Visitor Perceptions of Appropriate Management Actions Across the Recreation Opportunity Spectrum

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EXECUTIVE SUMMARY: An assumption of the Recreation Opportunity Spectrum is that direct or regulatory management strategies are more appropriate in modern or developed settings, but less appropriate in primitive settings, where indirect visitor management techniques are considered more appropriate. During the summer of 2003, 410 visitors to eight recreation settings (representing urban through primitive) in the American River watershed of California participated in a survey about their perceptions of 25 direct and indirect visitor management techniques. From four generic ROS settings described in both text and photos, participants chose the type of setting in which they most frequently recreated. For that chosen setting type, participants then rated the appropriateness of each of the 25 management actions. What we found suggests that the assumed linear relationship of direct and indirect management actions to the ROS is not fully supported. Instead, management actions are perceived differently in different types of recreation settings, and certain types of actions may be more accepted in certain ROS settings. Respondents who recreate most often in primitive settings were the most supportive (of the four groups) of direct or regulatory management actions, while respondents who recreate most often in semi-primitive motorized settings were the least supportive of direct or regulatory actions. The primitive setting respondents were less supportive of what we called engineering-type management actions. We found more differences among the ROS settings for direct management actions than we did for indirect actions,

and our results suggest that management actions may play a smaller role in defining primitive settings, a moderate role in defining rural and urban settings, and a major role in defining semi-primitive motorized settings.

KEYWORDS: direct management, indirect management, Recreation Oppor-

Visitors to outdoor recreation settings are exposed to a variety of settings characteristics. According to the assumptions of the Recreation Opportunity Spectrum (ROS), differences in the combinations of these setting attributes is what differentiates one type of setting from another, for example a semi-primitive setting from a rural or urban setting. The Recreation Opportunity Spectrum (ROS) encourages managing for a diversity of outdoor recreation opportunities (Manning, 1999). The ROS is designed to be applicable to any type of environment and any recreation setting. It does not, however, describe a blueprint for managers to provide a particular opportunity (Clark & Stankey, 1979), nor does it represent a "cookbook" of requirements (Clark, 1982). In other words, application of the ROS can be adapted to fit individual contexts.

The ROS is a framework that has as one of its goals the provision and enjoyment of a variety of recreation environments (USDA, 1986). Forest Service managers employ the ROS to provide this variety of recreation environments, and it has become integral to management of recreation on National Forest lands. Consequently, it is helpful to understand assumptions of the ROS as managers face an increase in use that is sometimes a precursor to a loss of recreation opportunities and degradation of ecosystems (Driver et al., 1987).
A key concept of the ROS is that recreation settings are comprised of biophysical, social, and managerial attributes (USDA, 1986). Biophysical attributes include such things as size, remoteness, distance from roads, topography, vegetation type, wildlife/fish species, water, and rock formations. Social attributes include size and type of groups visiting the area, the spatial and temporal distribution of use, visitor activities, and noise. Management attributes include fees, signage, education, information, use limits, zoning, rules and regulations, on-site management presence, reservation systems, facility design and layout, and type and level of access (Manning, 1999). Differences in any number of attributes play a key role in endowing a particular recreation setting with a certain character.

Driver and others (1987) identified some basic assumptions of the ROS needing research for validation, including studies of how visitors define recreation settings, and whether recreationists distinguish among recreation opportunities based on preferences for particular setting attributes. Manning (1985) questioned the oft-implied and simplified linear relationships of setting attributes to ROS settings, expressing the concern that applying the ROS in such a linear fashion could limit diversity of recreation opportunities. Taking the cue from Manning, Heywood and others (1991) examined recreationists' preferences and found non-linear relationships between the ROS setting components that they tested.

