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**Reclamation** *see* **Silviculture**: Bamboos and their Role in Ecosystem Rehabilitation; Forest Rehabilitation. **Site-Specific Silviculture**: Reclamation of Mining Lands; Silviculture in Polluted Areas. **Soil Development and Properties**: Soil Contamination and Amelioration; Waste Treatment and Recycling.

# RECREATION

Contents



## User Needs and Preferences

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### Definitions

'Forest recreation' is defined as 'recreational activities and experiences conducted in forest and associated wildland environments that are dependent on the natural resources of these areas.' I include associated wildland environments along with forests in the definition, for forest recreation activities can occur above treeline at high attitudes and/or extreme latitudes, on streams and lakes in forested areas, and in old fields. The key point is that forest recreation is dependent upon the natural resources of the areas. Moreover, the resources and conditions of these forest/wildland settings are largely natural, and management strives to maintain a natural appearance.

'User needs' refer to physiological or psychological requirements for the well-being of an individual. Needs are the primary influences on an individual's behavior. When a particular need (physiological–emotional state) emerges in a recreationist, it determines the recreationist's behavior in terms of motivations, priorities, and actions taken. The unmet needs of recreationists are the basis for psychological and physiological forces, motives, and drives, which cause recreationists to pursue forest environments, recreational engagements, and desired recreational experiences. Driver and Tocher postulate that recreation is an experience that exists to the extent to which the needs or desires to recreate are gratified.

'Preferences' are related to needs gratification and refer to desired conditions and favored situations that recreationists expect will facilitate or satisfy their unmet needs during recreation engagements. Recreation managers need to know user preferences toward site facilities, services, programs, and management policies in order to design and manage conditions and situations to meet the recreation needs of users. They also must know users' psychological needs and preferences toward recreational experiences expected and desired, in order to provide opportunities for users to realize those needs and preferences.

### User Need and Preference Relationships

User needs and preferences are essential components of forest recreation science and management, for the ultimate aim and product of forest recreation planning and management are quality recreation experiences. The relationships among user needs, preferences, quality experiences, and recreational benefits must be understood in the field of forest recreation (**Figures 1–3**).

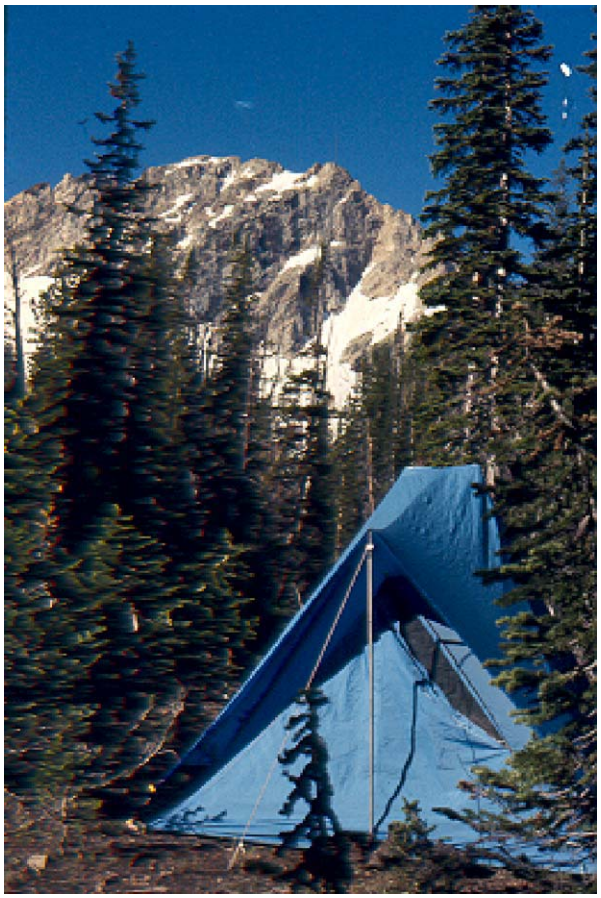

**Figure 1** A preferred campsite where the recreation user is offered the opportunity of naturalness and solitude in a nonimpacted site.

**Figure 2** An unpreferred campsite where the natural conditions of the forest environment have been greatly impacted by heavy recreation use.

## Quality Experiences

Forest recreation, like any aspect of natural resource management, be it timber management, wildlife management, or water management, is ultimately concerned with enhancing the quality of the existing resource and the products and benefits derived from management. Long before professional forestry and forest sciences existed, forests were capable of producing timber, wildlife, water, and recreational benefits. However, because societal pressures and use of these resources can decrease the quality of products and benefits derived from them, professional management has aimed to maintain and enhance the quality of derived products and benefits, when possible. In the specific area of forest recreation, science and management have aimed to enhance the quality of resource conditions upon which various forest recreation engagements depend, the quality of visitor use of these dependent resources, and the interactions between the two. In order for forest recreation to enhance the quality of desired recreation resource conditions, and opportunities for quality recreation experiences, the recreational needs and preferences of users need to be identified. Once identified, managers can attempt to provide the resource and social conditions, and recreational opportunities, for users potentially to realize the quality experiences desired.

**Figure 3** Nearness to water or in view of it is a major preference of forest recreation users. However, riparian sites can be sensitive to recreation use impacts.

