ULSC #335469, VOL 30, ISS 05

A Meta-Study of the Values of Visitors to Four Protected Areas in the Western United States

RANDY J. TANNER, WAYNE A. FREIMUND, WILLIAM T. BORRIE, AND R. NEIL MOISEY

QUERY SHEET

This page lists questions we have about your paper. The numbers displayed at left can be found in the text of the paper for reference. In addition, please review your paper as a whole for correctness.

Q1: Au: publisher location?

TABLE OF CONTENTS LISTING

The table of contents for the journal will list your paper exactly as it appears below:
A Meta-Study of the Values of Visitors to Four Protected Areas in the Western United States
Randy J. Tanner, Wayne A. Freimund, William T. Borrie, and R. Neil Moisey

Leisure Sciences, 30: 1–14, 2008

ISSN: 0149-0400 print / 1521-0588 online
DOI: 10.1080/01490400802353026

Routledge
Taylor & Francis Group

A Meta-Study of the Values of Visitors to Four Protected Areas in the Western United States

RANDY J. TANNER
WAYNE A. FREIMUND
WILLIAM T. BORRIE
R. NEIL MOISEY

Department of Society and Conservation
University of Montana
Missoula, Montana, USA

The values that visitors assign to protected areas influence the way they relate to those areas. Because of the diversity of objectives and missions associated with protected areas, values might be equally diverse. The purpose of this study is to identify through confirmatory factor analysis the structure of values assigned to one protected area compared to other protected areas. By employing visitor survey data from four protected areas in the western United States, the results demonstrate that some assigned values were common to all of the areas, while others were specific to the type of protected area. Understanding how and why assigned values vary by protected area is likely to be useful as managers confront complex and conflict-laden issues.

Keywords confirmatory factor analysis, protected areas, survey research, values

The study of how societies interact and relate to protected areas has given rise to competing theories and ideas over the past several decades. One principle that has garnered wide acceptance is that values are important determinants of interactions and relationships. Yankelovich (1991) discussed how values are higher, more stable and more enduring forms of public judgment that "reflect the individual's ideals and goals" (p. 123). More specifically, *values* may be thought of as "an enduring conception of the preferable, which influences choice and action" (Brown, 1984, as cited in Manning, Valliere, & Minteer, 1999, p. 422). Generally speaking, the importance of values lies in the assumption that "values lead us to regard some goals or ends as more legitimate or correct and other goals as illegitimate or wrong" (Myers & Close, 1998, p. 291).

The importance of values has been particularly apparent in the management of visitors to protected areas. As demand for the services that protected areas provide has increased (English, Marcoullier, & Cordell, 2000) and as constituencies of these protected areas have become increasingly diverse (McKinney & Harmon, 2004), the practice of visitor management has become correspondingly more complex. Consequently, managers are increasingly faced with social conflict rooted in values both held by individuals and assigned to protected areas (Vaske, Needham, & Cline, 2007). Since these values manifest in broader

Received 1 June 2007; accepted 18 September 2007.

The authors would like to thank the graduate students who collected much of the data discussed in this article and the anonymous reviewers for their timely and helpful comments.

Address correspondence to Randy J. Tanner, Department of Society and Conservation, The University of Montana, 32 Campus Dr., Missoula, MT 59812. E-mail: randy.tanner@umontana.edu

societal discussions or debates on the environment, the operationalizing of these values occurs in courts, planning processes, and public meetings.

An important and evident trend in the study of protected areas is that scholarship has broadened to include meaning-bound concepts, such as place attachment. These approaches have rekindled an interest in the role values have in forming the basis of visitor relationships to protected areas. This trend is largely the result of acknowledging that values fundamentally shape experience motivations (Borrie, Freimund, & Davenport, 2002; Manfredo, Teel, & Bright, 2003), attitudes related to ecosystem management (Manning et al., 1999), voting preferences (Vaske & Donnelly, 1999), social conflict (Vaske et al., 2007), land classification (Raymond & Brown, 2006) and support for conservation (Vining & Saunders, 2004).