The ROS, as operationalized by the Forest Service at least, defines managerial attributes as the interactions between user groups and the land manager, including "the degree to which users' actions are regulated [and] the visible evidence of such regimentation" (USDA, 1986). Actions or strategies employed by recreation managers to address problems, such as resource impacts, user conflict, or vandalism, or to provide a particular type of experience opportunity, can generally be characterized as direct or indirect. Direct

techniques are defined as "those characterized by legal prescriptions of appropriate and inappropriate behaviors that are accompanied by formalized sanctions, such as penalties or fines" (McCool & Christensen, 1996.). They include such actions as rules, regulations, enforcement, and restrictions of use or access, and are often perceived by visitors as "heavy-handed" (Lime, 1979). Indirect techniques are management actions that change the factors recreationists use to make decisions about appropriate behavior in recreation settings (Peterson & Lime, 1979). Indirect actions are generally proactive but passive, including such techniques as informational signing, facility design, educational materials, and interpretive services (Lime, 1979). They are frequently seen as "light-handed" by recreationists, and it is considered conventional wisdom that they are preferred by visitors.

The primary difference between indirect and direct management actions lies in the effect on the visitor's freedom of choice (Hendricks et al., 1993). Direct management practices "act directly on visitor behavior, leaving little or no freedom of choice," while indirect management practices aim to guide recreationists' behavior by influencing the decisions they make and the factors on which those decisions are based (Manning, 1999). Both direct and indirect strategies have their place in management. Traditional management has favored the indirect approach for two main reasons; a belief that freedom for recreationists is highly valued, and a belief that informational and educational services lead to positive visitor behavior (Lucas, 1982, 1983). McAvoy (1985) asserted that resource managers generally prefer indirect techniques as they cost less to management and have less impact on the visitor experience. Some advocates of direct management actions argue that indirect strategies are often inadequate (McAvoy & Dustin, 1983). Studies of wilderness visitor preferences have also suggested that visitors may accept more direct management and regulation if they believe it maintains the conditions necessary for their preferred experience (Bultena et al., 1981; Shindler & Shelby, 1993). Managers are often forced to use direct management strategies when problems are intense or widespread. The selection of actions such as zoning, restricting use, and enforcement is made in order to modify behavior swiftly. In these cases, regulation is viewed as the easiest solution to the problem, often without regard for the potential impact on the recreation experience.

One assumption of the ROS is that management strategies should move progressively from direct actions (such as law enforcement) toward indirect actions (such as visitor education) as the recreation setting changes along the spectrum from urban toward primitive (USDA, 1986). This implies that "light-handed" or indirect management actions like information dissemination and education are more appropriate in a primitive setting than are regulatory or direct management actions. Conversely, regulatory or direct management actions, such as area closures or law enforcement, would be more appropriate in an urban setting than in a primitive one. However, while there has been much debate over the appropriateness of using direct versus indirect management strategies for dealing with visitor related management problems, much of this debate has occurred without regard to the Recreation Opportunity Spectrum. This study examined how visitors perceive direct and indirect management actions. It explored the similarities and differences that visitors perceive among a variety of management actions and examined visitor perceptions of appropriateness of these management actions in different ROS settings. Thus, this study tests assumptions about the relationship between ROS classes and the appropriateness of direct and indirect management actions.

Method

Summer recreationists in the American River watershed in California (El Dorado and Sacramento counties) were sampled. The American River watershed has its headwaters in the Sierra Nevada Mountains of California. It includes the Eldorado National Forest and the foothills of the Sacramento Valley. Sampling sites were selected that represented different ROS-setting types, from forested lands in the headwaters of the watershed (ROS primitive and semi-primitive motorized sites), the foothills area (ROS rural or semi-urban sites), to the city of Sacramento (ROS urban sites). There were two different sampling sites for each of the four selected ROS categories.

Respondents included a mix of day and overnight groups and were contacted at trailheads, visitor information stations, Off Highway Vehicle (OHV) staging areas, parking facilities, campgrounds, day-use areas, parks, and in heavily used dispersed recreation areas. Sampling was conducted from Memorial Day weekend through Labor Day weekend 2003 and was stratified by day, time, and location. Systematic or interval sampling was used, with the sampling interval k based on an estimate of the total use at the site (upon arrival) and the number of completed surveys needed per site/per visit to meet the overall sampling target.

