Journal of Leisure Research
2012, Vol. 44, No. 3, pp. 392-415

Effects of Setting-Based Management on Visitor Experience Outcomes: Differences Across a Management Continuum

Erik A. Backlund
St. Lawrence University

William P. Stewart
University of Illinois

Abstract

Opinions diverge as to whether visitor experiences vary across setting-based management continua. Evidence suggests that recreationists with different experiences profiles have distinct setting preferences but is mixed regarding supporting a link between settings and experiences. This paper explores the relationship between settings and experiences at Grand Canyon National Park. Our analyses examine variation in experiences across three management zones in two ways: (1) by experience intensity by setting, and (2) size of experience clusters by setting. Results indicated minor differences in experience intensity consistent with the management zone continuum, but large difference in the relative experience clusters size. These results imply that setting management systems may function to change the rate at which experiences are produced rather than the intensity.

KEYWORDS: Outdoor recreation experiences, backcountry, Recreation Opportunity Spectrum, ROS, Grand Canyon National Park

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Erik A. Backlund is an assistant professor in the Environmental Studies Department, St. Lawrence University.

William P. Stewart is a professor in the Department of Recreation, Sport, & Tourism, University of Illinois.

An earlier version of this paper was presented at the 2010 International Symposium on Society and Resource Management in Corpus Christi, TX. Funding for the original data collection was provided by the Department of the Interior, National Park Service, Grand Canyon National Park.

Correspondence should be sent to Erik A. Backlund, Environmental Studies, St. Lawrence University, 23 Romoda Dr., Canton, NY 13617, ebacklund@stlawu.edu

Introduction

For almost 40 years, social scientists engaged in outdoor recreation research have sought to understand how settings and their management affect visitors' experiences (Williams, 2007). The motivation behind much of this research was the USDA Forest Service's Recreation Opportunity Spectrum (Driver & Brown, 1978; Clarke & Stankey, 1979). It was developed with a belief that the way to maximize the public satisfaction with recreational experiences in wildland settings was for managers to provide an array of opportunities that might appeal to a broad range of visitors. By manipulating the physical, social, and managerial attributes of different sites, managers could provide rewarding social and psychological experiences (Manfredo, Driver & Brown, 1983; Driver, Brown, Stankey & Gregorie, 1987; Floyd & Gramman, 1997; Moore & Driver 2005).

The ROS and similar Experience-Based Setting Management (EBSM) systems seek to fulfill demand by providing a spectrum of environments from which visitors choose for their activities. It assumes that the "Realization of some experiences…depend on the availability of particular combinations of activities and settings" and "because different combinations of activities and settings are arrayed along a spectrum, opportunities to realize at least partially different experiences will vary along that spectrum" (Driver, et al., 1987, p. 204).

As a managerial idea, the ROS and EBSM enjoy wide application. Empirically, the relationships between settings and experiences in a management spectrum are still an open question. Some authors suggest their data substantiates the psychological concepts of the ROS (e.g., Manfredo, et al., 1983, Floyd & Gramman, 1997) while other have expressed reservations (e.g., Knopf, Peterson & Leatherberry, 1983; Wollmuth, Schomaker & Merriam, 1985; Yuan & McEwen, 1989). More recent work has suggested the relationship is highly nuanced (Pierskalla, Lee, Stein, Anderson & Nickerson, 2004). The differing conclusions may be an artifact of the variety of approaches to addressing the question. Analyses that have supported the ROS have relied on the identification of homogenous subgroups of recreationists based upon reported preferences for site and management attributes. Analyses not supporting the ROS have examined differences in experience intensity across settings using actual behavior as a measure of preferred attributes. Both approaches are problematic and have led to an impasse in this line of research. Given the importance of the relationship between settings and experiences to park managers and the increasing importance placed on evidence-based decision-making (Franchina & Meier, 2007), explaining discrepancies between these conclusions is a worthwhile direction for research.

In this paper, we examine how the experience-based setting management system at Grand Canyon National Park (GCNP) functions in terms of the relationship between settings and experiences. Based on our analysis of homogenous subgroups of overnight backcountry hikers, our findings suggest that the experiences of hikers vary across the park's backcountry management zones with partial alignment to the management continuum. The most interesting finding is that rather than producing different experiences, all of the outcomes identified are experienced in all setting classes but at different rates.

Environmental Interaction and Human Experience

The relationship between environmental settings and human experiences is an important theme in the outdoor recreation literature. Williams (2007) outlines four theoretical approaches in environmental psychology that have been applied to understanding outdoor recreation experiences. These include an "aesthetic," "cultural/symbolic," "individual/expressive," and the "instrumental/goal" modes of experience. In the aesthetic mode, perception and preference for landscapes are evolutionary adaptations which are timeless and generalizable. The cultural/symbolic mode suggests that the meanings derived from the landscape are tied to social and cultural systems and thus acquire competing social and political meanings. In the Individualistic/Expressive mode people develop individualistic meanings associated with specific places that emerge from accumulated personal engagement over time. Of the four, the instrumental/goal directed mode has been the dominant approach in outdoor recreation research and is premised on outdoor recreation activity being a behavioral means to some end-state (or psychological goal). The previous three modes are more common in disciplines related to human geography, landscape architecture, and psychology.

One of the core propositions of the outdoor recreation behavior literature is that people's engagement in activities and environments results in beneficial psychological outcomes (Driver & Brown, 1975; Moore & Driver, 2005). A classic example is illustrated by Driver and Knopf (1976) who found "temporary escape" as being an important product of fishing opportunities. In subsequent research, Driver and colleagues identified numerous other beneficial psychological outcomes produced by outdoor recreation opportunities (Driver et al., 1987). Sometimes referred to as the "behavioral approach," the research posits that people engage in outdoor recreation activity to fulfill basic goals, and characterizes recreation activity as goal-directed behavior (Manfredo et al., 1983; Saegert & Winkel, 1990). In other words, park settings are an array of land uses that facilitate fulfillments of needs and goals. This approach generally assumes that one's motives for engaging in recreation behavior are fulfilled by the activity. Thus motives and psychological outcomes are synonymous terms. The preferred method in this approach is a post-activity assessment in which motives are identified and inferred as psychological outcomes of the activity. The research that has tested this assumption has found mixed results regarding the equivalency of motives and outcomes (Stewart, 1992; Dickson & Hall, 2006).