The importance of values for protected area management and governance is relatively uncontested. Thorough conceptual treatments have been offered (e.g., Borrie et al., 2002; Fulton, Manfredo, & Lipscomb, 1996; Manning et al., 1999; Vaske et al., 2007). Nevertheless, little empirical research has been conducted aimed at understanding how the values visitors assign to protected areas either vary or remain constant across protected areas. Such information would not only be interesting from a theoretical perspective but would also be useful to protected area managers. Identifying how values do or do not vary across protected areas could, for instance, assist managers in more accurately predicting support for management actions or identifying scenarios where user conflict might arise.

Study Purpose

The purpose of this meta-study was to explore values based on four previously conducted studies of the values visitors assign to protected areas (Borrie et al., 2002; Cauley, 2004; Carson, 2005; Manning, Freimund, & Marion, 2004). These studies were conducted at Yellowstone National Park (Borrie et al., 2002), Zion National Park (Manning et al., 1999), the Missouri National Wild and Scenic River (Montana; Carson, 2005) and Birds of Prey National Conservation Area (Idaho; Cauley, 2004). In each study, researchers distributed visitor surveys that included the same 24 item "values scale." In all cases, exploratory factor analysis or principal components analysis was employed to identify the structure of assigned values. Our overarching research question for this study was: how does the value structure from one protected area fit the values that visitors assign to other protected areas? To respond to this question, we conducted confirmatory factor analyses of the values scale employed in each of the four studies identified above.

We begin by providing an overview of the values scale first used by Borrie et al. (2002) in Yellowstone National Park, as well as a sample of results from the Yellowstone and Birds of Prey (Cauley, 2004) studies. We then describe the confirmatory factor analysis procedure employed to test the fit of certain value structures against the respective datasets. Next, we discuss how two values structures emerged from that analysis, including one that exhibited the best fit for the National Parks datasets and another that exhibited the best fit for the other two datasets. Despite some commonalities, important differences were found between the two values structures. We conclude by discussing possible explanations for this difference, as well as recommendations for the study of protected area values.

Scale for Exploring Protected Area Visitors' Values

Each of the studies used in the meta-study employed the same values scale within the context of different research purposes. The Yellowstone study (Borrie et al., 2002) was an exploration of visitor preferences for winter conditions and their support for winter use

management actions. The Zion study (Manning et al., 2004) was aimed at understanding the Visitor Experience and Resource Protection (VERP) planning framework and informing a backcountry management plan. The Birds of Prey study (Cauley, 2004) was conducted in order to understand social justice dimensions of protected areas. The Missouri River study (Carson, 2005) was aimed at understanding the historical and recreational significance of the Lewis and Clark Bicentennial. See Table 1 for a summary of these studies. Though situated within different studies, the same values scale (see Table 2) was presented to all respondents to obtain a better understanding of the values visitors assign to protected areas. Respondents were asked to respond on Likert-type scales whether they agreed or disagreed with the item statements.

The scale was first employed in the Yellowstone study led by Borrie et al. (2002). They discussed how the 24-item scale was not developed as a result of preliminary qualitative research as many scales are, but was based on a "review of the literature concerning the National Park idea, in particular the work of Henneberger (1996)" (Borrie et al., p. 43). In general, and as illustrated in Table 2, the scale items broadly refer to foundational, historic, recreational, wildlife, and spiritual values that are commonly used to describe National Park. In the Yellowstone study, a principal components analysis of responses to the scale items led to the identification of four values dimensions: natural values (e.g., "protection of fish and wildlife habitat"), symbolic and historic values (e.g., "a symbol of America's identity"), recreation and tourism values (e.g., "a tourist destination"), and personal growth and development values (e.g., "a place to develop my skills and abilities") (p. 44).

Although the values scale was developed within the context of National Parks, the values underlying the scale items also pertain to broader discussions of protected areas, in general. As such, the scale was also employed in two non-National Park settings: the Birds of Prey National Conservation Area (Cauley, 2004) and the Missouri National Wild and Scenic River (Carson, 2005). In the Birds of Prey study (Cauley), a *natural values* dimension emerged as did in the Yellowstone (Borrie et al., 2002) and Zion (Manning et al., 2004) studies. Rather than constituting a single dimension, *tourism* and *recreation values* emerged as two separate dimensions. Moreover, a *historic and symbolic values* dimension did not emerge at all in the Birds of Prey study, as it did in the Yellowstone study. In the Missouri River study, the values structure consisted of dimensions that described *environmental values*, *historic values*, and *social values*.