A visual aid poster was used to focus respondents' attention to a single setting type. A series of color photographs representing primitive, semi-primitive motorized, rural, and urban ROS settings, but labeled simply A, B, C, D, were displayed on the poster (four different photos for each setting type). The survey instrument described in writing each of the four setting types in terms of social and biophysical setting attributes; the managerial attributes were purposely left out of the setting descriptions so as not to influence subjects' responses to subsequent questions (see Table 1 for examples).

Using both the poster photographs and the written descriptions, subjects selected the type of setting in which they most often recreated. A questionnaire was then used to

Table 1. Example of two of the four written ROS setting descriptions

Setting A: This area is an unmodified natural environment of a fairly large size. Encounters between users are very low, and evidence of other users is minimal. Motorized use is prohibited. Visitors to this area have an extremely high chance to experience independence, tranquility, closeness to nature, isolation from the sights and sounds of humans, and self-reliance through the use of outdoor skills in an environment that offers a high degree of challenge and risk.

Setting C: Although the background may appear natural, the environment of this area has been modified in order to accommodate a relatively high level of recreational use. Fellow recreational users are often nearby. A wide variety of recreational activities is usually taking place. Facilities are designed for easy motorized access, including recreational vehicles, and have many modern conveniences and amenities. Safety, comfort, and convenience while in a natural-appearing setting are emphasized instead of challenge and risk.

examine recreationists' perceptions of the appropriateness of various management actions. We chose this more experimental approach to reduce the number of confounding variables. We wanted our subjects to generalize their responses to a "type" of recreation setting rather than to an actual site. Had our subjects responded to the actual setting in which we sampled them, we felt their responses could have been influenced more by their history and attachment to that specific site rather than to that "type" of setting.

For their chosen ROS setting (not necessarily the type of setting they were sampled in), respondents answered a series of questions about their perceptions of the appropriateness of 25 specific management actions (see Table 2 for examples). Again using the more experimental approach to allow for greater comparability of ratings across the list of 25 actions, respondents were instructed to consider each action equal in its ability to solve a non-specified management problem. Respondents answered on a Likert scale ranging from 1 to 5 (1 "very inappropriate," 3 "neutral," and 5 "very appropriate").

Table 2. Examples of full wording of management actions used in survey

Inform potential users in advance of specific site characteristics so users can better choose among locations.

Limit the overall number of users allowed in the area at one time (issue a limited number of permits).

Educate users about basic ecology or minimum impact skills at entrance stations or trailheads.

Results

Sampling yielded 410 completed surveys of 441 individuals approached (93% response rate). A target sample of at least 100 completed surveys for each of the four chosen setting types was achieved, ranging from 101 surveys each for the urban and semi-primitive motorized settings to 103 and 105 for the rural and primitive settings respectively.

Respondents, earlier described as "summer recreationists," were engaged in a variety of activities, the most common being walking or day hiking (82%), viewing wildlife (62%), swimming (73%), beach activities (53%), primitive camping (51%), developed site camping (49%), driving and sightseeing (46%), backpacking (42%), visiting a cultural or historic site (41%), rafting or canoeing (40%), and lake fishing (39%).

Table 3 reports mean appropriateness scores for each management action (abbreviated) by ROS setting, with the actions grouped into direct and indirect categories (adapted from Manning, 1999). Overall ranking for all respondents is shown in parentheses to establish an overall assessment of appropriateness of management actions. We found differences in appropriateness ratings between two or more of the ROS settings for 15 of the 25 management actions. Of 150 possible paired comparisons, 43 showed a significant difference between ROS settings. Of the 43 paired comparisons that were significantly

different, 32 involved primitive setting respondents, 22 involved semi-primitive motorized respondents, 18 involved rural setting respondents, and only 14 involved urban respondents.

