THE RELATIONSHIP BETWEEN EVALUATIVE STANDARDS OF QUALITY AND EXISTING CONDITIONS IN PARKS AND PROTECTED AREAS

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Abstract: In response to rising visitation, many parks and protected areas have adopted indicator-based management frameworks in an attempt to protect natural and cultural resources and the quality of visitor experiences. Indicator-based management frameworks rely on development of indicators and evaluative standards of quality. Indicators of quality are measurable, manageable variables that reflect the quality of natural/cultural resources and visitor experiences. Standards of quality define the minimum acceptable condition of indicator variables. Research to help formulate standards of quality has relied on normative theory and techniques. In this research approach, visitors to parks and related areas are asked to judge the acceptability of a range of recreation-related impacts to natural/cultural resources and the quality of the visitor experience. An issue related to this research is the extent to which normative standards of quality are linked to existing conditions in parks and outdoor recreation areas. This issue has important implications for research and management of national parks and related areas. If societal standards for parks and other components of the environment are shaped by existing conditions, then this may have implications for normative research and may emphasize the importance of maintaining relatively high levels of environmental and experiential quality. Data for this analysis are derived from studies in a number of units in the U.S. National Park System. In these studies, visitors are asked to judge the acceptability of a range of impacts to a variety of natural and social indicators of quality, and to report the actual, or existing condition of those indicator variables they experienced. This study explores the strength and variability of the relationship between existing conditions and evaluative standards of quality using data from studies conducted at 51 sites in the national park system.

Introduction

In response to rising visitor use levels, indicator-based planning frameworks such as Limits of Acceptable Change (LAC) (Stankey et al 1985, Cole and McCool 1997), Visitor Impact Management (VIM) (Graefe et al 1990), and Visitor Experience and Resource Protection (VERP) (National Park Service 1997) are being applied increasingly in U.S. National Parks and related areas to protect natural and cultural resources as well as the quality of visitor experiences (Stokes 1990). Developed from the concept of recreation carrying capacity, these planning and management approaches seek to define the level of resource protection and the type of visitor experience to be provided. In doing so, indicator-based planning frameworks traditionally organize park management into two components: resource and experiential. Once management objectives have been identified, indicators and standards of quality are developed to monitor recreation impacts and guide management actions in an effort to maintain standards of quality over time. Indicators of quality are measurable, manageable variables that reflect the quality of natural/cultural resources and visitor experiences. Standards of quality define the minimum acceptable condition of indicator variables.

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Figure 1. Social Conditions at Kenai Fjords

Some of these studies have used image-capture techniques to simulate existing conditions as well as experiential and/or resource impacts, while in other studies visitors are simply asked to evaluate alternative levels of resource and social impacts that are described in a narrative and/or numerical format. For example, in a study conducted at Kenai Fjords National Park (Manning et al In Press), visitors were asked to rate the acceptability of a series of photographs showing a range of