## Diverse Opportunities

Many different types of users come to forest environments to engage in many diverse activities and resource settings, in order to realize quality and fulfilling recreation engagements. Associated with this diversity of user activities and resource settings is a diversity of user needs and preferences. In an attempt to meet these needs and preferences, scientists have researched the spectrum of needs and preferences, and management has developed recreation opportunity systems. Dr. Driver, long-time researcher at the University of Michigan and US Forest

Service, worked with colleagues to develop the recreation opportunity spectrum (ROS) as a system of diverse recreation opportunities to meet the many needs and preferences of forest recreationists in North America.

ROS has been formally adopted by the US Department of Agriculture Forest Service and the Department of Interior's Bureau of Land Management to manage forest recreation on their lands. The spectrum of recreation opportunities approach to forest recreation is based on understanding the recreation experience needs and preferences of users, and providing opportunities necessary to enhance the quality of recreation engagements, experiences, and outcome benefits.

### Conceptual Models

Researchers have conceptualized the relationships among forest recreation, user needs, preferences, recreation opportunities, quality/experiences, satisfaction, and benefits (**Figure 4**). Driver *et al*. provide expanded discussions of the models and their theoretical/research foundations.

In **Figure 4**, it is proposed that unmet psychological and physiological needs result in internal drives and motivations to seek desired opportunities in order to fulfill need states and preferences, thus leading to satisfying experience outcomes and personal benefits. The model is based on Lawler's work with expectance theory. Lawler's approach is backed by the unmet-needs hypothesis of behavior, suggesting that the attractiveness of recreation experiences is determined by the extent to which it satisfies a human need. For example, the attractiveness to hike in a wilderness area is determined by the expectation that it will satisfy the human need for solitude and privacy in a natural outdoor setting. The focus of the Fishbein and Ajzen theory is upon salient beliefs regarding the outcomes of making a specific recreation choice.

In more practical terms of forest recreation science and management, the behavioral model of **Figure 4** can be restated to say that forest recreation users have needs, preferences, and expectations concerning resource settings, services, programs, and social setting use conditions. These user needs, preferences, and expectations toward recreation resource conditions and desired outcomes must be understood in order for managers to provide quality recreation opportunities and recreation experiences to gratify user needs and preferences and thus provide personal–social benefits. It must be realized that forest recreation cannot manage personal, psychological needs, preferences, and experiences; it can only attempt to understand user needs, preferences, and desired experiences so that diverse opportunities can be managed to meet the potential needs and preferences of users.

**Figure 5** provides a more applied conceptual model of forest recreation-based needs-preference behavior. In the application, recreation visitors interact with forest environments because they have certain recreation needs. The needs are the determining factor behind their preferences and expectations concerning recreation opportunities and engagements. Management has the ability to enhance or diminish the quality (i.e., the plus and negative signs in the model) of recreation opportunities – experiences, and thus satisfaction – benefits of forest recreation to society.

## User Need Determination

The determination of forest recreation needs has been influenced by Maslow's theory of hierarchy of needs. Maslow theorized that humans have five classes of needs and that various need states could be classified into these five categories in a hierarchical structure. The need hierarchy can be visualized as a climbing ladder where the individual must have

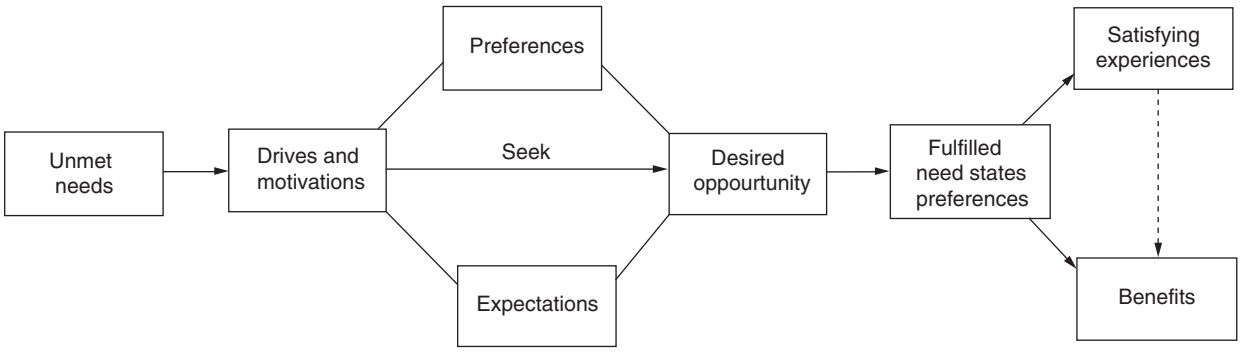


**Figure 4** Conceptual model of relationships between user needs, preferences, desired opportunities, and satisfying recreational experiences.