Table 3. Mean perceived appropriateness[1] of direct and indirect management actions, by ROS setting

Management Action	Primitive	Semi-Prim.	Rural	Urban	All Respondents
Direct					
Impose fines	4.07	4.27	4.07	4.12	4.13 (2)
Limit number of users in the area	3.98[a]	2.99[b]	3.50[c]	3.27[bc]	3.44 (11)
Limit group size	3.98[a]	2.82[b]	3.20[b]	3.26[b]	3.32 (12)
Separate (zone) incompatible uses	3.85[a]	3.38[b]	3.49[ab]	3.60[ab]	3.58 (9)
Prohibit wood gathering for fires	3.77[a]	2.52[b]	3.41[a]	3.49[a]	3.30 (13)
Increase rangers	3.47	3.63	3.65	3.66	3.60 (8)
Seasonally close areas	3.41	3.07	3.38	3.11	3.25 (15)
Close sites	3.40[a]	2.30[b]	2.86[c]	2.65[bc]	2.81 (23)
Separate incompatible uses in time	3.3	2.95	3.06	3.14	3.11 (19)
Limit uses to assigned areas	3.29[a]	3.14[a]	3.91[b]	3.61[ab]	3.49 (10)
Require reservations	3.21[a]	2.55[b]	2.87[ab]	2.66[b]	2.83 (22)
Limit length of stay	3.16	2.78	2.9	2.76	2.90 (21)
Indirect					
Educate users about ecology	4.58[a]	4.21[b]	4.07[b]	4.11[b]	4.24 (1)
Inform visitors of use patterns	4.22	4.09	3.97	4.07	4.09 (4)
Inform users of other opportunities	3.97	4.04	4.18	4.21	4.10 (3)
Inform users of site characteristics	3.88	3.84	4.1	4.14	3.99 (5)
Direct users to other opportunities	3.69	3.75	4.02	3.87	3.83 (6)
Improve sites	3.31[a]	3.50[a]	4.05[b]	4.03[b]	3.72 (7)
Charge differential fees	3.22[a]	2.66[b]	2.93[ab]	2.85[ab]	2.92 (20)
Charge same entrance fees	3.05	2.97	3.41	3.16	3.15 (18)
Make it harder to access the area	3.01[a]	2.35[b]	2.36[b]	2.29[b]	2.50 (24)
Pass a test showing knowledge	2.81[a]	2.40[ab]	2.20[b]	2.34[ab]	2.44 (25)
Build additional sites	2.74[a]	3.36[b]	3.48[b]	3.59[b]	3.29 (14)
Upgrade sites to more modern level	2.73[a]	3.08[a]	3.64[b]	3.51[b]	3.24 (16)
Make it easier to access the area	2.49[a]	3.03[b]	3.54[c]	3.87[c]	3.23 (17)

[1] Appropriateness was rated on a 5-point scale from 1 (very inappropriate) to 5 (very appropriate); 3 denotes a neutral opinion.
Note: Mean values with different superscript letters are significantly different at $p < 0.05$. Overall ranking for all respondents in parentheses.

In examining the highest and lowest mean responses for the various management actions, we find that subjects responding in the context of the primitive setting scored the highest mean responses (i.e., most appropriate) on nine of the 12 direct management actions and lowest on only two of the 12 direct actions (both law enforcement actions). Meanwhile, subjects responding in the context of the semi-primitive motorized setting recorded the lowest mean responses (i.e., least appropriate) for nine of the 12 direct management actions, including all of the actions for which the primitive setting scored highest, and the highest mean score on only one (a law enforcement action).

For the indirect management actions, there is greater variation in which respondents scored the highest and lowest for each action. The primitive setting respondents scored highest on five of the 13 indirect actions, but also scored lowest on six of the 13. The urban setting respondents scored highest on four of the 13 indirect actions. The rural setting respondents scored highest on four of the 13 indirect management actions, but also scored lowest on three of the 13.

While there were differences in appropriateness ratings between two or more of the ROS settings for most of the management actions, there were also no differences among any of

the ROS settings for 10 of the 25 actions. Of these 10 actions, six were ranked (by all respondents) in the top eight most appropriate actions.

Next, the 25 management actions were grouped into six categories using a typology based on the type of action. These categories were initially identified by a professional panel during survey development, but were subsequently supported by factor analysis of our respondents' appropriateness ratings. A Principal Components factor analysis (Varimax rotation; eigenvalues > 1) was done for the 25 management actions; convergence was achieved in six iterations (Table 4). We labeled the six categories of management actions "information and education," "restrictions on use," "engineering," "zoning," "law enforcement," and "user fees."