The work exploring relationships between settings, activities and experience was grounded in Lawler's (1973) expectancy-valence theory of motivation (Manfredo, Driver & Tarrant, 1996). According to this framework, unconstrained choices about recreation were a function of the expectations to achieve a desired set of physical, psychological, or social outcomes. From this framework, social scientists have sought to understand the relationships between desired psychological outcomes and setting attributes and activities. If managers understand factors that fulfill expectations, they could then provide the facilities, setting attributes and activity mixes that maximize the probability that visitor achieve those experiences.

Research in the Goal-Directed Framework

Early work by Driver and his associates focused on developing a set of scales to capture people's motivations for participation (See Manfredo, Driver & Tarrant, 1999 for a historical discussion of the REP Scales). The research has investigated the effects of individual and group characteristics, activities, settings on the quality of recreational experiences (Buchanan, Christensen & Burdge, 1981; Heywood, 1984; Williams, Schreyer & Knopf, 1990; Driver & Knopf, 1977; Yuan & Fredman, 2010). A second wave of studies have attempted to understand the effects of time and on-site interactions on recreation experiences using experience sampling procedures (e.g. Hull, Stewart & Yi, 1992; Hull, Michael, Walker & Roggenbuck, 1994; Lee, Datillo & Howard, 1994; McIntyre & Roggenbuck, 1998; Borrie & Rogggenbuck, 2001; Dickinson & Hall, 2006). This latter stream of research emphasizes recreation as a creative experience that unfolds and develops across the entire endeavor. If situational effects of managerial attributes are important to understand, this latter stream of research appears to be a more useful approach.

This study is interested in the fairly narrow question of the relationship between settings and experiences. In this narrow scope, two major approaches to study design and analysis have been developed: (1) analysis based upon verbal reports of preferences, and (2) analysis based upon behavioral choices of settings. In both cases, the respondents are asked to rate items, often from Driver's Recreation Experience Preference Scales (see Moore and Driver 2005), in terms of their importance or the degree to which they added to the respondents satisfaction.

Studies analyzing setting/experience relationships based on verbal reports of setting preferences have tended to (but not always) operationalize experience through homogenous sub-groups of visitors and conclude that the finding supported the tenets of the goal directed approach. In one of the earliest of these studies, McLaughlin and Paradice (1980) indicated differences in setting preferences among visitors grouped by desirable experiences. Manfredo, Driver and Brown (1983) also found homogeneous visitors' setting preferences varied based upon desired experiences. In Virden and Knopf (1989), desirable preferences differed with setting preference, especially when controlling for activity type. Vogelsong, Graefe, Confer, Solan and Kramp (1997) indicated that the experience preferences of visitors to Delaware State Parks were related to the type of park visited. Finally, Floyd and Gramman (1997) found differences in setting preferences among hunters segmented by desired experiences.

Another set of authors have come to different conclusions. Williams and Knopf (1985) examined variation in experience preferences across different river settings varying on an urban to primitive continuum; they did not find any practical significance in relationships between desired experiences and settings. Findings based on 11 rivers led Knopf, Peterson, and Leatherberry (1983) to suggest that the experiential profiles exhibited "striking consistency across the wide range of environmental settings represented" (p. 231). A similar conclusion was reach by Wollmuth, Schumaker, and Merriam (1985) evaluating the desired experiences of river runners in two adjacent ROS classes as well as in Yuan and McEwen (1989) where they tested mean differences in experience preferences across campers in different classes of the ROS and found few or on differences.

When evaluating the findings of studies concluding a link between settings and experiences, two consistent characteristics emerge. First, while statistically significant, the magnitudes of the relationships appear numerically small. Most studies did not report effect sizes, and focused attention on reliability statistics of scales and the significance (rather than magnitude) of relationships. Knopf and Virden (1989) included effects sizes in their analysis. Of the 36 ANOVA's they performed, 13 were statistically significant. Of statistically significant analyses, one had an effect size of .53, seven between .10 and .20, and five .09 or below (see p. 171, Table 4). Second, it is often difficult to interpret the practical significance of the relationships found. In all of the studies, the majority of reported mean preference items are the same valence (i.e., all positive or all negative) across settings.

In a recent attempt to clarify these relationships, Pierskalla, et. al (2004) used meta-analysis techniques to understand the effects of settings on recreation benefits. Their analysis indicated that the effects of settings depended on the benefit but that the effect was generally small. Reported effects size ranged from .03-.29, with average effect sizes by benefit type ranging from .06-.13 (Pierskalla et al., 2004, p. 174).

The differences in the study design and approaches may account for the differences in conclusions. The studies that showed a link between settings and experiences tended to operationalize "experience" in a different way than those not showing a link. Those with positive conclusions tended to use homogenous subgroups as their dependent variables. They also tended to ask respondents for verbal reports of setting or management attributes preference, rather than what they encountered. The studies that were skeptical of an empirical link between settings and experiences focused on the average domain or item intensity (average scale rating or scores) as the dependent variable and managerial classification of the location as the independent variable.

