrounding landscape.</p> <p>Improved roads are constructed to a standard. These include graded and drained, aggregate surface, or pavement travelways, such as logging roads.</p> <p>Planning maps should be comprehensive, displaying all known roads.</p>

Table 3b.—ROS classes for New England—remoteness criteria and clarifications

REMOTENESS CRITERIA				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
Area is within 0.5 mile from improved, maintained roads, railroads, or trails.	No distance criteria.	No distance criteria.	No distance criteria.	No distance criteria.
REMOTENESS CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
Improved roads are constructed to a standard.				

Table 4a.—ROS classes for New England—size criteria and clarifications

SIZE CRITERIA		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Minimum of 5,000 acres. In New England, 3,000 acres may be appropriate.	Minimum of 2,500 acres. In New England, 1,000 acres may be appropriate.	Minimum of 2,500 acres. In New England, 1,000 acres may be appropriate.
SIZE CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Size may be smaller if contiguous to semiprimitive nonmotorized class or other private or public lands that are protected or managed in a complementary or consistent manner.	Size may be smaller if contiguous to primitive class or other private or public lands that are protected or managed in a complementary or consistent manner.	Size may be adjusted to account for difficulty of access or if adjacent to other private or public lands that are protected or managed in a complementary or consistent manner.

Table 4b.—ROS classes for New England—size criteria and clarifications

SIZE CRITERIA				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
No size criteria.	No size criteria.	Usually more than 15 acres.	Usually fewer than 15 acres.	No size criteria.
SIZE CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
			Includes “pocket” parks which may be less than 1 acre.	Although there are no size criteria, different sizes of areas and facilities may provide different experiences and need to be considered in planning.

Table 5a.—ROS classes for New England—evidence of humans criteria and clarifications

EVIDENCE OF HUMAN CRITERIA		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Setting appears to be an essentially unmodified natural environment. Evidence of recent human activities would be unnoticed by an observer wandering through the area. Evidence of past human activities may be compatible.	Natural appearing setting may have subtle modifications that could be noticed but not draw the attention of an observer wandering through the area.	Natural appearing setting may have moderately dominant alterations but would not draw the attention of motorized observers on trails and primitive roads within the area.
Trails may be acceptable but must be designed to a primitive standard. Structures are extremely rare.	Little or no evidence of unimproved roads and motorized use of trails (e.g., snowmobile trail in winter with no evidence of its presence in summer).	Unimproved roads and trails with motorized use are present.
	Structures are rare and isolated.	Structures are rare and isolated.
EVIDENCE OF HUMAN CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Very low trail density.	Low road and trail density.	Low road and trail density.

Table 5b.—ROS classes for New England—evidence of humans criteria and clarifications

EVIDENCE OF HUMAN CRITERIA				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>Natural appearing setting may have obvious modifications, ranging from easily noticed to strongly dominant. However these alterations remain unnoticed or visually subordinate from visually scenic and heavily traveled routes and use areas.</p>	<p>Natural appearing setting has been culturally modified so that the modifications are dominant.</p> <p>Pedestrian or other slow-moving observers are constantly within view of culturally changed landscape.</p> <p>May include pastoral, agricultural, intensively managed wildland resource landscapes, or utility corridors.</p>	<p>Setting is predominantly natural, but design elements are obvious and prominently located.</p> <p>Natural or natural appearing elements may play an important role but are visually subordinate.</p> <p>May include fountains, benches, statues, etc.</p>	<p>Setting may appear primarily natural, but design elements are obvious and prominently located.</p> <p>Pedestrian and other slow-moving observers are constantly within view of artificial enclosure of spaces.</p>	<p>Setting is strongly structure dominated and is determined by the requirements of specific activities.</p>
<p>Designed roads and/or highways are present.</p>	<p>Designed roads and/or highways are present.</p>	<p>Designed travelways, including roads, paths, sidewalks, trails, highways, and streets are common.</p>	<p>Designed travelways, including roads, paths, sidewalks, trails, highways, and streets are common.</p> <p>Design depends on activity requirements.</p>	<p>Designed travelways, including roads, paths, sidewalks, trails, highways, and streets are common.</p>
<p>Structures generally are scattered, remaining visually subordinate or unnoticed by observers on visually scenic or heavily traveled routes.</p> <p>Structures may include power lines, microwave installations, etc.</p>	<p>Structures are readily apparent and may range from scattered to small clusters that could dominate the landscape.</p> <p>Structures may include power lines, microwave installations, local ski areas, minor resorts, and recreation sites.</p>	<p>Structures like picnic shelters, boat ramps, etc. are designed to support specific activities. These differ from facilities that are highly organized areas usually designed for a specific activity (e.g., ball diamonds). Facilities may incorporate multiple structures.</p>	<p>Structures may include major year-round resorts and marinas, national and regional ski areas, industrial parks, condominiums, or second home developments.</p>	<p>Design is dependent on requirements of activities. Structures and large structure complexes are dominant.</p>
EVIDENCE OF HUMAN CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>Moderate road and trail density.</p> <p>Strive to maintain a spectrum of development levels in this class. Sites with flush toilets as well as those with fewer structures and/or with more distance between them should be managed toward the semiprimitive (more rustic) end of the spectrum.</p>	<p>Moderate road and trail density.</p>	<p>No road-density criteria.</p>		