Heuristically, a comparison of values structures across all four protected areas could be based on the original analyses performed. For instance, we might conclude that, structurally speaking, *symbolic and historic values* are not as apparent among visitors to Birds of Prey (Cauley, 2004) as they are to Yellowstone visitors (Borrie et al., 2002). Two observations, though, render this approach weak. First, different analytic methods were performed in each study. For example, in the Yellowstone study principal components analysis was used, whereas in the Zion study (Manning et al., 2004) exploratory factor analysis was employed. Moreover, each analysis used different factor loading suppression levels and factor rotation methods. Comparing the studies in their original form would, methodologically speaking, be a comparison of apples and oranges. Second, in each study the analyses gave rise to the extraction of one "best" model, depending on the method of component or factor extraction. A number of values structures might exhibit good fit for the dataset, but the analyses only gave rise to the best or optimal models. For example, the absence of a *symbolic and historic values* dimension in the best or optimal extracted model for the Birds of Prey dataset does not imply that such a dimension necessarily exhibits poor fit for the dataset. Through the confirmatory factor analysis procedure, we sought to determine whether or not factor models derived from one dataset would exhibit good fit for the others.

TABLE 1 A Summary of the Four Values Studies

	Feature		Study	
	Yellowstone	Zion	Birds of Prey	Missouri River
Study citation	Borrie, Freimund, & Davenport, 2002	Manning, Freimund, & Marion, 2004	Cauley, 2004	Carson, 2005
Survey type	Mail-back survey	On-site and mail-back surveys	On-site surveys	On-site
Sampling method	Multistage cluster sampling	Multistage cluster sampling	Multistage cluster sampling	Quota sampling
Sample size	1064	1099	213	271
Response rate	71%	80%	90%	91%
Analytic method	Principal components	Exploratory factor analysis	Principal components	Principal components
Values structure (i.e., factors or components extracted)	Natural Values	Natural Values	Natural Values	Environmental Values
	Historic and Symbolic Values	Historic and Symbolic Values	Tourism and Personal Growth Values	Historic Values
	Recreation and Tourism Values	Recreation and Tourism Values	Recreation Values	Social Values
	Personal Growth and Development Values	Freedom Values		
		Scenic Beauty Values		

TABLE 2 I believe Yellowstone National Park Is Particularly Important As:

Item
A wildlife sanctuary
A place for education about nature
A place to develop my skills and abilities
A protector of threatened and endangered species
A sacred place
An economic resource
A family or individual tradition
A place everyone should see at least once in their life
A place without most types of commercial development
A display of natural curiosities
A historic resource
A symbol of America's identity
A place for the use and enjoyment of the people
A social place
A site to renew your sense of personal well being
A place of scenic beauty
A place to be free from society and its regulations
A reserve of natural resources for future use
A tourist destination
A place for scientific research and monitoring
A place for recreational activities
A place for wildness
A place for all living things to exist
Protection of fish and wildlife habitat

Methods

Confirmatory factor analysis was employed in this meta-study to determine how well different values structures conformed to or fit the values visitors assigned to the four protected areas in question. In exploratory factor analysis, the values structure emerges from the dataset in a quasi-inductive way. With confirmatory factor analysis, a structure is deductively imposed on the dataset and its fit is tested. Through confirmatory factor analysis we were able to craft factor models that represented values structures and test them against each of the four datasets. In doing so, a model might exhibit good fit for a dataset but look very different than the best or optimal model derived through exploratory factor analysis. If a particular factor model exhibits good fit for two or more datasets, the value structure it represents is common to those datasets. If, on the other hand, if a model that exhibits good fit for those datasets does not exist, then the values structures of those datasets differ in some way.