Both approaches have advantages and disadvantages. Using homogenous subgroups of visitors based on their ratings of different motivations or experiences seems an operationalization consistent with Driver's notion that experiences are a set of psychological outcomes (Driver & Brown, 1975; Driver & Moore, 2005). The use of preferred attributes rather than actual settings is a weak operationalization of setting attributes due to setting preferences that may vary from the settings encountered on one's trip. This weakness could be eliminated by studying visitors to a recreation site managed by ROS zones, and whose users could be sampled via zones, thus the settings encountered by visitors would be objectively assessed. Although having captured the setting conditions in a relatively objective fashion, these studies may not be sensitive to recreation experiences as sets of psychological outcomes and fail to capture the diversity of experiences that might be found in a visitor population (Shafer, 1969).

After almost 40 years of investigation, research on relationships between settings and experiential outcomes has produced mixed results. On the one hand, recreationists have tendencies to tell researchers that they have distinct setting preferences when seeking specific experiential outcomes. On the other hand, when visitors of sites are asked about their experiential outcomes there is little, if any, practical differences found across an array of sites. These mixed, if not con-

founding, findings suggest the relationship between settings and experiences is more complex than previously assumed.

In this analysis, we examine the influence of an EBSM regime on visitors' experiential outcomes. To do so, we examine the relationships between overnight hikers' experience outcomes and the backcountry management zones at Grand Canyon National Park in two ways. First, we examine the experience ratings of visitors who hiked in different management zones. We then evaluate the distribution of experience outcome sets, operationalized as homogenous subgroups of visitors, across management zones. Grand Canyon's management continuum provides a natural laboratory to examine the effects of settings on visitor experiential outcomes because: (1) the physical setting of the Canyon is fairly consistent but there are functionally significant differences in the quality and intensity of management, and (2) the backcountry is generally limited to hiking activity which minimizes any differences in activity groups across settings (Virden & Knopf 1989).

Methods

Backcountry Management at Grand Canyon National Park

Grand Canyon National Park is approximately 1.4 million acres, of which more than 90% is considered backcountry. For management purposes, the backcountry is divided into 79 use areas with each classified into one of four use zones that vary along a primitive-urban continuum. Overnight hiking permits are allocated for each of the 79 use areas on a nightly basis. Backcountry Management Plan (1988) describes a continuum of management and experiences for the four use zones, the most developed being the Corridor Use Zone, followed by the Threshold, Primitive, and the Wild Use Zones.

The most developed use zone is the *Corridor* containing the Bright Angel and Kaibab Trails as well as Phantom Ranch, several ranger stations, and three campgrounds that account for 66% of backcountry visitation. There are running water sinks, drinking fountains, and flush toilets, with occasional rest houses and ranger patrols. Camping is limited to sites in the designated campgrounds. The *Threshold* Use Zone is less developed than the Corridor. Trail access is less easily available than in the Corridor, and water is taken from natural water sources. There are designated campsites that hold between one to four parties per night and at-large camping, and account for 16% of backcountry visitation.

Within the *Primitive* Use Zone, less managerial development occurs than in either the Corridor or Threshold Use Zones. Trails are more difficult to access and not frequently maintained. In some places, hikers follow un-marked routes. Water access can be difficult and ranger patrols are rare. The least developed is the *Wild* Use Zone. There are few, if any, trails and visitors travel mostly on un-marked routes. Ranger patrols are rare and camping is at-large through the Wild Use Zone. Capacity standards restrict the number of user groups to one or two total groups in a use zone per night. Travel in the Wild Zone is suggested only for the most experienced backcountry hikers. Table 1 shows the descriptions for each management zone in the park's informational materials provided to the public.

Table 1

Managerial Zone Descriptions

Corridor	Threshold	Primitive	Wild
Recommended for hikers without previous experience at Grand Canyon. Maintained trails. Purified water stations. Paved roads to trailheads. Toilets, signs, emergency phones, and ranger stations. Use of private livestock (horses and mules only) allowed only when specified on permit.	*Recommended for experienced Grand Canyon hikers. Non-maintained trails. Scarce water sources. Dirt roads to trailheads. Pit toilets. Use of private livestock (horses and mules only) allowed with permit only on Whitmore Trail and on designated roads and trails on the rim.*	*Recommended for highly experienced Grand Canyon hikers with proven route-finding ability. Non-maintained trails and routes. 4-wheel-drive roads to trailheads. Occasional signs. No other developments. Use of private livestock (horses and mules only) allowed with permit only on the Ken Patrick Trail to Uncle Jim Trail to Uncle Jim Point and on designated roads on the rim.*	*Recommended for highly experienced Grand Canyon hikers with extensive route finding ability. Indistinct to non-existent routes require advanced route finding ability. Water sources scarce to non-existent. No other development. Use of private livestock is not allowed.*
Note. All quoted from http://www.nps.gov/grca/planyourvisit/campsite-information.htm			

Sample

Overnight backcountry hikers at Grand Canyon National Park who applied for and used a camping permit between March 2004 and February 2005 were the study population. An uneven stratified random procedure was used to sample permit applicants. Stratification was based on season and management zone according to the proportions of the previous 12 months. GCNP backcountry overnight hiking permits are distributed based on where the visitor will camp. Hikers were considered part of a management zone population based on the zone where most of their nights were spent unless they spent a night in the "Wild" zone. Anyone who spent a night in a wild zone management area was classified as such. This was necessary to ensure an adequate cell size. As a result of the stratification criteria the management zone and season with the highest use, the Corridor in the summer, was under-sampled, and the lowest use zone, the Wild in the Summer, was over-sampled. Weights were then calculated and applied so that the results reflect the population distribution. The weights were equal to the inverse of the sampling ratio (see Backlund, Stewart, & Schwartz, 2008 for further detail).

Data collection followed a modified Tailored Design procedure (Dillman, 2007). All potential respondents were sent a personalized letter inviting them to participate in the study and informing them they would receive a questionnaire packet with a pre-paid return mail envelope. One week after the initial questionnaire packet was sent, a thank you/reminder post card was sent. After another week, a second questionnaire packet was sent to non-respondents, followed by a

second thank you/reminder post card. Data collection yielded 1400 responses for a 78% adjusted response rate.