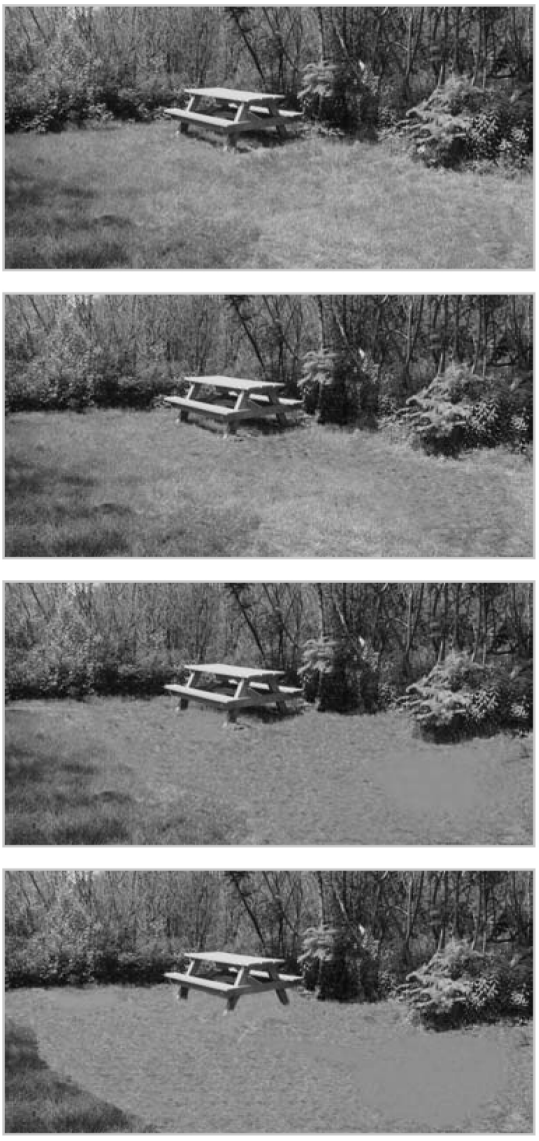

Figure 2. Campsite Impacts at Boston Harbor Islands National Recreation Area

visitor use levels at Exit Glacier, a popular attraction site in the park (Figure 1). Similar studies (Manning et al In Press) have been conducted where visitors were asked to evaluate the acceptability of a series of photographs showing a range of environmental impacts at trails and campsites (Figure 2). Resulting data from studies like these can help provide an empirical basis to formulate socially acceptable standards of quality for resource and experiential conditions.

An important issue related to this research is the extent to which normative standards of quality are linked to existing conditions in parks and outdoor

recreation areas. In other words, to what extent are normative standards of visitors (standards of quality) shaped by conditions visitors experience (existing conditions)? Previous research suggests that existing conditions, or environmental cues can influence standards such as appropriate behaviors in outdoor recreation areas as well as expectations associated with outdoor recreation experiences (Barker 1969, Barker 1968, Barker 1965, Kuentzel and Heberlein 1992, Samdahl and Christensen 1985, Schindler and Shelby 1995, Shelby and Heberlein 1986, Wicker 1979, Willems 1973, Willems 1974, Willems 1977). From this body of literature, the question of the relationship between existing conditions and evaluative standards of quality with respect to indicator-based planning frameworks emerges. If existing conditions are strongly linked to, and perhaps even shape evaluative standards of quality, this suggests that park visitors may be identifying evaluative standards of quality that simply reflect existing conditions they encountered during their visit, rather than "objective" evaluative standards of quality. In other words, it may be the case that visitors are simply expressing the existing conditions they experienced in terms of evaluative standards of quality. This issue has important implications for management of parks and protected areas. If evaluative standards of quality are shaped by existing conditions, then socially acceptable standards of quality may simply reflect the acceptable standards of quality may simply reflect the existing conditions experienced by visitors at any given time, thereby perpetuating the management status quo. In some instances, this may result in the loss of ecological integrity and/or opportunities for high quality experiences at parks and protected areas. To explore this further, we examined the strength and variability of the relationship between existing conditions and evaluative standards of quality among visitors to 10 different units of the U.S. National Park System.

Methods

Data for this analysis are derived from visitor studies at 51 sites in 10 different units of the U.S. National Park System (Table 1). Study sites ranged from Kenai Fjords National Park, AK to Acadia National Park, ME, and included NPS units near urban centers (e.g., Boston Harbor Islands National Recreation Area) as well as NPS units in more remote locations (e.g., Yosemite National Park). In these studies, visitors were asked to evaluate the level of a variety of recreation-related impacts such as crowding, ecological degradation, automobile traffic, graffiti, and litter in terms of four evaluative standards: preference, acceptability, displacement, and management action. Survey questions used to measure these evaluative standards are shown in Table 2. To measure this, at some study sites visitors were shown a series of photographs depicting a range of impact levels and asked to identify the photograph representing each evaluative standard. For example, visitors to Boston Harbor Islands National Recreation Area were shown a series of photographs depicting a range environmental impact at campsites on the islands (Figure 2), and asked to evaluate these photographs in terms of preference, acceptability, displacement, and management action (Table 2). In addition to ecological impacts, this technique was used at other units of the national park system to measure evaluative standards associated with crowding, graffiti, litter, and automobile traffic. Responses to the visual components of the survey were reported to the National Park Service to help provide an empirical basis for formulating evaluative standards of quality. At other study sites, photographs were not used and visitors were asked to formulate evaluative standards of quality by responding to a narrative and/or numeric questionnaire. Resulting data from these questions have helped provide an empirical basis to formulate socially acceptable standards of quality at U.S. National Parks and related areas, as well as generated the data for the 'standards of quality' variables in this analysis.

Along with judging the photographs in terms of evaluative standards, visitors were asked to identify which photograph looked most like the existing conditions, or impact levels they encountered during their visit. For example, visitors at Boston Harbor Islands National Recreation Area were asked to identify which photograph looked most like the amount of environmental impact along trails and at campsites they typically saw during their visit. Results from these questions generated the data for the 'existing condition' variables in this analysis.