Table 4. Results of principal components factor analysis.

Management Action	Component Factor Loadings					
	Inform Educate	Use Restrict	Engineer	Zoning	Law Enforce	User Fees
Inform visitors of site characteristics	0.698					
Inform visitors of other opportunities	0.791					
Direct visitors to other opportunities	0.767					
Educate visitors about ecology and impacts	0.673					
Inform visitors of use patterns	0.748					
Limit length of stay[1]		0.437		0.412		
Limit to assigned or designated space		0.584				
Require reservations		0.722				
Limit number of users		0.728				
Limit group size		0.696				
Prohibit wood gathering		0.663				
Close certain campsites[1]		0.514	0.491			
Make area easier to access			0.723			
Make area harder to access[2]			-0.441	0.496		
Improve campsites			0.727			
Build additional campsites			0.757			
Upgrade sites to more modern			0.695			
Separate incompatible uses				0.651		
Separate uses in time				0.716		
Seasonally close areas				0.473		
Pass a test				0.503		
Impose fines on violators					0.758	
Increase presence of rangers					0.755	
Charge same fees						-0.657
Charge different fees to influence use						0.642

Factor loadings less than .4 removed for ease of interpretation.
[1]In subsequent analysis these actions were included with the Use Restrictions category.
[2]In subsequent analysis this action was included with the Engineering category.

Analysis was conducted to determine if the ROS setting influenced perceived appropriateness of management actions. By examining the groups or categories of management actions, results could focus on the type of management action rather than on individual management actions. First, we used analysis of variance to determine if the appropriateness score for a particular type of action was significantly different across the ROS settings. The respondent-chosen ROS setting was used as the grouping or independent variable, and the mean appropriateness score for each of the six types of management actions served as the dependent variable (Table 5). We also used the mean appropriateness score for each of the six types of management actions to rank the management actions by ROS setting (shown in parentheses in Table 5). Rankings for "all respondents" matched those of the urban setting respondents.

Table 5. Mean ratings (and rankings) of appropriateness of six types of management actions by ROS setting.

Type/Category of Management Action	Primitive setting	Semi-Prim setting	Rural setting	Urban setting	F-statistic	p-value
Information and education	4.1 (1)	4.0 (1)	4.1 (1)	4.1 (1)	0.47	0.707
Law Enforcement	3.8 (2)	4.0 (2)	3.9 (2)	3.9 (2)	1.10	0.349
Engineering	2.9^a (6)	3.1^a (3)	3.4^b (3)	3.5^b (3)	23.75	<0.001
Use Restrictions	3.5^a (3)	2.7^b (6)	3.2^c (4)	3.1^c (4)	19.18	<0.001
Zoning	3.3^a (4)	3.0^b (4)	3.0^b (6)	3.0^b (5)	5.04	0.002
User Fees	3.1^a (5)	2.8^b (5)	3.2^a (5)	3.0^{ab} (6)	4.02	0.008

[1] Appropriateness was rated on a 5 point scale from 1 (very inappropriate) to 5 (very appropriate); 3 denotes a neutral opinion.
Note**:** Mean values with different superscript letters are significantly different at $p < 0.05$.

For each type of management action, there are six possible paired comparisons among the four ROS settings. For the "restrictions on use" category, five of the six ROS paired comparisons were significantly different, with only the Rural-Urban comparison not significantly different. Primitive setting respondents uniformly found use restrictions more appropriate than did respondents for the other three ROS settings, while semi-primitive motorized setting respondents uniformly found use restrictions less appropriate than did respondents for the other three ROS settings. For the "engineering" category, four of six ROS paired comparisons were significantly different; in this case both the primitive and the semi-primitive motorized respondents found engineering solutions less appropriate than did both rural and urban setting respondents. For two categories of management actions, "information/education" and "law enforcement" there were no significant differences among the four ROS settings. In all, 14 of 36 possible paired comparisons were significantly different. ROS setting clearly influences visitors' perceived appropriateness of management actions, particularly for use restrictions and engineering solutions, but apparently, not information/education or law enforcement, both of which were deemed uniformly appropriate by respondents in all ROS settings.