With such an approach, model selection and design is a critical initial step. Confirmatory factor models may be designed on the basis of different considerations whether theoretical or empirical. Based on the empirical findings from the Yellowstone (Borrie et al., 2002) cite and Birds of Prey (Cauley, 2004) studies, we reasonably asserted that a *natural values* factor in a model comprised items such as "A wildlife sanctuary," "A place for wildness" or "Protection of fish and wildlife habitat." For theoretical reasons, however, one might posit

that a model should consist of an *economic/utilitarian values* factor consisting of items such as "An economic resource" and "A reserve of natural resources for future use." However, no empirical evidence to support this factor was found in the four studies analyzed. Either approach to model selection (i.e., theoretical or empirical or a mix) is valid in a confirmatory factor analysis framework.

For this meta-study, we employed an empirical approach to model selection based on models derived through exploratory factor analysis of each dataset. We tested, for example, how a values structure associated with Zion visitors (Manning et al., 2004) fit the values visitors assigned to the Missouri River (Carson, 2005). Four factor models representing four different values structures were tested against each dataset for a total of 16 confirmatory factor analyses. Because the researchers who initially analyzed the respective datasets employed different analytic methods for deriving the factor models, each dataset was re-analyzed in a consistent manner to reduce methodological bias. We adopted a relatively standard approach to exploratory factor analysis by using maximum likelihood extraction with varimax rotation and suppressing item loadings less than .6. The results of these four analyses are presented in Table 3. Because of the different analytic approaches, slightly different models emerged from this analysis compared to the original analysis (e.g., the Yellowstone model extracted from this analysis does not include what might be labeled a *personal growth and development* dimension that was evident in the original analysis; Borrie et al., 2002).

The second and final step in the analysis consisted of sixteen confirmatory factor analyses where each of the four factor models derived in the first step was fitted against each of the four datasets. As an illustration, a visual representation of the model derived from the exploratory factor analysis of the Yellowstone dataset (Borrie et al., 2002) is presented in Figure 1. The confirmatory factor analyses were performed with the software package EQS version 6.1. Because the data are categorical, fit statistics were obtained through robust estimation and the use of polychoric correlations (DiStefano, 2002; Mislevy, 1986; Olsson, Drasgo, & Doransm, 1982). Further, because model comparison for each dataset involved nonnested models, Akaike's Information Criteria (AIC) rather than a robust chi-square measure was used to compare the fit of the four models (Ting Hsiang Lin & Dayton, 1997). Three measures of fit were obtained for each confirmatory factor analysis:

- Akaike's Information Criteria (AIC). The model exhibiting the lowest AIC for a particular dataset is indicative of the best fit.
- Comparative Fit Index (CFI). A CFI score greater than .95 is indicative of "excellent" fit, and a CFI score of .9 to .95 is indicates "good" fit.
- Standardized Root Mean Residual (SRMR). For models of categorical data, the SRMR should be less than or equal to .08 for "good" fit and between .08 and .1 for "adequate fit."

For a general discussion of fit indices and these criteria, see Hu and Bentler (1999), Kyle, Graefe, Manning, and Bacon (2004), and Yu (2002).

Results

The fit statistics obtained through confirmatory factor analysis for each model and dataset are shown in Table 4. Two models emerged through the analysis that exhibited excellent fit. The factor model derived through the exploratory factor analysis of the Yellowstone dataset (Borrie et al., 2002), which consisted of three factors that emphasized values related to *learning about and protecting wildlife*, *tourism and recreation* and *historical identity* (see Figure 1), produced excellent fit for both the Yellowstone (Borrie et al.) and Zion (Manning