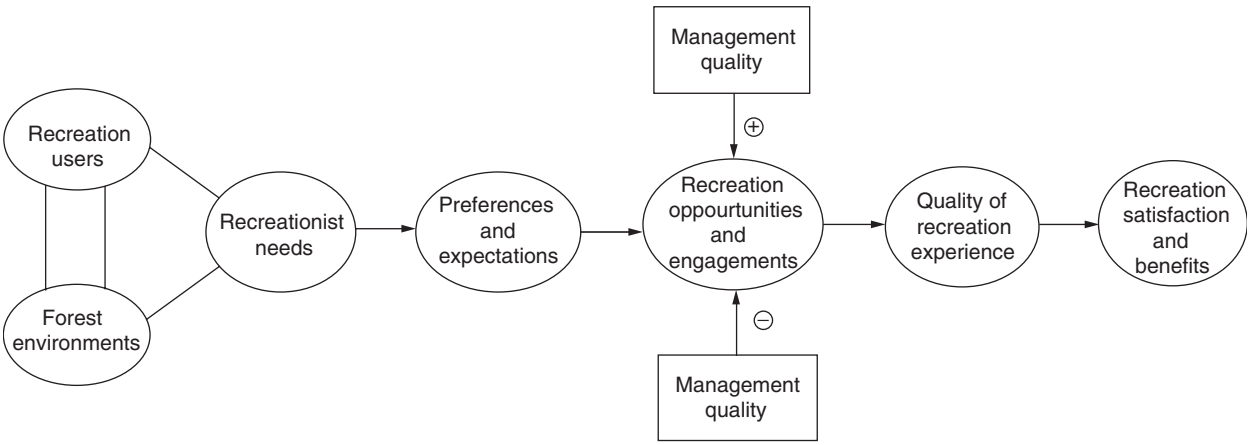


**Figure 5** Conceptual model of forest recreation needs, preferences, and quality recreation opportunities – experiences.

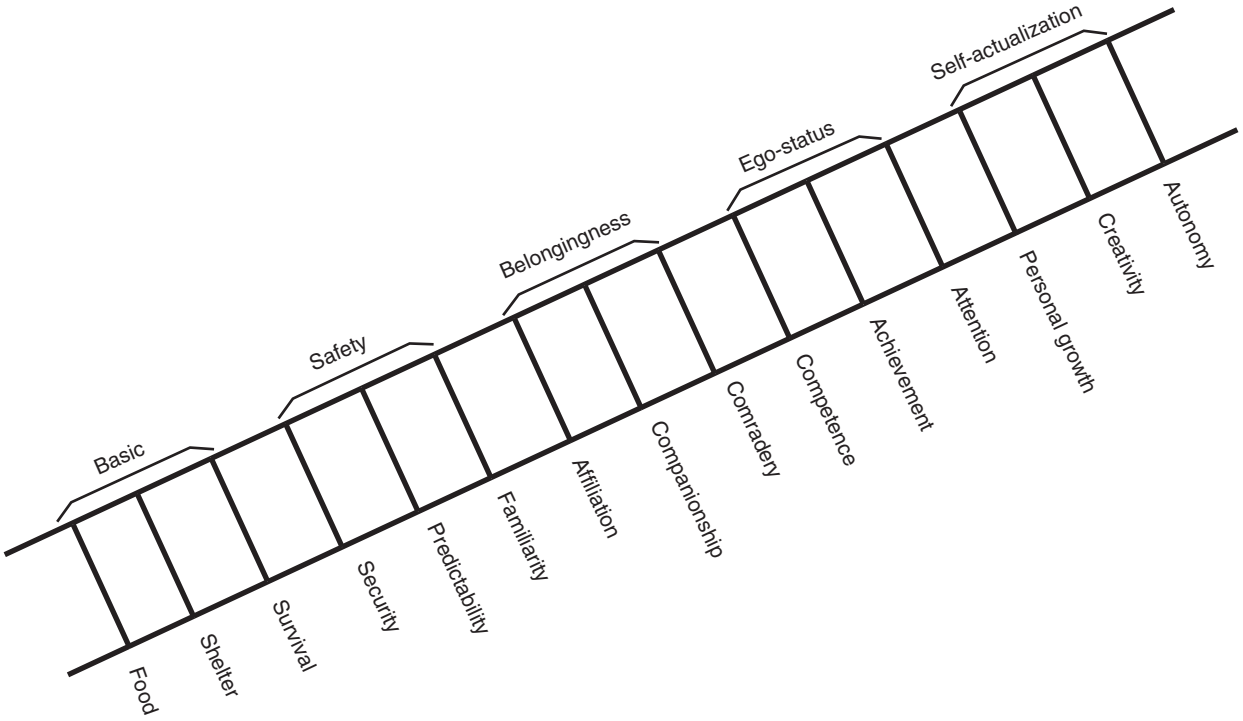


**Figure 6** Maslow's ladder of human needs applied to forest recreation.

experienced a secure footing on the first rung in order to experience the need to step up to the next higher rung (**Figure 6**). He believed that there is a natural process whereby individuals fulfill needs in ascending order from the basic needs of food, shelter, survival, and other physiological needs, to the higher-order needs of self-actualization and personal creative growth.

Maslow's needs categories are related to needs-preference research in forest recreation. For example, survival skills and survival forms of wilderness recreation where self-reliance is necessary to participate successfully could be linked to basic-level needs. Safety and security needs are often at play when recreation planners, managers, and back country rangers design facilities, regulate visitor use, and rescue individuals from dangerous situations. The needs for affiliation, companionship, and comradery are commonly associated with many group activities and address the need level of belongingness. Ego-status is relevant to forest recreationists in terms of the need for competence and achievement that accompanies advanced skills necessary to participate in many risk-oriented and adventure

activities. Self-actualization includes needs for personal growth, creativity, autonomy, and freedom to act, assets of many forms of remote-area recreation.