Discussion

The Recreation Opportunity Spectrum assumes a linear relationship between the appropriateness of direct or indirect management actions and the ROS classes, with management strategies moving progressively from direct actions toward indirect actions as the recreation setting changes along the spectrum from urban toward primitive. In particular, "light-handed" or indirect management actions like information dissemination and education are assumed to be more appropriate in a primitive setting than are regulatory or direct management actions.

Results from our study call into question this assumed linear relationship of direct and indirect management actions along the ROS. The principal finding of this study is that recreation setting type affects visitors' perceptions of the appropriateness of management actions, with the differences most often involving the primitive and semi-primitive motorized settings. We also found that certain types of management actions, both direct (law enforcement) and indirect (information and education), were perceived as appropriate in all settings.

Primitive setting respondents were the most different of the four groups of respondents, accounting for 32 of the 43 significantly different paired comparisons for the 25

individual management actions. Assuming that perceived appropriateness of a management action translates into, or is roughly equivalent to, support for that action, then primitive setting respondents are generally more supportive of the management actions on our list than are respondents for the other types of settings. Primitive setting respondents scored the highest (most appropriate) mean response on 14 of the 25 management actions, including the highest response for nine of the 12 direct actions. In particular, primitive setting respondents were significantly more supportive of both use restrictions and zoning types of actions. Primitive setting respondents scored the highest mean response for limiting the number of users in the area, limiting group size, requiring reservations, prohibiting wood gathering for fires, closing sites, and separating or zoning incompatible uses.

Visitors to primitive settings have previously been found to respond favorably to some forms of restriction, especially when such restrictions help improve or preserve social and/ or resource conditions (Anderson & Manfredo, 1985; Lucas, 1985; Frost & McCool, 1988; Lawson & Manning, 2002). A recent study of Bob Marshall Wilderness visitors (Whitmore et al., 2005) found that a majority of visitors said "limiting the size of parties to 12 people" and "restricting the number of visitors to an area if it is being used beyond capacity" were both "desirable" management actions.

In our study, even in the case of direct management actions with little overall support (closing sites, requiring advance reservations, limiting length of stay), primitive setting respondents felt those management actions were more appropriate than did respondents for the other setting types. This suggests that for primitive settings, managers may find more visitor support for, or at least less opposition to, the type of direct management actions that the ROS implies may be less appropriate in a primitive setting.

However, primitive setting respondents also scored the lowest of all four groups on the engineering category actions. In particular, primitive setting respondents showed little support for improving campsites, building additional campsites, making a site or area easier to access, and upgrading campsites to a more modern level. These management actions are among the small handful that did show the expected linear relationship implied in the ROS. For these actions, primitive setting respondents scored between inappropriate and neutral, with appropriateness ratings increasing in a linear fashion to the urban setting respondents, who scored between neutral and appropriate. These results are consistent with those of Manfredo et al. (1983), who found, in a study of primitive area visitors, that development-related management actions elicited a negative response. In an Anderson and Manfredo (1985) analysis of studies from the late 1970s, wilderness and primitive area respondents expressed opposition to construction of pit toilets and hardening sites. More recently, a study of Bob Marshall Wilderness visitors in 2004 (Whitmore et al., 2005) found only small minorities of visitors rated such developments as cemented rock fireplaces with metal grates, split-log picnic tables, and outhouses or pit toilets as desirable at campsites; majorities of respondents deemed the fireplaces and picnic tables undesirable, as did a plurality for the outhouses.

Conventional ROS wisdom would suggest that developing high-standard trails or campsites, particularly with an eye toward making access easier, would be contrary to the management goals of primitive settings. The inverse would be true for the urban end of the ROS, where visitors expect an increased level of development and access. We found this trend for the entire engineering group of management actions. This suggests clear and differentiated expectations by the public of what types and levels of access and development they expect in different types of recreation settings.