TABLE 3 Factor Loadings and Reliability Scores for Exploratory Factor Analyses

	Yellowstone			Zion				Missouri River		Birds of Prey		
Scale item	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 1	Factor 2	Factor 3
A wildlife sanctuary	0.845			0.842				0.89		0.693		
A place for education about nature	0.617			0.708				0.629		0.737		
A place to develop my skills and abilities							0.62				0.784	
A protector of threatened and endangered species	0.752			0.883				0.767		0.726		
An economic resource											0.624	
A family or individual tradition											0.752	
A display of natural curiosities									0.62	0.709		
An historic resource			0.692		0.689				0.835	0.711		
A symbol of America's identity			0.619		0.666				0.654		0.618	
A place for the use and enjoyment of the people		0.766										0.621
A social place						0.644					0.746	
A site to renew your sense of personal well being							0.687				0.718	
A place of scenic beauty									0.714			0.614
A tourist destination		0.709				0.811						
A place for scientific research and monitoring				0.605						0.719		
A place for recreational activities		0.712										
A place for wildness												0.627
A place for all living things to exist				0.603								0.834
Protection of fish and wildlife habitat	0.841			0.819				0.678				0.734
Cronbach's alpha	.8422	.7948	.7786	.8853	.6583	.7144	.5848	.8463	.8354	.9238	.8791	.9244

Note: Factor loadings lower than .6 are suppressed.

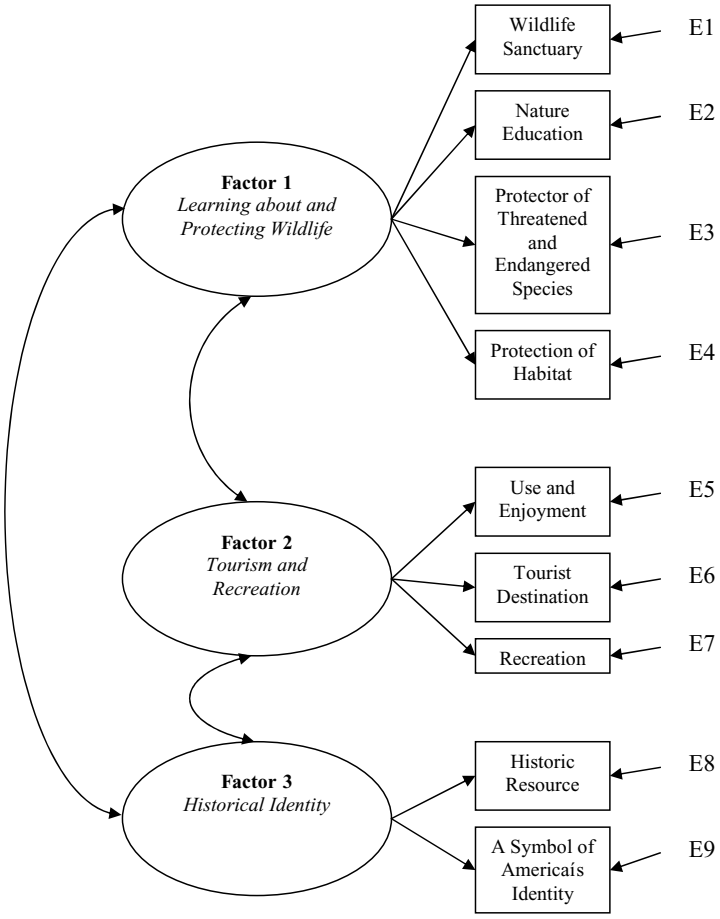

FIGURE 1 Factor model derived from the Yellowstone dataset (a.k.a., "The Parks Model"). *Note*: E1 to E9 represent measurement errors, which is the indicator variance not explained by the factors.

et al., 2004) datasets. To prevent any confusion, we label this model the "Parks Model." The factor model derived from the exploratory factor analysis of the Missouri River dataset (Carson, 2005), consisting of two factors describing values related to *Learning about and Protecting wildlife* and *identifying with history and Nature* (see Figure 2), demonstrated **200** excellent fit for the Missouri River and Birds of Prey (Cauley, 2004) datasets. To prevent confusion, we labeled this model the "Conservation Area Model." As illustrated in Tables 5 and 6, each factor for the two models had acceptable Cronbach alphas. For factors with less than 6 items, .6 is generally used as the cutoff criteria (see, e.g., Kyle et al., 2004).