Tinsley and associates developed an inventory of psychological needs concerning leisure, using the paragraphs about leisure (PAL) inventory. The PAL inventory of recreation needs is based on the premise that leisure experiences result in the satisfaction of some of the psychological needs of recreation participants. The needs gratification helps to maintain and enhance the physical health, mental health, and life satisfaction of individuals which, in turn, stimulates personal psychological growth and increased self-actualization.

The PAL methodology consists of a series of single paragraphs which describe the gratification of a particular psychological need. Respondents are instructed to indicate the extent to which each paragraph is an accurate statement about the leisure activity being described. Ratings are done on a five-point rating scale with response alternatives ranging from 1 = not true to 5 = definitely true. This research resulted in the identification of 44 psychological needs that may be gratified by participation in leisure activities. Tinsley and associates also identified 27 of the 44 need-gratifying dimensions that varied the most across leisure activities. These two groups of leisure needs are shown in **Table 1**.

## User Preference Determination

User needs are the psychophysiological antecedents that lead to the desired conditions and preferred situations (i.e preferences) that recreationists expect will facilitate and/or satisfy unmet needs. Driver's research, though similar in many respects to that of Tinsley's on leisure needs, concentrated on determining the recreation experience preferences (REP) of recreationists in natural environments. In particular, the research identified and assessed the relative importance of individual reasons or feelings of motivational implying reasons why recreationists selected certain activities and environments. A primary objective of this research was to enhance forest recreation managers' ability to specify management objectives and prescriptions that would provide quality recreation experience opportunities (i.e., the plus and minus aspects in **Figure 2**) identified by research on recreationists' motivations.

Like the PAL, the development of the REP scales was backed by the unmet-needs hypothesis that forest recreation was beneficial to helping people gratify needs not satisfied by their nonleisure behavior. Identification and evaluation of people's 'recreation experience preferences' was seen as a means to address the more difficult determination of human need states and as a managerial guide to provide the necessary recreational opportunities for quality recreation experiences. This research orientation later led to the practice of experience-based management of recreation settings, plus the development of the ROS.

The REP scales to measure recreationists' preferences were developed by means of survey questionnaires and interviews of individuals engaged in many activities in many environments. Each item in the REP inventory was assessed as to its 'importance' as

**Table 1** Psychological needs of leisure

| | | |
|---|---|---|
| Leisure activity general: 17 needs which are satisfied to approximately the same degree by all leisure activities | | |
| Abasement | Infavoidance | Relaxation |
| Autonomy | Justice | Self-control |
| Counteraction | Moral values | Succorance |
| Defendence | Order | Task generalization |
| Deference | Recognition | Tolerance |
| Harm-avoidance | Rejection | |
| Leisure activity specific: 27 needs which can be satisfied to a significantly greater degree through participation in some leisure activities than by participation in other leisure activities | | |
| Ability utilization | Creativity | Security |
| Achievement | Dominance | Self-esteem |
| Activity | Exhibition | Sentience |
| Advancement | Getting along with others | Sex |
| Affiliation | Independence | Social service |
| Aggression | Nurturance | Social status |
| Authority | Play | Supervision |
| Catharsis | Responsibility | Understanding |
| Compensation | Reward | Variety |

Reproduced, with permission, from Tinsley HEA, Barrett TC, and Kass RA (1977) Leisure activities and need satisfaction. *Journal of Leisure Research* 9: 110–120.

a reason for deciding to recreate in a particular activity at a certain place. Recreationists rated the reasons on a five-point importance basis, ranging from not at all important to extremely important. Years of research by Driver and colleagues resulted in 43 reliable and valid REP scales to measure the extent to which specific experiences are preferred and expected from recreational activities. **Table 2** demonstrates 19 general recreation experience preference domains into which the 43 REP scales are grouped empirically (i.e., factor analysis). Note the degree of similarity and difference between the human needs of Maslow, the leisure needs of Tinsley, and the REP of Driver.

The REP scales have dominated the determination of user needs and preferences in forest/wildland recreation, involving over 30 years of research by many different scientists. This research has yielded REP profiles for many recreational activities in an array of natural environments. **Table 3** summarizes the overall mean scores and rank order of 16 REP domains (i.e., groups of REP scales) of users of 15 different areas ranging from low-use designated wilderness to highly used outdoor areas. Note the patterns of commonality across areas in those REPs ranked the highest (i.e., enjoy nature, reduce tensions in wilderness). In areas offering a more diverse array of undeveloped and developed facilities and activities than wilderness, more variation in preference profiles, specific to activity and place, have been produced.

## Site Needs and Preferences Application

While recreation scientists, planners, and managers have been interested in the physiological–psychological needs and preferences underlying why people recreate and the experiences preferred, they have also been interested in user needs and preference about on-site facilities, services, and other amenities desired. The behavioral needs and preferences of users are directly, and indirectly, related to the amenity needs and preferences of forest recreationists, for the amenity-site facilities and services can influence the type of experience derived by users. For example, the many amenities of a developed campground can provide for the needs of affiliation and family cohesion while an undeveloped wilderness area is better suited for solitude and self-reliance.