Table 1. — National Parks and Study Sites

NPS Unit	Number of Study Sites
Acadia National Park	5
Alcatraz Island – Golden Gate National Recreation Area	1
Arches National Park	1
Appalachian Trail	1
Boston Harbor Island National Park Area	23
Grand Canyon National Park	1
Kenai Fjords National Park	1
Mesa Verde National Park	6
Statue of Liberty National Park	1
Yosemite National Park	11
Total	51

Initial frequency distribution and cross-tabular analysis revealed that data for these variables are not normally distributed, and that a curvilinear relationship exists between existing condition and standards of quality variables. As a result, Crámer's V was used to measure the strength of association between existing condition and standard of quality variables. For each study site presented in Table 1, a Crámer's V coefficient was calculated between standards of quality variables (Table 2) and the existing condition variable for that study site. Cases with sample sizes less than 30, or constant values for either standard of quality or existing conditions variables were discarded, yielding a total of 181 Crámer's V coefficients.

As a statistical measure of association, Crámer's V coefficients are interpreted on a 0 - 1 scale, where 0.0 - 0.3 indicates a "weak" association, 0.31 - 0.60 indicates a "moderate" association, and 0.61 - 1.0 indicates a "strong" association between variables (Fox 1998, Humpries 2001). Crámer's V coefficients generated in this analysis were organized into a frequency distribution table. Once in tabular form, we calculated the percentage of studies with weak associations (0.0 - 0.3), moderate associations (0.31 - 0.60), and strong associations (0.61 - 1.0).

Table 2. — Evaluative Standards of Quality

Evaluative Standard of Quality	Survey Question Used to Measure Standard
Preference	Which photograph shows the highest level of use you would prefer to see?
Acceptability	Which photograph shows the highest level of use that you think would be acceptable to see?
Displacement	Which photograph shows the level of use that would be so unacceptable that you would no longer visit this site?
Management Action	Which photograph shows the highest level of use you think the National Park Service should allow

Results

Crámer's V coefficients ranged from .021 between 'existing conditions' and 'preference' variables for litter impacts on Little Brewster Island, (Boston Harbor Islands National Park Area), to .74 between 'existing conditions' and 'preference' variables for ecological impacts to trails on Grape Island (Boston Harbor Islands National Park Area). Despite this range, the majority of studies exhibited either weak (66.4%) or moderate (29.8%) associations between standard of quality and existing conditions variables, while few studies (3.8%) were characterized by strong associations between existing condition and standard of quality variables (Table 3). More broadly, these data indicate that the vast majority of studies (96.2%) exhibit weak to moderate associations between existing condition and evaluative standard of quality variables.

Because association is a necessary condition of a causal relationship between independent and dependent variables, results from this study suggest there may not be a direct, causal relationship between existing condition and evaluative standard of quality variables as employed by the normative approach in the development of evaluative standards of quality.

Table 3. — Standards of Quality

Strength of Association	Cramer's V	Frequency	% of Studies
weak	.00-.10	7	3.8%
	.11-.20	66	35.9%
	.21-.30	49	26.7%
moderate	.31-.40	26	14.1%
	.41-.50	20	10.8%
	.51-.60	9	4.9%
strong	.61-.70	5	2.7%
	.71-.80	2	1.1%

Management Implications

Results from this study have at least three broad implications for the application of indicator-based planning frameworks in the management parks and protected areas. These implications are 1) visitors appear to have relatively 'objective' evaluative standards of quality for relevant indicator variables, 2) there may be an important difference in the relationship between existing conditions and evaluative standards of quality (i.e. preference, acceptability, etc.) compared to the relationship between existing conditions and visitor expectations, 3) managers must continue to recognize and emphasize the importance of visitor education to achieve agency-mandated conservation goals.