The questionnaire was fairly extensive. It was 17 pages long and required approximately 45 minutes to complete. Most important to this study were 33 items modified from Driver's (1983) Recreation Experience Preference (REP) inventory. For each item, five response categories followed Likert-type bipolar anchors with a range of *extremely unimportant* to *extremely important* with a *neither* in the middle. It was our intention to follow Driver's (1983) original unipolar response scale so that we could compare this data to data published by Underhill, Stewart, Manning and Carpenter (1986). The change was necessary for Office of Management and Budget approval. For analysis purposes the anchors were then coded -2 to +2.

Because the data come from a post hoc survey of visitors, we view the results of the questionnaire as an indication of the hiker's recollected experiences, the outcomes. This interpretation is consistent with Driver's (1983) framework and the results of research by Stewart (1992) and Williams, Ellis, Nickerson, and Schafer (1988) who have found that visitor responses to the REP scales were influenced by on-site situations. That is, the importance ratings reflect what respondents feel were the important outcomes of their trip rather than their motivations for undertaking the trip or an in-situ assessment of what they are experiencing during an given moment of the trip.

Analysis

The data analysis followed four steps. Manfredo, Drive and Tarrant (1996) suggest that the items from the REP inventory are reliable enough that it is sufficient to calculate scale scores and reliability coefficients before use. Because some of the items were modified, we chose to reduce the items with factor analytic techniques. The 33 items from the REP inventory were entered into a principal components extraction in SPSS 14[1]. Initial extraction eigenvalues and scree plots suggested eight and nine component solutions. Several solutions were calculated including combinations of Principal Factors and Principal Components extraction with Orthogonal and Promax[2] rotations. After rotation, although not meeting the typical eigenvalue cut point of one, the nine component solution was selected because it had the simplest structure and was the most interpretable (Tabachnick & Fidel 2001).

[1]At the suggestion of the Associate Editor, we attempted to verify a measurement model with Confirmatory Factor Analysis based on the factors suggested by Manfredo, Driver and Tarrant (1996). Since the items used in the instrument were only partial subsets, the hypothesized model did not yield a good fit. The continual adjustment necessary to yield a good fitting model failed to meet the assumptions of a confirmatory model (Byrne 2010).

[2]Is an oblique rotation method for large sample sizes (n=1000+) that allows the components to be correlated.

Second, experience outcome sets were identified by developing homogenous subgroups of visitors. A two-step cluster analysis was performed based on REP item responses and component scores. The SPSS two-step algorithm begins by combining a distance calculation as a first step and a hierarchical procedure as a second step. The distance calculation pre-clusters the cases and those clusters are then used in the hierarchical analysis to arrive at a solution. This approach is robust for both discrete and continuous data as well as large data sets (1000+ observations). To better identify the sub-groups, analysis of variances of component scores, past experience and group type across cluster was performed. Post-hoc paired comparisons were based on a Scheffe's test.

Third, to examine the relationship between the management zones and hiker experiences, two approaches were taken. First, analyses of variance of using management zones as the independent (or class) variable and component scores as the dependent variable were performed with an eta^2 calculated to indicate variance explained by zone. Post hoc paired comparisons were based on Scheffe's tests. Next, a simple contingency table relating cluster and management zones was calculated to display the probability that an experience cluster would be found in each management zone. Then to indicate the evenness of the clusters' distribution within the management zone, Blau's (1977) Index of Diversity was calculated.

Blau's index is commonly used in sociology, economics and management research as an estimate for diversity. In economics it is often referred to as the Hirschman-Herfindahl Index and derived from Simpson's (1949) measure of species diversity in an ecosystem (Harrison & Klein 2007). It is calculated $1-\sum\pi_k^2$ where p equals the proportion in the K^{th} category. The maximum possible value is equal to K-1/K and occurs when the categories are evenly divided.

Results

The principal components analysis yielded an experience profile including nine components. Table 2 summarizes the descriptive name, number of items, Eigenvalue, percent of variance explained, mean, and reliability coefficient for each component. All items loaded at an acceptable level of 0.4 or greater and the alpha's with a range from .62 to .87 suggest all of the scales are sufficiently reliable. Eight of the nine domains were rated as important, the most important experience domains being Wild Setting (m=1.32), Enjoying Nature (m=1.24), and Solitude (m=1.15). The domain Sense of Security was rated as being unimportant to the sample (m= -.47).

The two-step cluster analysis yielded a five-cluster solution (Tables 3, 4, and 5). The largest cluster (27.7%) was labeled "Social Wilderness." This group placed an emphasis on the Wild Setting (m=1.61), Enjoy Nature (m=1.59), Skills Testing (m=1.41) and Solitude (m=1.40) experience components. Their distinguishing feature was that they highest mean scores for the Family (m=1.20), Learning (m=1.36), and Social (m=0.66) components. They were more likely than average to be in family groups or groups mixed of friends and family. These hikers had a modest amount of experience hiking at Grand Canyon (5 years) and had made 2.5 trips in those five years.