There have been many management-oriented studies on the site needs and preferences of users in many activities in many environments. Manning provides a major review and synthesis of this research, which will be summarized here.

**Table 2** Recreation experience preference (REP) scales making up the recreation experience preference domains[a]

1. Enjoy nature
   - A Scenery
   - B General nature experience
2. Physical fitness
3. Reduce tension
   - A Tension release
   - B Slow down mentally
   - C Escape role overloads
   - D Escape daily routines
4. Escape physical stressors
   - A Tranquility/solitude
   - B Privacy
   - C Escape crowds
   - D Escape noise
5. Outdoor learning
   - A General learning
   - B Exploration
   - C Learn geography of area
   - D Learn about nature
6. Share similar values
   - A Be with friends
   - B Be with people having similar values
7. Independence
   - A Independence
   - B Autonomy
   - C Being in control
8. Family relations
   - A Family kinship
   - B Escape family
9. Introspection
   - A Spiritual
   - B Personal values
10. Be with considerate people (social security)
11. Achievement/stimulation
   - A Reinforcing self-confidence
   - B Social recognition
   - C Skill development
   - D Competence testing
   - E Seeking excitement
   - F Endurance
   - G Telling others
12. Physical rest
13. Teach/lead others
   - A Teaching/sharing skills
   - B Leading others
14. Risk-taking
15. Risk reduction
   - A Risk moderation
   - B Risk prevention
16. Meet new people
   - A Meet new people
   - B Observe other people
17. Creativity
18. Nostalgia
19. Agreeable temperatures

[a] Individual REP scales are designated by the capital letters if there is more than one scale per domain and by the name given the domain when there is only one scale per domain.

Reproduced, with permission, from Driver BL, Tinsley HEA, and Manfredo MJ (1991) The paragraph about leisure and recreation experience preference scales: results from the two inventories designed to assess the breadth of the perceived psychological benefits of leisure. In: Driver BL, Brown PJ, and Peterson GL (eds) *Benefits of Leisure*, pp. 263–286. Pennsylvania: Venture Publishing.

**Table 3** Mean scores and ranks (in parentheses) of 16 recreation experience preference domain by users of 15 recreation areas[a]

| | *Experience preference domains* | *Designated wilderness* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Weminuche (CO) (n = 313)* | *Maroon Bells (CO) (n = 268)* | *Flattops (CO) (n = 135)* | *Eagles Nest (CO) (n = 271)* | *Rawah (CO) (n = 212)* | *Linville Gorge (NC) (n = 249)* | *Shining Rock (NC) (n = 297)* | *Joyce Kilmer (NC) (n = 80)* |
| 1. | Enjoy nature | 1.5 (1) | 1.5 (1) | 1.5 (1) | 1.5 (1) | 1.7 (1) | 1.5 (1) | 1.6 (1) | 1.4 (1) |
| 2. | Physical fitness | 2.4 (4) | 2.0 (2) | 2.5 (5) | 2.3 (2) | 2.3 (3) | 2.1 (2) | 2.2 (2) | 1.8 (2) |
| 3. | Reduce tensions | 2.1 (2) | 2.3 (4) | 2.1 (2) | 2.4 (3) | 2.2 (2) | 2.3 (3) | 2.3 (3) | 2.1 (3) |
| 4. | Escape noise/crowds | 2.2 (3) | 2.2 (3) | 2.2 (3) | 2.4 (3) | 2.2 (2) | 2.3 (3) | 2.3 (3) | 2.2 (4) |
| 5. | Outdoor learning | 2.1 (2) | 2.4 (5) | 2.4 (4) | 2.5 (4) | 2.2 (2) | 2.3 (3) | 2.4 (4) | 2.2 (4) |
| 6. | Sharing similar values | 2.8 (5) | 2.9 (6) | 3.2 (8) | 2.8 (4) | 2.8 (4) | 2.7 (4) | 2.9 (5) | 2.7 (6) |
| 7. | Independence | 3.1 (7) | 2.9 (6) | 2.8 (7) | 3.3 (7) | 3.0 (6) | 3.0 (7) | 3.0 (6) | 3.0 (8) |
| 8. | Family kinship | 3.0 (6) | 3.0 (7) | 2.6 (6) | 3.2 (6) | 2.9 (5) | 3.4 (9) | 3.1 (7) | 3.0 (8) |
| 9. | Introspection/spiritual | 3.5 (8) | 3.1 (8) | 3.3 (9) | 3.7 (8) | 3.5 (7) | 2.8 (5) | 2.9 (5) | 2.6 (5) |
| 10. | Considerate people | 3.6 (9) | 3.4 (9) | 3.2 (8) | 3.8 (9) | 3.7 (8) | 3.0 (7) | 3.3 (8) | 2.8 (7) |
| 11. | Achievement/ stimulation | 3.9 (11) | 3.1 (8) | 3.4 (10) | 4.0 (11) | 3.9 (10) | 2.9 (6) | 3.1 (7) | 3.0 (8) |
| 12. | Physical rest | 3.8 (10) | 4.3 (10) | 2.5 (5) | 3.9 (10) | 3.9 (10) | 3.2 (8) | 3.3 (8) | 3.4 (9) |
| 13. | Teach/lead others | 3.7 (10) | 4.3 (10) | 3.5 (11) | 3.9 (10) | 3.8 (9) | 3.6 (10) | 3.7 (9) | 3.9 (10) |
| 14. | Risk-taking | 4.7 (12) | 4.8 (12) | 4.8 (13) | 4.6 (12) | 4.8 (10) | 4.1 (11) | 4.5 (10) | 4.6 (12) |
| 15. | Risk reduction | 4.8 (13) | 4.7 (11) | 4.7 (12) | 4.7 (13) | 4.8 (11) | 4.7 (13) | 4.7 (11) | 4.7 (13) |
| 16. | Meet new people | 5.6 (14) | 5.3 (13) | 5.5 (14) | 5.5 (14) | 5.8 (12) | 4.6 (12) | 4.5 (10) | 4.5 (11) |