Results from this study suggest that although existing conditions are related to evaluative standards of quality to some degree, this relationship, in a general sense, is characterized by a relatively weak association. Therefore, it appears that visitors are identifying standards of quality in a relatively 'objective' manner. In other words, visitors are evaluating resource and/or experiential conditions based on criteria in addition to, not solely on, existing conditions. When applied to the context of park and protected area management, this suggests that use of indicator-based planning frameworks does not necessarily perpetuate the 'management status-quo'. The status-quo issue is conceptually related to the notion of 'product shift' first discussed by Heberlein (1977). The idea Heberlein (1977) introduced, which has received subsequent attention in the literature (e.g., Shelby and Heberlein 1986, Kuentzel and Heberlein 1992, Schindler and Shelby 1995), centers around the notion that when faced with increasing levels of social and/or environmental impacts, visitors will change the definition of their recreational experience and adjust their normative standards to fit existing conditions. As a result, visitors will continue to be satisfied by recreational experiences even though conditions at various sites may have deteriorated. For example, Heberlein writes, "while those few who experienced the Grand Canyon before 1960 may be appalled by 1970 use levels...most visitors may not notice" (Heberlein 1977, p.71). Thus, 'product shift' can act as a temporal mechanism that may lead to loss of experiential and/or resource quality in parks and protected areas. Similarly, perpetuating the 'management status-quo' may also result in a loss of experiential and/or resource quality in parks and protected areas. For example, if existing conditions are strongly influencing evaluative standards of quality, then evaluative standards of quality may simply reflect existing conditions at that moment. If, in this example, existing conditions are deteriorating over time, then evaluative standards of quality may be formulated that simply reflect and perpetuate lower-quality sets of existing conditions, resulting in a loss of experiential and/or resource quality. While 'product shift' remains an important issue, findings from this study suggest that existing conditions and evaluative standards of quality are not strongly linked, and therefore use of indicator-based planning frameworks do not necessarily perpetuate the 'management status-quo'.

In addition, findings from this study suggest there may be a difference in the relationship between existing conditions and evaluative standards of quality (i.e. preference, acceptability, etc.) compared to the relationship between existing conditions and visitor expectations. Previous research has shown that existing conditions can affect visitor expectations and preferences with respect to outdoor recreation experiences (Chambers and Price 1986, Shelby and Heberlein 1986, Neilson and Endo 1977). However, it has been suggested that existing conditions influence evaluative standards of quality to the same degree that existing conditions influence visitor expectations. For example, Shelby and Heberlein (1986) maintain that visitors may alter their expectations and preferences in response to perceived crowding. This assumption is supported by a large body of social psychology literature (e.g. Lawler 1973) that demonstrates and discusses the role existing conditions play in the formulation of expectations. In addition, several studies in outdoor recreation have shown that visitors may alter their preferences to conform to existing conditions (e.g., Kuentzel and Heberlein 1992). Although results from our study also suggest there is a relationship between existing conditions and evaluative standards of quality, this relationship appears to be relatively weak. Therefore, it remains unclear whether existing conditions influence evaluative standards of quality to the same degree that existing conditions influence visitor expectations. While subtle, recognizing this

difference may contribute to a broader understanding of how visitors formulate evaluative standards of quality with respect to changing social and environmental conditions within parks and protected areas.

Finally, results from this study suggest that natural resource managers must continue to recognize the importance of visitor education to achieve agency-mandated conservation goals. Because the relationship between existing conditions and evaluative standards of quality appears to be relatively weak, this suggests that visitors may be using a variety of criteria in evaluating social and environmental conditions. As a result, management strategies should continue to emphasize the use of educational programs to develop congruence between agency conservation objectives and evaluative standards of quality. This discussion speaks directly to the issue raised by Dennis Galvin, former Deputy Director of the National Park Service in his keynote address at this conference. In his address, Mr. Galvin argued that in 25 years, if NPS visitors are still satisfied with their experiences even though numerous species have become extinct, then the agency has failed. Within this context, it becomes clear that visitor education can be a valuable tool for achieving conservation objectives within parks and protected areas. Furthermore, previous research (e.g., Light 2000) suggests that educational programs, such as restoration initiatives, may have broader social significance because they increase public awareness with respect to environmental problems within parks and protected areas as well as within the communities in which park visitors live.

Future Research

As this paper suggests, the relationship between existing conditions and evaluative standards of quality is a broad question with implications for parks and protected areas, and beyond. Although a fairly large body of literature addresses issues related to how visitors evaluate changing experiential and resource conditions over time, two important questions emerge from this study. First, from a park and protected area management perspective, it is important to understand how the relationship between existing conditions and evaluative standards of quality affects carrying capacity. Conceptually, it seems likely that study sites with high correlations, or strong relationships between existing condition and evaluative standards of quality variables may be at carrying capacity. For example, if visitors to the Yosemite backcountry report that existing encounter levels are at their standard for 'acceptability', then this relationship should also be reflected by a high correlation between existing condition and standard of quality variables. Although this explanation is theoretically possible, an empirical exploration should be conducted to test its validity.

Second, it is important to further explore, empirically, the difference in the relationship between existing conditions and visitor expectations compared to the relationship between existing conditions and evaluative standards of quality. Articulating this difference in greater detail will only contribute to the understanding of how visitors evaluate changing experiential and resource conditions and may provide insight into the refinement of park and protected area management strategies.