A particular model exhibiting better fit for a dataset than the model that was derived **205** from that dataset may seem counterintuitive. The Parks Model derived from the Yellowstone dataset (Borrie et al., 2002), for instance, exhibited better fit for the Zion dataset (Manning et al., 2004) than did the Zion model. This phenomenon can be attributed to the parsimonious nature of the four models employed in the analysis. By including only a subset of the total scale items in the models, no assurance exists that a particular factor **210** model will demonstrate the best fit for the dataset from which it was derived. Excluding a subset of scale items from a model (i.e., in this case those items that had a loading of less than .6) changes the covariance structure of the model to the extent that the model

TABLE 4 Fit Statistics for Confirmatory Factor Analyses of Values Models

	Model											
	Yellowstone Model			Zion			Birds of Prey			Missouri River		
Dataset	AIC	CFI	SRMR	AIC	CFI	SRMR	AIC	CFI	SRMR	AIC	CFI	SRMR
Yellowstone	**64.17**	**.978**	**.051**	214.7	.948	.082	122.8	.655	.109	103.9	.971	.067
Zion	**136.1**	**.962**	**.058**	447.7	.924	.070	1569	.703	.115	202.3	.952	.079
Birds of Prey	14.04	.910	.059	3.925	.984	.073	21.56	.940	.075	**−1.232**	**.994**	**.038**
Missouri River	15.00	.960	.070	96.95	.892	.091	271.29	.638	.117	**7.832**	**.977**	**.067**

Note: Bolded fit statistics identify the models with the best fit.

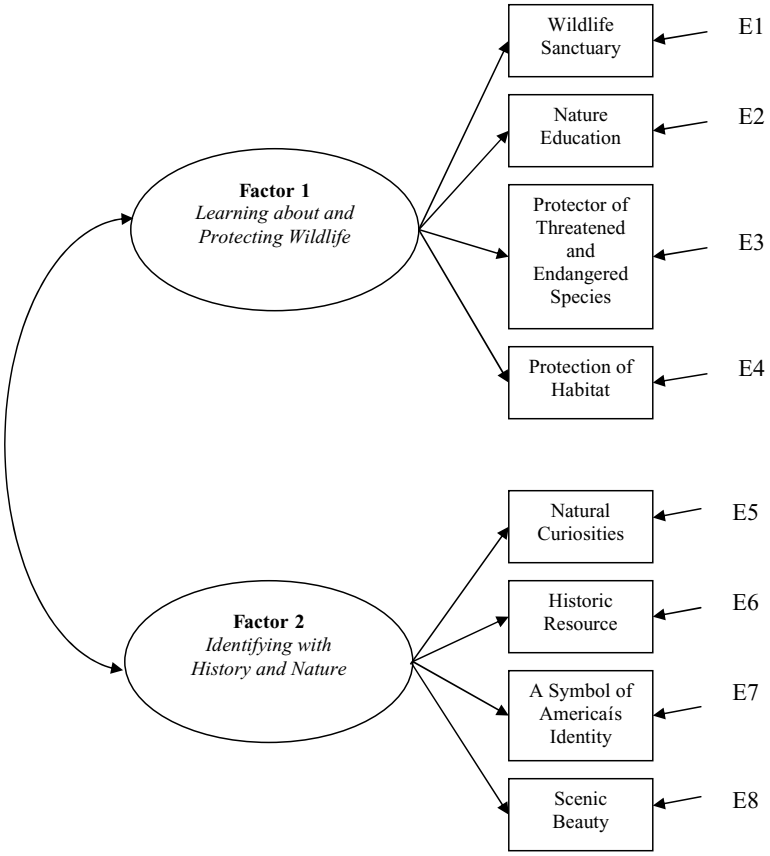

FIGURE 2 Factor model derived from the Missouri River dataset (a.k.a., "The Conservation Areas Model").

might not exhibit good fit for the data from which it was derived. The models derived from the Zion and Birds of Prey datasets, however, would have demonstrated the best fit for their respective datasets if the models had accounted for the effects of all twenty-four scale items on all possible factors (i.e., even those factors where all items loaded lower than .6). But, using such full models, where each item is specified to load on every factor, would have precluded the construction of parsimonious factor models that could be meaningfully evaluated across all four datasets.