| | *Experience preference domains* | *Undesignated wilderness* | | | | *Nonwilderness areas* | | |
|---|---|---|---|---|---|---|---|---|
| | | *Indian Peaks (CO) (n = 101)* | *Vermont (VT) (n = 415)* | *Commanche (CO) (n = 424)* | *Shoshone (WY) (n = 165)* | *Little Sahara (UT) (n = 421)* | *Arkansas River (CO) (n = 442)* | *Lake Shelbyville (IL) (n = 1567)* |
| 1. | Enjoy nature | 1.8 (1) | 2.5 (2) | 1.7 (1) | 1.9 (1) | 2.4 (4) | 1.7 (1) | 3.1 (2) |
| 2. | Physical fitness | 2.8 (4) | 2.7 (4) | 2.4 (2) | 2.2 (3) | 2.2 (3) | 2.3 (4) | 3.1 (2) |
| 3. | Reduce tensions | 1.9 (2) | 1.9 (1) | 2.4 (2) | 2.0 (2) | 2.7 (5) | 2.2 (3) | 3.3 (4) |
| 4. | Escape noise/crowds | 2.8 (4) | 2.8 (5) | 2.5 (3) | 2.0 (2) | 3.1 (9) | 2.1 (2) | 3.3 (4) |
| 5. | Outdoor learning | 2.4 (3) | 2.5 (3) | 2.5 (3) | 2.2 (3) | 2.9 (8) | 2.3 (4) | 3.8 (6) |
| 6. | Sharing similar values | 3.3 (6) | 3.0 (7) | 3.5 (7) | 3.1 (7) | 1.2 (1) | 2.3 (4) | 3.1 (2) |
| 7. | Independence | 3.2 (5) | 2.9 (5) | 3.2 (4) | 3.1 (7) | 2.7 (6) | 2.7 (5) | 3.7 (5) |
| 8. | Family kinship | 3.4 (7) | 3.6 (9) | 3.6 (8) | 2.5 (4) | 2.1 (2) | 2.1 (2) | 3.2 (3) |
| 9. | Introspection/spiritual | 3.3 (6) | 3.2 (8) | 3.4 (6) | 2.6 (5) | 3.5 (12) | 3.5 (8) | 4.1 (8) |
| 10. | Considerate people | 3.1 (4) | — | 3.3 (5) | 3.0 (6) | — | — | 4.8 (10) |
| 11. | Achievement/ stimulation | 3.6 (8) | 3.3 (9) | 3.8 (9) | 3.1 (8) | 2.8 (7) | 3.1 (6) | 4.2 (9) |
| 12. | Physical rest | 3.1 (4) | 5.0 (11) | 3.4 (6) | 3.3 (9) | 3.2 (10) | 3.1 (2) | 3.0 (1) |
| 13. | Teach/lead others | 4.2 (9) | — | 4.1 (10) | 3.9 (10) | 3.6 (13) | 3.1 (6) | 5.2 (11) |
| 14. | Risk-taking | 4.6 (10) | 3.2 (8) | 5.1 (13) | 2.2 (3) | 2.2 (3) | 2.2 (3) | 5.3 (12) |
| 15. | Risk reduction | 4.7 (11) | — | 4.5 (11) | 4.9 (11) | 3.3 (11) | 3.4 (7) | — |
| 16. | Meet new people | 5.1 (12) | 4.5 (10) | 4.9 (12) | 4.9 (11) | 3.5 (12) | 4.0 (9) | 4.0 (7) |

[a] Ratings were made on the following nine-point response format (with numerical codes used to compute means); adds (to satisfaction): most strongly (1), strongly (2), moderately (3), a little (4), neither adds nor detracts (5), detracts: a little (6), moderately (7), strongly (8), most strongly (9).

Reproduced, from Driver BL, Nash R, and Haas GE (1987) Wilderness benefits: a state-of-knowledge review: In: Lucas RC (Comp.) *Proceedings, National Wilderness Research Conference: Issues, State of Knowledge, Future Directions.* General technical report INT-220, pp. 294–319. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

### Environmental Preferences

Recreation experiences are seldom derived from a single on-site recreation activity (i.e., camping), but rather, result from a package of amenity-related events. For example, trail hiking and/or driving to sightsee the surrounding forest environs are popular and rewarding outdoor recreation activities while camping. Trail preferences among North American forest recreation users indicate they prefer trails of less than 10% slope, that have many bends to create an element of mystery in terms of what lies around the corner, a natural but somewhat open understory so they can see into the forest, views of large and otherwise unique features, including wildlife, and the most important preference, nearness to water.