References

Barker, R. G. (1969). Wanted: an eco-behavioral science. In E. P. Williams and H. L. Rush (eds.) Naturalistic Viewpoints in Psychological Research. New York: Holt, Rinehart& Winston.

Barker, R. G. (1968). Ecological psychology: Concepts and methods for studying the environment of human behavior. Stanford, CA: Stanford University Press.

Barker, R. G. (1965). Explorations in ecological psychology. American Psychologist 20:1-14.

Chambers, T. W. M., and C. Price (1986). Recreational congestion: Some hypotheses tested in the Forest of Dean. Journal of Rural Studies, 2(1), pp. 41-52.

Cole, D., and S. McCool. (1997). The Limits of Acceptable Change Process: Modifications and clarifications. Proceedings - Limits of Acceptable Change and Related Planning Processes: Progress and Future Directions. USDA Forest Service General Technical Report INT-371, 61-68.

Fox, W. (1998). Social Statistics, 3rd Edition. Bellevue, WA: Microcase Corporation.

Graefe, A., F. Kuss, J. Vaske. (1990). Visitor Impact Management: The Planning Framework. Washington, D.C.: National Parks and Conservation Association.

Heberlein, T. (1977). Density, crowding, and satisfaction: Sociological studies for determining carrying capacities. Proceedings: River Recreation Management and Research Symposium. USDA Forest Service General Technical Report NC-28, 67-76.

Humphries, D. (2001). Basic Rules for Interpreting Cross Tabulation Website. Retrieved June 18, 2002 from the World Wide Web: http://crab.rutgers.edu/~humphri/CramersV.htm.

Kuentzel, W., and T. Heberlein (1992). Cognitive and behavioral adaptations to perceived crowding: A panel study of coping and displacement. Journal of Leisure Research, 24, 377-93.

Lawler, E. E. (1973). Motivation in Work Organizations. San Francisco, CA: Jossey - Bass.

Light, A. (2000). Restoration, the Value of Participation, and the Risks of Professionalization. In P. Gobster and B. Hull (Eds.) Restoring Nature: Perspectives from the Social Sciences and Humanities. Washington, D.C.: Island Press.

Manning, R., B. Valliere, D. Johnson, and M. Vande Kamp. (In Press). Research to support Carrying Capacity at Kenai Fjords National Park. Data on file at the Park Studies Lab, University of Vermont, 05405.

Manning, R, M. Budruk, and D. Laven (In Press). Research to support Carrying Capacity at Boston Harbor Islands National Recreation Area. Data on File at Park Studies Lab, University of Vermont, 05405.

National Park Service. (1997). VERP: The Visitor Experience and Resource Protection (VERP) Framework: A handbook for Planners and Managers. Denver, CO: Denver Service Center.

Neilson, J., and R. Endo (1977). Where have all the purists gone? An empirical examination of the displacement hypothesis in wilderness recreation. Western Sociological Review, 8, pp. 61-65.

Samdahl, D.M., and H. Christensen. (1985). Environmental cues and vandalism: An exploratory study of picnic table carving. Environment and Behavior, 17(4), July 1985, pp. 445-458.

Shelby, B., and T. Heberlein (1986). Carrying Capacity in Recreation Settings. Corvallis, OR: Oregon State University Press.

Shindler, B. and B. Shelby (1995). Product Shift in Recreation Settings: Findings and Implications from Panel Research Leisure Sciences, 17, pp. 91-107.

Stankey, G., D. Cole, R. Lucas, M. Peterson, S. Frissell, and R. Washburne. (1985). The Limits of Acceptable Change (LAC) System for Wilderness Planning. USDA Forest Service General Technical Report INT-176.

Stokes, G. L. (1990). The evolution of wilderness management: The Bob Marshall wilderness complex. Journal of Forestry. 88:15-20.

Wicker, A. W. (1979). An Introduction to Ecological Psychology. Monterey, CA: Brooks/Cole.

Willems, E. P. (1977). Behavioral ecology. In D. Stokols (ed.) Perspectives on Environment and Behavior: Theory Research, and Application. New York, Plenum Press.

Willems, E. P. (1974). Behavioral technology and behavioral ecology. Journal of Applied Behavioral Analysis 7: 151-165.

Willems, E. P. (1973). Behavioral ecology as a perspective for man-environment research. Pp. 152-1666 in W. F. E. Preiser (ed.) Environmental Design Research. Vol. 2, Stroudsburg, PA: Dowden, Hutchison & Ross.

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