For both the Parks and Conservation Areas models, the confirmatory factor loadings were all statistically significant ($p < 0.05$) with relatively small standard errors (SE $<$ 0.10). All of the loadings ranged from 0.47 to 0.94 with the exception of *historic resource*'s loading on the Missouri River dataset (Carson, 2005), which loaded at 0.19. Moreover, each factor demonstrated acceptable reliability (see Tables 5 and 6).

Discussion

Understanding the structures of values visitors assign to protected areas is important both to researchers and protected area managers because values provide the foundation for the way visitors relate to protected areas. Borrie et al. (2002), for instance, found the values of visitors to Yellowstone National Park were important predictors of support for or opposition

TABLE 5 Factor Loadings and Reliability Scores for Confirmatory Factor Analyses Performed on the Yellowstone and Zion datasets (fitted with the "Parks model")

Factor and items	Yellowstone	Zion
Learning about and Protecting Wildlife		
A wildlife sanctuary	.871	.864
A place for education about nature	.663	.748
A protector of threatened and endangered species	.749	.895
Protection of fish and wildlife habitat	.836	.776
Cronbach's alpha	.842	.885
Tourism and Recreation		
A place for the use and enjoyment of the people	.826	.772
A tourist destination	.714	.472
A place for recreational activities	.731	.564
Cronbach's alpha	.795	.616
Historical Identity		
An historic resource	.837	.793
A symbol of America's identity	.781	.727
Cronbach's alpha	.779	.714

to management actions related to snowmobile use (e.g., more aggressive enforcement of snowmobile speed limits, closing roads to over-snow vehicles, etc.). Although this meta-study did not attempt to explore the relationship between visitors' values and the acceptability of management actions across the four study sites, the results provide valuable
235 insight related to the common structures of protected area visitors' values.

Using the factor models derived from exploratory factor analyses provided four models to analyze. Through confirmatory factor analyses, the Parks Model and the Conservation Areas Model demonstrated the best fit. The Parks Model provided the best fit for the

TABLE 6 Factor Loadings and Reliability Scores for Confirmatory Factor Analyses Performed on the Missouri River and Birds of Prey Datasets (fitted with the "Conservation Areas Model")

Factors and items	Missouri River	Birds of Prey
Learning about and Protecting Wildlife		
A wildlife sanctuary	.947	.946
A place for education about nature	.708	.863
A protector of threatened and endangered species	.765	.937
Protection of fish and wildlife habitat	.702	.812
Cronbach's alpha	.884	.846
Identifying with History and Nature		
A display of natural curiosities	.682	.937
An historic resource	.192	.855
A symbol of America's identity	.706	.752
A place of scenic beauty	.723	.831
Cronbach's alpha	.910	.835

Yellowstone (Borrie et al., 2002) and Zion (Manning et al., 2004) datasets, and the Conservation Areas Model provided the best fit for the Missouri River (Carson, 2005) and Birds of Prey (Cauley, 2004) datasets. As different as these protected areas are (e.g., Yellowstone receives over three million visitors annually from around the world, while Birds of Prey receives far less visitation and is used primarily by local residents), noting that the values structures for these areas were similar is interesting. The only difference between the two datasets fitted with the Parks Model and the two fitted with the Conservation Areas Model was the existence of the *tourism and recreation* factor in the Parks model. Such a factor emerging for Zion and Yellowstone National Parks was not surprising, since providing for both tourism and recreation are fundamental purposes of National Parks and both feature strongly in Zion and Yellowstone. Protected areas such as the Missouri River and Birds of Prey, however, were not necessarily established to provide a wide array of recreational and tourism opportunities. For example, elaborate visitor areas, museums, curio shops or highly developed roads would not be found in either of these areas, while such infrastructure is prevalent in Yellowstone and Zion.