Sightseeing involves larger-scale environmental forest preferences. Sightseers in North America prefer vistas and corridors that offer views into the forest, large trees and mature forests that have open, park-like understories that offer visual penetration into the forest, viewsheds that include water (i.e., rivers, lakes, falls), mountains offering multiridge and valley views, and unique features and landmarks. These sightseeing needs and preferences of forest recreationists are essential to understand and manage, for driving-for-pleasure remains one of the most popular forest recreation activities. Scenic byway, parkways, and natural-roaded areas are the preference of 'windshield visitors' to forested areas.

### Developed Recreation Areas

Campsites and campgrounds have been researched the most and offer insight as to what campers prefer, and what planners need to consider when designing camping-related recreation opportunities.

Most campers find partial-to-full shade desirable, strongly prefer vegetative screening between adjacent campsites, and prefer spacing between campsites in the 50–100 ft (15–30 m) range, to be located between 100 and 200 ft (30 and 60 m) from both comfort station and drinking water, strongly prefer flush toilets, and favor fireplaces constructed of metal. Nearness to lakes, rivers, and other water, as well as major tourist attractions, are universally desired amenities of developed camping. However, it should be noted that there are several types of developed campgrounds and a diversity of camper preferences, meaning that management for the average preferences of the average camper may not meet the diverse preferences of many campers.

### Undeveloped Recreation Areas

Several studies have researched the preferences of backcountry and wilderness users toward management policies, and facilities and services. Preferences toward management policies suggest that:

1. Most users prefer restrictions on the number of users in crowded areas.
2. There is no consensus on the preferred method of use rationing, although queuing seems most favored and lottery the least favored procedures.
3. Opinions are mixed on the desirability of fixed-travel routes or itineraries (via, permits).
4. A majority of users support self-registration permits.
5. Degree of preference is mixed on spatial zoning by method of travel (i.e., horse versus hiking), lowering trail standards, and restricting or downgrading access routes.
6. Most users prefer limits on group size.
7. Most users do not favor prohibition of campfires, although this may change as more areas restrict campfire use.
8. Most wilderness users do not prefer policies requiring use of designated campsites.

Studies of backcountry–wilderness user preferences for facilities and services (**Table 4**) suggest:

1. Relatively low-standard trails are preferred to high-standard trails.
2. Most users prefer bridges at large streams difficult or dangerous to ford.
3. Information signs along trails (i.e., trail names, directions, and distances) are preferred, while campsite and interpretive signs are less favored.
4. Fireplaces and picnic tables are not preferred at campsites, while fire rings are.
5. Degree of preference is mixed on pit toilets and other types of sanitary facilities at campsites.
6. Degree of preference is mixed on trail shelters.
7. Special equestrian facilities (i.e., corrals and hitching racks) are generally not preferred.
8. Emergency telephones are generally not favored, although cell phones are more commonly being carried into wilderness areas.
9. Maps and informational pamphlets about areas are preferred by the majority of areas.
10. The majority of users favor the presence of wilderness rangers.

In both developed and undeveloped areas, there is considerable evidence that users tend to prefer or respond favorably to the facilities and services they find on-site when recreating; in other words, site supply determines preference demand. Manning suggests this finding might be explained by the fact that visitors may sort themselves, or self-select,