Table 2

Component Loadings, Communalities (h2), and Percent of Variance explained by for Principal Components Extraction with Promax Rotation

Item	Load	h^2	Item Mean	α	Component Mean	% Variation Explained
Challenge				.82	0.31	22.21
Chancing dangerous situations	.89	.70	-.24			
Having thrills	.81	.67	.42			
Being your own boss	.64	.57	.52			
Experiencing the risks involved	.58	.68	.52			
Being self-sufficient in a wilderness area	.44	.57	1.08			
Solitude				.81	1.15	14.73
Being alone	.86	.70	.71			
Getting away from crowded situations	.85	.75	1.25			
Experiencing solitude	.81	.71	1.26			
Experiencing peace and calm	.74	.67	1.40			
Releasing or reducing some built up tensions	.47	.51	.78			
Skills Testing				.87	1.00	9.48
Developing your outdoor abilities and skills	.92	.74	1.02			
Depending on your skills in to deal with wilderness conditions	.84	.71	1.02			
Testing your abilities	.68	.75	.98			
Learning what you are capable of	.64	.74	.98			
Social				.73	.011	4.93
Meeting other people in the area	.81	.81	-.28			
Talking to new and varied people	.81	.75	.14			
Being with others who enjoy the same thing you do	.68	.60	.78			
Observing other people in the area	.55	.64	-.71			
Reflecting on your spiritual values	.43	.51	.61			
Sense of Security				.87	-.47	4.59
Being near others who could help you if you need them	.89	.83	-.31			
Knowing others are nearby	.86	.83	-.62			
Wild Setting				.68	1.32	3.84
Encountering wildlife	.77	.70	1.21			
Being in an area where human influence is not noticeable	.70	.60	1.17			
Being in a wilderness setting	.70	.65	1.57			
Enjoying Nature				.70	1.24	3.57
Enjoying the sounds of nature	.86	.72	1.45			
Enjoying smells of nature	.85	.71	1.05			
Studying nature	.42	.61	1.03			
Family				.87	0.76	3.21
Doing something with your family	.86	.87	.91			
Bringing your family closer together	.85	.87	.60			
Learning				.62	1.02	2.94
Learning about the park's natural wonders	.81	.72	1.20			
Learning about the park's history	.74	.68	.84			

Table 3

ANOVA Results of Experience Component Means by Experience Cluster

	Social Wilderness		Newly Initiated		Solitude with Friends		Easy Solitude		Wilderness Adventurers			
Experience Domain	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	M	(*SD*)	F^a	Scheffe's[b]
Social	0.66	(0.53)	0.40	(0.45)	-0.38	(0.49)	-0.55	0.58	-0.37	(0.60)	2301.06	SF=WA
Wild Setting	1.61	(0.36)	0.81	(0.48)	1.12	(0.35)	1.64	0.37	1.72	(0.34)	2177.05	SW=ES
Skills Testing	1.41	(0.46)	0.86	(0.50)	0.91	(0.48)	0.09	0.71	1.57	(0.40)	2020.23	NI=SF
Sense of Security	0.03	(0.72)	0.05	(0.74)	-1.02	(0.53)	-0.95	0.88	-1.50	(0.52)	1848.66	SW=SF
Solitude	1.40	(0.46)	0.49	(0.63)	1.12	(0.43	1.42	0.61	1.76	(0.31)	1787.30	SW=ES
Enjoy Nature	1.59	(0.41)	0.86	(0.50)	0.79	(0.50)	1.50	0.52	1.71	(0.36)	1678.70	-
Challenge	0.71	(0.73)	0.22	(0.68)	0.11	(0.64)	-0.60	0.69	0.95	(0.56)	1232.79	-
Learning	1.36	(0.48)	0.91	(0.48)	0.72	(0.57)	0.80	0.70	1.13	(0.51)	526.23	-
Family	1.20	(0.68)	0.75	(0.77)	0.33	(0.96)	0.51	1.08	0.63	(1.04)	324.57	-

Note. SW = Social Wilderness, NI = Newly Initiated, SF=Solitude with Friends, ES = Easy Solitude, WA = Wilderness Adventurers

[a] All $p < .001$

[b] Homogenous subsets, all other statistically significant at $p<.05$

Table 4

Group Types and Size by Experience Cluster

Group Type[a]	Social Wilderness	Newly Initiated	Solitude with Friends	Easy Solitude	Wilderness Adventurers	Total
Family	43.7	47.8	30.5	49.1	30.5	42.4
Friends	30.0	33.9	37.8	24.5	39.4	32.8
Family & Friends	13.4	7.4	17.4	12.9	8.7	11.9
Organized group	2.3	3.8	3.2	1.9	1.5	2.7
Alone	10.5	7.0	11.1	11.7	13.0	10.2
Group Size[b]:						
Mean	3.10	3.43	3.15	2.59	2.97	3.11
(*SD)*	(2.15)	(2.55)	(2.02)	(1.24)	(2.04)	(2.14)

[a] χ^2=345.40, df=16, p<.001
[b] F =137.86, p<.001

Table 5

ANOVA for Past Experience by Experience Cluster

	Social Wilderness		Newly Initiated		Solitude with Friends		Easy Solitude		Wilderness Adventurers			
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*F*[a]	Scheffe's[b]
G.C. Trips in:												
Past 12 Months	1.48	(1.35)	1.17	(0.99)	1.32	(0.88)	1.29	*(0.72)*	1.93	(2.70)	71.53	NI=ES,SF=ES
Last 5 Years	2.87	(4.31)	2.26	(4.02)	2.75	(3.56)	2.82	*(4.07)*	5.23	(8.30)	83.56	SW=SF=ES
Number of years since first hike in G.C.	5.66	(9.26)	4.58	(8.64)	7.79	(11.55)	7.11	*(10.35)*	7.12	(9.05)	38.90	SF=ES=WA

Note. SW = Social Wilderness, NI = Newly Initiated, SF=Solitude with Friends, ES = Easy Solitude, WA = Wilderness Adventurers

[a] All $p<.001$

[b] Homogenous subsets, all other statistically significant at $p<.05$

The cluster labeled "Newly Initiated" comprised 26.9% of the sample. They did not indicate any one experience component was especially important. Every component score was positive for this group and none were over 1.00. The experience least important to this group was Help (m=0.05) and the experience most important was Learning (m=0.91). They were likely to hike with families or organized groups. The group sizes were the largest and the respondents had the least past experience hiking in the Canyon.