Table 6a.—ROS classes for New England—social setting criteria and clarifications

SOCIAL SETTING CRITERIA		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
Low contact frequency.	Low to moderate contact frequency.	Low to moderate contact frequency.
SOCIAL SETTING CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>Contact frequency varies with location, day, season, and conditions.</p> <p>Users can expect a higher number of parties at designated concentration points.</p> <p>Usually less than 6 parties per day encountered on trails and less than 3 parties visible at campsites.</p> <p>National standards provide a relative guide, but normative standards for the acceptable number of encounters need to be developed to meet regional and local conditions.</p>	<p>Contact frequency varies with location, day, season, and conditions.</p> <p>Users can expect a higher number of parties at designated concentration points.</p> <p>Usually 6 to 15 parties per day encountered on trails, and 6 or less visible at campsites.</p> <p>National standards provide a relative guide, but normative standards for the acceptable number of encounters need to be developed to meet regional and local conditions.</p>	<p>Contact frequency varies with location, day, season, and conditions.</p> <p>Users can expect a higher number of parties at designated concentration points.</p> <p>National standards provide a relative guide, but normative standards for the acceptable number of encounters need to be developed to meet regional and local conditions.</p>

Table 6b.—ROS classes for New England—social setting criteria and clarifications

SOCIAL SETTING CRITERIA				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
Frequency of contact is moderate to high on roads, and low to moderate on trails and away from roads.	Frequency of contact is moderate to high on roads, and low to moderate on trails and away from roads.	Large numbers of users may or may not be on site and in nearby areas. Area may be located in a commercial or industrial district but is more likely to be in a neighborhood or at the edge of a city.	Large numbers of users (relative to the size of the park) may be on site. The surrounding area may be commercial, industrial, or residential.	Large numbers of users on site and in nearby areas. Use level depends largely on programming or scheduling.
SOCIAL SETTING CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>Contact frequency varies with location, day, season, and conditions. Peak days may exceed typical limits.</p> <p>Strive to maintain a spectrum of facilities that supports a variety of contact levels. Sites that connect more directly to remote areas should be managed toward the semi-primitive (more rustic) end of the spectrum.</p>	Contact frequency varies with location, day, season, and conditions. Peak days may exceed typical limits.			

Table 7a.—ROS classes for New England—managerial setting criteria and clarifications

MANAGERIAL SETTING CRITERIA		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>On-site regimentation is low with controls primarily off site.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>	<p>On-site regimentation and controls are present but subtle.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>	<p>On-site regimentation and controls are present but subtle.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>
MANAGERIAL CLARIFICATIONS		
Primitive	Semiprimitive nonmotorized	Semiprimitive motorized
<p>Trails and facilities are constructed, maintained, and managed according to accepted management standards.</p> <p>Public information is provided off site. Amount of detail is minimal. Trail marking is infrequent.</p>	<p>Trails and facilities are constructed, maintained, and managed according to accepted management standards.</p>	<p>Trails and facilities are constructed, maintained, and managed according to accepted management standards.</p>

Table 7b.—ROS classes for New England—managerial setting criteria and clarifications

MANAGERIAL SETTING CRITERIA				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>On-site regimentation and controls are noticeable but harmonize with the natural environment.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>	<p>Regimentation and controls are obvious and may be numerous, largely in harmony with the developed environment.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>	<p>Regimentation and controls are obvious and may be numerous.</p> <p>Controls can be physical (such as barriers) or regulatory (such as permits).</p>		
MANAGERIAL CLARIFICATIONS				
Semideveloped natural	Developed natural	Highly developed		
		Large natural	Small natural	Facilities
<p>Trails and facilities are constructed, maintained, and managed according to accepted management standards.</p> <p>Trails leading to more remote or more developed areas are appropriate.</p> <p>Users are informed that trails may be shared and advised on how to do so.</p> <p>Bulletin boards, trailheads, and register boxes are appropriate here.</p>	<p>Trails and facilities are constructed, maintained, and managed according to accepted management standards.</p> <p>Trails leading to more remote or more developed areas are appropriate. Loop trails around a site are appropriate.</p> <p>Users are informed that trails may be shared and advised on how to do so.</p>	<p>Structures, facilities, trails, and pathways are constructed, maintained, and managed according to accepted management standards.</p> <p>Signs direct peoples' uses of roads and walkways.</p>		

More, Thomas A.; Bulmer, Susan; Henzel, Linda; Mates, Ann E. 2003. **Extending the Recreation Opportunity Spectrum to nonfederal lands in the Northeast: an implementation guide.** Gen. Tech. Rep. NE-309. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 25 p.

The Recreation Opportunity Spectrum (ROS) is one of the most powerful recreation inventory tools ever devised. Originally formulated in the late 1970's for use on public lands in the Western United States, the ROS was quickly adopted by federal land-management agencies. However, its application to public lands in the east proved problematic, as did its extension to state lands, which often can be smaller and closer to cities. Additionally, during the 25 years since its development there have been major changes in technology for both recreation users and managers. We report results of an effort by the Vermont Department of Forests, Parks, and Recreation, to adapt the ROS for use on public lands managed by state governments, regional authorities, and nongovernmental organizations, particularly in New England. The ROS tables have been updated but the basic content of the spectrum remains the same. This guide outlines the steps involved in its application.

Keywords: Recreation Opportunity Spectrum, recreation experience, planning





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