**Table 4** Percentage of users preferring selected backcountry facilities and services

| *Location* | *Facility* | *%* |
|---|---|---|
| Mt. Marcy, NY | Pit toilets, sanitary facilities | 70 |
| | Emergency telephones | 50 |
| Boundary Waters Canoe Area, MN | Pit toilets, sanitary facilities | 50 |
| | Emergency telephones | 26 |
| High Sierras, CA | Pit toilets, sanitary facilities | 36 |
| | Emergency telephones | 45 |
| Three wilderness areas | High-standard trails | m |
| | Information signs | M |
| | Interpretive signs | m |
| | Fireplaces | 25 |
| | Picnic tables | 40 |
| | Trail shelters | 60 |
| | Corrals | 20 |
| | Maps/pamphlets | M |
| Bob Marshall Wilderness, MT | High-standard trails | 25 |
| | Information signs | 90 |
| | Fireplaces | 34 |
| | Picnic tables | 34 |
| | Trail shelters | 15 |
| | Emergency telephones | 62 |
| Mission Mountains Primitive Area, MT | High-standard trails | 32 |
| | Information signs | 62 |
| | Fireplaces | 24 |
| | Picnic tables | 24 |
| | Trail shelters | 34 |
| | Emergency telephones | 32 |
| Glacier National Park, MT | High-standard trails | 10 |
| | Information signs | 67 |
| | Fireplaces | 52 |
| | Picnic tables | 52 |
| | Trail shelters | 76 |
| | Emergency telephones | 12 |
| Boundary Waters Canoe Area, MN | High-standard trails | 37 |
| | Pit toilets, sanitary facilities | 63 |
| | Maps/pamphlets | 60 |
| | Wilderness rangers | 70 |
| Bob Marshall Wilderness, MT | High-standard trails | 35 |
| | Bridges across large rivers | 67 |
| | Campsite signs | 52 |
| | Pit toilets, sanitary facilities | 43 |
| | Corrals | 25 |
| | Hitching racks | 26 |
| | Maps/pamphlets | 52 |
| | Wilderness rangers | 58 |
| Bridge Wilderness, WY | High-standard trails | 31 |
| | Bridges across large rivers | 65 |
| | Campsite signs | 30 |
| | Pit toilets, sanitary facilities | 22 |
| | Corrals | 4 |
| | Hitching racks | 4 |
| | Maps/pamphlets | 60 |
| | Wilderness rangers | 68 |
| High Uintas Primitive Area, UT | High-standard trails | 335 |
| | Bridges across large rivers | 62 |
| | Campsite signs | 26 |
| | Pit toilets, sanitary facilities | 25 |
| | Corrals | 11 |
| | Hitching racks | 16 |
| | Maps/pamphlets | 55 |
| | Wilderness rangers | 67 |
| Appalachian Trail | Low-standard trails | M |
| | Interpretive signs | 50 |
| Cranberry Backcountry, WV | Trail shelters | 35 |
| | Wilderness rangers | 63 |
| Appalachian Trail | Trail shelters | 49 |
| Nine wilderness areas | High-standard trails | m |
| | Low-standard trails | M |
| | Bridges across large rivers | M |
| | Information signs | M |
| | Fireplaces | mx |
| | Fire rings | M |
| | Picnic tables | m |
| | Pit toilets, sanitary facilities | m |
| | Corrals | mx |
| | Maps/pamphlets | M |
| | Wilderness rangers | M |
| Three wilderness areas | Information signs | 68 |
| | Picnic tables | 41 |
| | Maps/pamphlets | 74/90 |
| | Wilderness rangers | 62 |
| Three rivers | Wilderness rangers | 16 |
| Desolation | Low-standard trails | M |
| Wilderness, CA | Bridge across large rivers | M |
| | Interpretive signs | M |
| | Fireplaces | mx |
| | Fire rings | M |
| | Pit toilets, sanitary facilities | mx |

M, majority; m, minority; mx, mixed.

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among areas and facilities according to their preferences. Preferences may also be based on the types of areas and facilities previously encountered, and familiarity. For example, field observation research shows that users tend to camp at previously used and familiar sites rather than seek out and establish new sites.

### Use Impact Preference

User perceptions and preferences regarding various types and levels of recreation-caused impacts to environmental and experiential conditions are of interest to recreation researchers and managers, for impacts can degrade the quality of recreation places and experiences. However, forest recreationists seem to have few reactions to impacted site conditions, and are often not perceptive of existing impacts. Some exceptions are severe disturbances to site conditions (i.e., deep trail erosion) and experience conditions (i.e., crowded users); both examples of impacts that can be managed to improve the quality of forest recreation. In addition, forest recreationists are very sensitive about litter in natural areas. Litter is not only a site impact; it is also an experience

impact. Litter decreases the naturalness of a site, can indicate that an area is overused and/or misused, and detracts from the preferred conditions and, thus, quality of recreation experience received by users.

While forest recreation users exhibit preferences against some major impacts as listed above, they are not perceptive of and/or demonstrate preferences toward the majority of recreation resource impacts. For example, worn-out campsites and trails, as well as water pollution and wildlife disturbance, are not perceived by the majority of users as impacts or unpreferred conditions. A study of camper perceptions of site impacts at three Indiana state park campgrounds indicated that the majority of campers rated ground cover conditions as satisfactory to excellent, even in areas where over 75% of the campsites were 100% bare-ground and severely compacted. Two-thirds of the campers did not notice damage to trees or shrubs, despite the fact that damage was extensive in several areas. In addition, even the minority of users who rated the campsite conditions as poor reported that these conditions did not detract from their enjoyment of the area.

The lack of perception and reaction of recreationists toward recreation resource impacts has been troublesome to recreation resource managers, whose responsibilities include maintaining and enhancing the quality of the recreation resource. It seems the perceptions and preferences of users do not always match those of recreation scientists and managers. Managers tend to be more perceptive of site and experience conditions, and prefer higher standards of conditions than the majority of users. This is true for developed campgrounds, backcountry campsites, wilderness areas, roaded forest lands, and state parks. Impacts and problems studied in these areas have included litter, vandalism, theft, human waste, environmental impacts at campsites and along trails, water pollution, wildlife disturbance, excessive noise, rule violations, and conflicts among recreationists. Managers also tend to rate such issues as greater problems than do site users. Similar differences between managers and users have been found to occur concerning motivations and reasons for area and activity participations, and preferences/attitudes toward recreation management policies and practices. Thus, forest recreation scientists and managers not only need to understand the needs and preferences of recreation users, they must also understand the differences that exist between scientists, managers, and users of resources.

*See also*: **Landscape and Planning**: Forest Amenity Planning Approaches; Perceptions of Forest Landscapes; The Role of Visualization in Forest Planning. **Recreation**: Inventory, Monitoring and Management.

## Further Reading

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# Inventory, Monitoring and Management

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## Introduction

Outdoor recreation in forested settings is a use of forest resources which has become more and more important for urbanized societies. It plays a prominent role in people's leisure time. Forests together