The "Solitude with Friends" cluster was composed of 18.6% of the sample. The most important experience components for these hikers were Solitude (m=1.12) and Wild Setting (m=1.12). The least important experience components were Help (m=-1.02) and Social (m=-0.39.). Most other component ratings were moderate and ranged between 0 and 1.00. These hikers had the longest history hiking at the Canyon (m=7.79 years) and were with larger groups of friends or friends and family.

The "Easy Solitude" hikers placed the most importance on Solitude (m =1.42), Wild Setting (m=1.65), and Enjoying Nature (m=1.50). They place far less importance on experiences like Skills Testing (m=0.09) and Challenge (m=.60), and suggesting that they strongly desired solitude but did not want to hike far or challenge themselves to achieve it. The Easy Solitude hikers also had the lowest overall importance rating for the Social component (m=-0.55). This cluster is very experienced hiking the Canyon. They had hiked there over 7 years on average and had gone on 3 trips in the past five years. They made up 14.6% of the overnight hiker population.

Finally the "Wilderness Adventurers" made up 12.2% of the hiker population. Wilderness Adventurers place high importance on Solitude (m=1.76), Wild Setting (m=1.73), Enjoying Nature (1.71), and Skills Testing (m=1.53). They placed the least emphasis on Help (m=-1.50) and Social (m=-0.38). Of all the outcome clusters, these hikers indicated the highest Challenge rating (m=0.95). They have hiked the Grand Canyon on average of 7 years and hiked frequently, about once a year the previous five years.

Differences in Experiential Outcomes across Management Zones

Following Yuan and McEwen (1989) and Virden and Knopf (1989) differences in experience component scores were examined across management zones. Tests were conducted across all zones and were significantly different across all components (Table 4). Management zone explained between 4 to 12% of the variance for four of the nine components including Help (η^2 = .12), Solitude (η^2 =.06), Social (η^2=.05), and Family (η^2 =.04). Five of the nine components increased in importance across the management spectrum from the developed Corridor to the Wild Zone, including Solitude (mean increase .42), Wild Setting (mean increase .18), Skills Testing (mean increase .22), Challenge (mean increase 0.24) and Enjoying Nature (mean increase 0.13). Only one component changed across the management zones from negative to positive. The mean for the Social component was .21 in the Corridor, 0.0 in the Threshold Zone, and -.21 in the Primitive/Wild Zones.

Differing Rates of Experiential Outcomes across Management Zones

A contingency table is used to examine the relationship of experience clusters with the management zones (Table 6). Chi-square analysis suggests that experience group and management zone are associated (χ^2 = 1053.81, df=8, p<.001). The zone population proportion of "Social Wilderness" and "Newly Initiated" declined as the management spectrum moved from the Corridor to the Wild Zone, specifically the proportion declined 51% for the "Social Wilderness" and 63% for "Newly Initiated." The zone proportion of the "Easy Solitude" and "Wilderness Adventurers" groups increase from the Corridor to the Primitive/Wild zones. The change is greatest for the "Wilderness Adventurers" for whom the probability of being in the Primitive/Wild zone is 400% greater than being in the Corridor. The magnitude of the change was not as great for the "Solitude with Friends" cluster. They comprise 15.9% of the hikers in the Corridor, 23.2% in the Threshold zones and 25.7% in the Primitive/Wild zones for a 60% increase.

The "Easy Solitude" cluster did not adhere to the management spectrum pattern. The proportion of the population in the "Easy Solitude" group increased between the Corridor and Threshold zone but declined again in the Primitive/Wild zone. The proportion of Primitive/Wild zone hiker in the "Easy Solitude" cluster was higher than in the Corridor. For both the "Solitude with Friends" and "Easy Solitude" clusters, the major distinction in management zones was whether in or out of the Corridor (Figure 1).

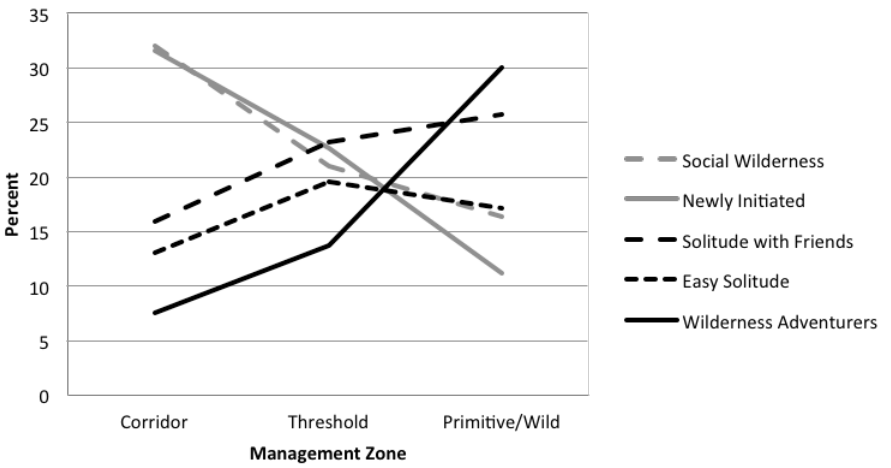

Figure 1. Experience Group Distribution Change Across Management Zone Spectrum

Table 6

ANOVA of Experience Components Across Management Zones

	Corridor		Threshold		Primitive/Wild					
	M	(SD)	*M*	(*SD*)	*M*	(*SD*)	n	*F*[a]	η^2	Scheffe[b]
Sense of Security	-0.25	(0.88)	-0.74	(0.88)	-1.09	*(0.81)*	10604	754.43	.12	-
Solitude	1.04	(0.68)	1.30	(0.57)	1.46	*(0.56)*	10706	335.44	.06	-
Social	0.21	(0.71)	0.00	(0.70)	-0.22	*(0.66)*	10764	280.13	.05	-
Family	0.88	(0.86)	0.57	(0.90)	0.42	*(1.04)*	10716	224.28	.04	-
Learning	1.08	(0.54)	0.89	(0.65)	0.89	*(0.66)*	10811	126.94	-	T=P/W
Wild Setting	1.28	(0.54)	1.32	(0.53)	1.46	*(0.52)*	10800	81.98	-	C=T
Skills Testing	0.95	(0.69)	0.99	(0.67)	1.17	*(0.65)*	10584	76.99	-	C=T
Challenge	0.25	(0.84)	0.36	(0.77)	0.49	*(0.75)*	10521	63.52	-	-
Enjoy Nature	1.22	(0.61)	1.27	(0.60)	1.35	*(0.58)*	10805	36.14	-	-