Semi-primitive motorized setting respondents accounted for 22 of the 43 significantly different paired comparisons for the 25 individual management actions and were at odds with the primitive setting respondents (11 actions) more so than with the rural (seven actions) or urban (four actions) setting respondents. Semi-primitive motorized respondents were often the least supportive of many of the same direct management actions that primitive setting respondents most supported. Of the 12 direct management actions, primitive setting respondents scored highest on nine, while semi-primitive motorized respondents scored lowest on eight of those same nine. Semi-primitive motorized setting respondents were also less supportive than rural and/or urban setting respondents on five of the 12 direct actions. This finding strikingly questions the linearity between management actions and setting type across the ROS, and suggests managers should approach management actions for the semi-primitive setting cautiously. It may also suggest that freedom from restriction plays a larger role in defining a semi-primitive motorized experience than other types of experiences, including those sought by visitors in primitive recreation settings.

Why might primitive and semi-primitive motorized respondents differ so markedly on their support for (or perceived appropriateness of) many of these management actions? While we focused in this study on the distinction between what are generally categorized as direct and indirect types of actions, respondents may have also been responding to other characteristics of the management actions, and the respondents themselves may have differed in ways other than simply which ROS setting they chose. For example, differences in obtrusiveness (visual evidence of development or artificial appearance) could explain some of the difference in appropriateness ratings for certain management actions, with primitive setting respondents probably more sensitive to the visual effects of developments, such as site upgrades or construction of additional sites. Also, actions that would make it easier to access an area and/or that might lead to increased use would likely be met with less support from primitive setting recreationists who are possibly seeking an experience higher in solitude.

In fact, differences among respondents in the type of experience being sought might account for some of the differences in perceived appropriateness of certain management actions. If primitive setting recreationists seek more solitude than semi-primitive motorized recreationists, that could partly explain why our primitive setting respondents were more supportive of many of the direct management actions restricting use. We asked our respondents about the type of experience they sought in their chosen ROS setting, and our results were consistent with this explanation—respondents who most often recreated in a primitive setting rated solitude as significantly more important than did respondents in any of the other ROS settings.

Likewise, the activities engaged in by our respondents, particularly their style of recreation (motorized or non-motorized), may have influenced their appropriateness ratings for certain management actions. We asked our respondents about the activities they most commonly pursued while recreating in their chosen ROS setting, then compared the non-motorized recreationists from the primitive setting with the motorized recreationists from the semi-primitive setting on their appropriateness ratings for the six categories of actions. The two groups differed significantly on three of the six categories of management actions: restrictions on use, zoning, and user fees, with the use restrictions difference being the largest. So although we have focused mainly on differences in appropri-

ateness ratings based on different ROS settings, the reality is likely more complex—that perceived appropriateness of management actions is a combination of differences in chosen setting, desired experiences, style of recreating, and characteristics of the actions themselves.

While our results very clearly show a strong contrast between the primitive and semi-primitive motorized setting respondents in how they perceive management actions, particularly direct management actions, we also found that of the eight management actions on our list that garnered the most overall support (far right column in Table 1), there were no differences among the ROS settings for six of those actions (impose fines, inform users of other opportunities, inform visitors of use patterns, inform visitors of site characteristics, direct users to other opportunities, and increase rangers). One of the other two actions, "educate users about ecology," was rated highly by all ROS groups (ranked number one overall), but more so by the Primitive setting respondents than by the other ROS groups. There appears to be a high level of agreement about the appropriateness of these actions across the entire ROS.

One final idea explored in this study was that, based on visitor perceptions of appropriateness, management actions would group into categories of like actions along a direct/indirect management action continuum. The groupings found in this study support the idea that visitors can and do distinguish among types of management actions, recognizing similarities and differences among them. This is consistent with Vistad (2003), who found that a factor analysis of visitor ratings of the "value" of 12 proposed management actions resulted in four distinct groups of actions virtually identical to ours—use restrictions, user fees, information, and engineering/restoration. Once again, however, we found that our six groups of management actions (the four above plus our additional groups of zoning and law enforcement) do not align themselves across the ROS in a direct/indirect continuum. Instead, we found that while the information/education group of actions (arguably the most indirect) was deemed most appropriate for all ROS settings, law enforcement actions (arguably the most direct) were next, followed by (for all respondents combined) engineering, restrictions on use, zoning, and finally user fees. Some differences among the ROS settings were observed. Once again, primitive and semi-primitive setting respondents differed the most, with primitive setting respondents more supportive of use restrictions, which the semi-primitive setting respondents ranked last, and semi-primitive setting respondents more supportive of engineering type actions, which the primitive setting respondents ranked last. For the four categories of actions that overlap in the two studies, Vistad (2003) likewise found that visitors rated information actions as most "valued," followed by engineering/restoration actions, restrictions on use, and finally user fees.