Note. C = Corridor, T = Threshold, P/W = Primitive/Wild

[a] All $p<.001$

[b] Homogenous subgroups, all others statistically significant at $p<.05$

Variability in Proportion of Experience Clusters within Management Zone

For each management zone, the proportions of each experience cluster are presented in Table 7. Along with the percentages for the relative size of each cluster in the zone, the differences between the zone and total population proportions are also presented. For example, Table 5 indicates that 32.0% of Corridor backcountry hikers were classified in the "Social Wilderness" experience cluster. As indicated in the difference column, 32.0% is 4.3 percentage points larger than the proportion of the experience group in the total population (i.e., 32.0 – 27.7 = 4.3). This positive difference indicates that the Corridor over-performs as an attractive zone to provide an opportunity for "Social Wilderness" hikers. In contrast, "Social Wilderness" hikers comprised 21.0% of Threshold hikers, which is 6.7 percentage points lower than the experience group in the total population. Thus, the Threshold under-performs as an attractive zone for "Social Wilderness" hikers. The Primitive/Wild zones also under-performed for the "Social Wilderness" experience group, with 16.2% of the Primitive/Wild zones comprised of this group or 11.5 percentage points less than the total population. Although "Social Wilderness" hikers are distributed across the four zones at Grand Canyon, there are tendencies for hikers in this group to systematically prefer the Corridor to hike and camp. Because of these tendencies, the Corridor is functioning according to the Park's backcountry objectives, and is appealing to visitors who are tolerant of encounters with other people and able to achieve wilderness experiences regardless of comparatively high encounter numbers.

Table 7

Distribution of Experience Clusters and Blau's Index by Management Zone

	Management Zone						
	Corridor (C)		Threshold (T)		Primitive/Wild (P/W)		Group % of
Experience Cluster[a]	%	C-P	%	T-P	%	P/W-P	Population (P)
Social Wilderness	32.0	4.3	21.0	-6.7	16.2	-11.5	27.7
Newly Initiated	31.6	4.7	22.7	-4.2	11.1	-15.8	26.9
Solitude with Friends	15.9	-2.7	23.2	4.6	25.7	7.1	18.6
Easy Solitude	13.0	-1.6	19.5	4.9	17.1	2.5	14.6
Wilderness Adventurers	7.5	-4.7	13.7	1.5	30.0	17.8	12.2
Blau's Index	.75		.79		.78		.78
% of total pop. in zone	68		16		15		100

[a] $\chi^2 = 1053.81$, df=8, $p<.001$

Along with the proportions of each experience cluster within zone, Table 5 presents Blau's diversity index for each management zone. With five experience clusters the index's maximum possible value is .8 (5-1/5). The closer to .8 the more evenness the distribution of categories within zones. The index scores are relatively high for each of the management zones. The index for the population was .78. The index for the threshold was the highest (.79) suggesting that the cluster sizes were the most evenly distributed and more evenly distributed than the population. The index for the Corridor was the lowest (.75) and lower than the population. This indicates that the visitors were least evenly distributed among the clusters.

Discussion

The purpose of this analysis was to examine the relationship between settings and experiential outcomes. Previous research has developed a conceptual framework to suggest that recreationists are driven by their goal-directed behavior to seek settings that match their desired experiential outcomes. The empirical support from this same collection of research has not, however, been convincing. We have learned from previous study designs, and strengthened the capacity of this design to address traditional questions related to effects of setting-based management on experiential outcomes. We expected clusters of experiential outcomes to be associated with any given setting at Grand Canyon. Using an analysis distinct from previous research, we found that: (1) the zones at Grand Canyon influenced hiker experiences consistent with the intentions of the managerial framework, (2) all of the experience groups were found in all of the management zones, and (3) exploring diversity of experience outcomes across settings holds promise for insight to setting based management. This third finding is a reframing of traditional questions that searched for homogeneity of experiential outcomes within settings. The discussion explains each of these interpretations in turn.

Like previous research, the REP scale scores of overnight backcountry hikers were very similar across the management zones. Management zone explained between four to twelve percent of the variance for four experience components, less than 1% for the other five components (from Table 4). At best, the magnitude of these relationships is weak and their statistical significance may be attributed to the sample size by which the F-test was calculated. Furthermore, while the pattern of means reflects the management spectrum and the analyses were statistically significant. Only the Social experience component suggested a relevant and practical change across the management spectrum. It went from a positive to a negative importance. Using these traditional analysis techniques, the findings suggest conclusions similar to those traditional findings; experiences are very similar across the management spectrum.

However, a second approach to analysis was to classify the hikers into homogenous sub-groups based on the importance they placed on the experience component and then to examine variability in the size of groups as a proportion of the hikers in the management zone. Assessing patterns in the cluster size by management zone should indicate an effect of the management zone on experiential outcomes. The comparatively larger the cluster, the more the zone "produces"

that experience type. Figure 1 shows a clear relationship between the management zones and the size of the hiker sub-groups. This finding suggests that hiker experiences map onto the management continuum. Looked at this way, these findings provide validation for the assumptions inherent in the EBSM framework.

By replacing average REP score as an indicator of opportunity with experience cluster size reveals a previously hidden attribute of management continua. Traditionally, it was assumed that settings and managerial attributes would each facilitate different experiences and in doing so, managers could satisfy the widest array of visitors (Driver, et al, 1987). The 1982 ROS Users' Guide suggests that the number of opportunities may change across that specific spectrum[3] but previous research has not demonstrated that the number of outcomes changed across the spectrum (Williams, 2007). In the case of the Grand Canyon backcountry, rather than facilitating distinct experiences, the management zones expand or contract the range of experiences facilitated by the setting and managerial attributes. The Threshold zone exemplifies this. The relatively even distribution of the cluster suggests that it provides *something for everyone*, whereas in the Corridor the groups' sizes were relatively lop-sided suggesting it over-performs for (or caters to) a handful of experience groups. This pattern is different than the Users' Guide indicates. In the Users' Guide, the experiences did not expand toward the more developed zones but was most diverse in the zone in the middle of the spectrum. One likely explanation for this divergence is likely that in the case of this research, there was only one activity.

The relatively high score of Blau's index for the management zones could have two interpretations:(1) The management conditions in any one zone were not distinct enough from other zones for hikers to discern differences – it's all the same, and/or (2) The management conditions in the zone were so diverse that they collectively provided preferred conditions for every experience group – something for everyone. For example, Table 5 indicates that the Threshold is associated with the highest index score, compare .79 to .75 (Corridor) and .78 (Primitive/Wild). These findings are interpreted as either the Threshold is enough like both the Corridor and Primitive/Wild that it attracts experience cluster that would otherwise go to these others, and/or that the Threshold has the highest diversity of managerial conditions affording each experience group the ability to fulfill their desired experiences.

Viewing management zones as expanding or contracting the range of available experiences and allowing the ability for the same set of experiential outcomes to be fulfilled by any given zone also helps to resolve the contradictions suggested by earlier research on settings and experiences. The experiences sought by visitors in different management zones might be quite similar, but it is likely each zone over-performs or under-performs for any given set of experiential outcomes. This under or over performance of a setting for any given experience group is an essential assessment for making sense of setting-based management.

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[3]Thanks to one of the reviewers for pointing this out.

An important finding is related to the proportionally large number of "Solitude with Friends" and "Wilderness Adventurers" that visit the Primitive/Wild zones. For both clusters, the Primitive/Wild zones over-perform as attractive zones for each of these experience groups, compare 25.7% of the "solitude setting" experience group in the Primitive/Wild zone with 18.6% in the total population (difference of 7.1%), and 30.0% of the "Wilderness Adventurers" experience group in the Primitive/Wild zone with 12.2% in the total population (difference of 17.8%). Setting-based management at Grand Canyon has purposely designed these two zones to appeal to hikers with strong route-finding capabilities, preferences for low-to-none encounters, and longer trips within remote regions of the backcountry.

The contradiction in earlier research is more fully resolved by changing the dependent variable from experience intensity to size of experience clusters. In this study, our results were similar to those of previous researchers that examined experiential profiles across ROS continua when we examined experience component scores by management zone. The zones were more alike than different. When there were differences, they were small and practically irrelevant. The implications changed when looking at the experience outcome clusters. The differences were large and practically significant. As a result of assuming that management zones would facilitate different experiences there may have been an expectation that the average experience intensity ought to differ across management zones. The ways that experiences might have varied within groups of recreationists could not be accounted, and thus, the importance of experiential outcomes across the management zones looked strikingly similar. Thus, the contradictions were not because settings lack influence on visitor experiences but rather the conclusions varied as artifacts of different methods and analyses to assess the relationships.

For managers and planners, these findings should sensitize them to the messy portrayal of each setting allowing members of any given experience group to find fulfillment. However they could also take comfort in knowing that most members of any given experience group will self-select opportunities in the direction the intentions of the ROS. In addition the findings suggest that when planning recreation opportunities, managers should identify the experiences they can best provide and concentrate on devising management prescriptions that afford that opportunity to the widest array of people. Furthermore, this line of thinking reinforces McCool and Cole's (2001) call for more regional thinking in carrying capacity decisions. They argue that a unit-by-unit approach to planning has led to a suboptimal distribution and homogenization of recreation opportunities. These findings suggest that because visitors respond to management differences, maximizing regional recreation benefits can best be achieved by greater coordination between units within a region so that the unique experiential attributes of a specific site can be enhanced and the diversity of available experiences in a region can be optimized.

The analysis has some important limitations. First, the categorization of the respondents into use zones does not allow for the effects of multiple use zones to be identified. Several visitors traveled across more than one management zone, and thus, their outcomes may be an effect of the collection of the zones encoun-

tered and not map exactly with the management zone in which they were classified. Second, Important factors excluded from this analysis are individual characteristics that may affect hiker's experiences and their management zone choice. Other research has indicated that recreation experiences are also determined by past experience (Williams, Schreyer, & Knopf, 1990), social group type and size (Buchanan, Christensen & Burdge, 1981; Heywood, 1984), and season of use. Many of these were used to help identify the experience outcome clusters but they are likely to be important determinants of the experience outcomes. These may further interact with the on-site experiences and one another to explain hikers' experiential outcomes. Yet, these factors may not change the conclusions of this analysis. What matters ultimately is that the diversity of visitors can find the experience they prefer.

Conclusion

Based on finds presented above, we conclude that overnight backcountry hikers' experiences reflect Grand Canyon National Park's EBSM spectrum. While hikers of all the experience groups can be found across the management zones, the probability that members of the experience outcome clusters were in a management zone vary in a pattern reflecting the management continuum. Furthermore, the contradiction found in the literature we explain by suggesting it is an artifact of different approaches to analysis. Understanding the effect of settings on experiences requires attention to the distribution of experiences within a population. The research presented here reminds us that resource managers are dealing with individuals that are difficult to represent through averages, and that accounting for the variability in populations of visitors has potential for insight.

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