Implications for Managers

What do our results mean for managers? Some of the specific management actions we asked about, and some of the general types of actions, seem universally appropriate. Information and visitor education actions, and law enforcement actions, appear to have the most support among visitors in all ROS settings, so managers should feel comfortable using those actions across the ROS. However, support for other specific actions, and general types of actions, differed substantially from one ROS setting to another. In particular, visitor support for restrictions on use (limiting the number of users, limiting

group size, prohibiting wood gathering, requiring reservations, and closing sites), and what we called "engineering"-type actions (building additional sites, making it easier or harder to access the area), differed dramatically between the primitive and the semi-primitive motorized respondents. This suggests managers should feel more comfortable (from a visitor acceptance standpoint) than the ROS literature might suggest in implementing use restrictions in primitive settings but should approach the use of those same actions much more cautiously in semi-primitive motorized settings. Freedom from restriction may play a larger role in defining a semi-primitive motorized experience than other types of experiences, including those sought by visitors in primitive recreation settings. Conversely, the use of management actions that might result in increased obtrusiveness or appearance of development, or that might result in increased visitor use, should be approached much more cautiously in primitive settings than in semi-primitive motorized settings. The experiences desired, the style of recreating, and the type of setting chosen appear to lead to very different levels of perceived appropriateness for these types of management actions. This is important to managers to the degree that perceived appropriateness translates into visitor acceptance, support, or opposition.

In conclusion, the ROS, as operationalized by the Forest Service, suggests that managers should use increasingly indirect techniques as they manage settings toward the primitive end of the spectrum, but the data from our study suggest the assumed linearity of that relationship is not fully supported. Our results suggest that management actions are perceived differently in different types of recreation settings and certain types of actions may be more accepted in certain ROS settings. In interpreting these findings, it appears that management actions may play a minor role in defining the primitive setting, a moderate role in defining the rural and urban settings, and a major role in defining the semi-primitive motorized setting. Consequently, managers employing management actions, particularly those that are more regulatory in nature, may have a greater effect on visitor experiences in semi-primitive motorized settings than in other types of recreation settings.

Limitations

Using a more experimental approach and asking our subjects to respond to a generic "type" of setting, albeit one of their choice, rather than to the actual site in which we sampled them, had trade-offs. On the one hand, this approach allowed us to minimize variation among actual sites, including variation in possible influences like place attachment and thus to maximize direct comparability of the four ROS setting types. Likewise, instructing our subjects to respond to each of the 25 management actions as if they were equal in their effectiveness at addressing an unspecified problem (which in reality they are not), and equal in their potential obtrusiveness (which in reality they are not), was necessary not only for practicality, but more importantly to maximize direct comparability of ratings among the 25 management actions. Obviously, managers wishing to use our results to help them choose from a set of management actions will have to balance not only visitor approval, but other factors, such as obtrusiveness of the action and likely effectiveness of the action in solving the specific problem.

Also as mentioned previously, while we focused our analyses on the role of the

ROS setting and its influence on perceptions of appropriateness, other factors, such as desired visitor experience and style or mode of recreating, may have also influenced our respondents' perceptions of appropriateness of management actions, and these variables deserve greater attention. Finally, although none of our specific analyses categorized or treated the 25 management actions dichotomously as either a "direct" or "indirect" action, in general we did discuss the management actions as though they were categorically one or the other, when in reality these actions lie along a continuum of directness and indirectness, and this should be acknowledged.

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