Differences existed between the Parks and Conservation Areas models, but they were more similar than different. Both include a *learning about and protecting wildlife* factor that contained the same items and similar factor loadings. The existence of this factor common to both models supports the proposition that whatever their charter might be, protected areas are valued by visitors as areas that provide for the protection of wildlife and their habitats (e.g., particularly those that are threatened or endangered) and as areas that visitors can learn about nature. The same could also be said of values associated with the historical identity that protected areas provide. Both models contain a factor with items characterizing the value of the areas as historic resources and as symbols of America's identity. Moreover, the Conservation Areas Model includes items related to the scenic beauty of the areas and the natural curiosities found within them. Thus, just as visitors valued the four areas for providing opportunities to learn about and protect wildlife, the areas also serve as historical artifacts that are a part of the American identity. Among the four areas studied, the values associated with *learning about and protecting wildlife*, as well as *historic and symbolic* values constituted the values common to the visitors of each area.

Arguing that the Parks Model and the Conservation Areas Model constitute common value structures for the respective datasets they are fitted to is reasonable, but the explanatory power of the models should not be overstated. The Parks Model explained only 23% of the variance of the Yellowstone dataset (Borrie et al., 2002) and 21% of the variance of the Zion dataset (Manning et al., 2004). Likewise, the Conservation Areas Model explained only 16% of the variance of the Missouri River dataset (Carson, 2005) and 25% of the Birds of Prey dataset (Cauley, 2004). That the models explain a relatively small amount of variance, though, does not imply they are poor models. The purpose of the analysis, rather than maximizing model fit, was to find commonality. The relatively small variance explained by each model raises an important issue, though – both the Parks and Conservation Areas models are inherently incomplete. For other protected areas, additional value dimensions are likely to manifest, which might or might not be common across any number of protected areas.

Thus, at best, we may only be certain that each model constitutes *part* (be it large or small) of the common value structure for the four areas studied. By adding additional items to the values scale beyond the 24 considered here, other dimensions (e.g., *social justice*, as identified by Cauley in her 2004 study at Birds of Prey) might add to the amount of variance explained. Additional scale items would also add additional variance to be explained. Nevertheless, although both models exhibiting a relatively high degree of parsimony demonstrate excellent fit across multiple datasets, they tell only part of the story.

A number of other value dimensions not identified through these models also might exhibit good fit.

Perhaps the most interesting unanswered question related to this study is whether visitors are drawn to areas that reflect their values or whether they simply assign different values to different places in different contexts. If the former is true, introducing different governance and management regimes that are inconsistent with the value structure current visitors assign to the area might be appropriate. Those regimes might attract a different set of visitors. The important aspect, though, is whether or not those regimes comport with any broader meanings or societal values that define the area's mission and objectives. If a goal of management is to manage for visitor satisfaction and if visitors simply assign different values to different areas, then it behooves protected area managers to manage the areas in a consistently with the values that visitors assign to the areas as long as those values are consistent with the agreed upon mission and objectives for the area. However, the decision of how to govern and manage an area is dependent on a number of factors beyond the values of visitors. Decisions are also made based on the values of other societal groups (e.g., nonvisitors who have an interest in protected area management, legislators, other officials), budgetary constraints and legal mandates. Visitor values are only a single variable in the decision-making equation. Inevitably these values are important.

Conclusion

Protected areas are established for a variety of reasons and reflect or foster diverse values structures. In the four areas included in this study, we found the opportunity to learn about and protect wildlife as well as historical identity were important common features to the values structures. Despite these shared values, Yellowstone (Borrie et al., 2002) and Zion National Parks (Manning et al., 2004) were assigned values related to recreation and tourism, whereas Missouri River (Carson, 2005) and Birds of Prey (Cauley, 2004) were not. The findings of this study may have implications for protected area management, but we also feel that further research related to visitors' values is needed. We feel that knowing whether or not the values assigned to a protected area reflect the self-selection of visitors (i.e., where visitors visit those protected areas whose mission and objectives are consistent with their held values) and/or whether they reflect a recognition by visitors of the multiple missions and objectives that protected areas may serve is an important consideration. In other words, would a visitor who values Yellowstone for its tourism and recreation opportunities value Birds of Prey for the same reason – because that is why they value protected areas, in general? Or, would they value Birds of Prey for other reasons because they believe Birds of Prey serves an entirely different purpose than Yellowstone? These explorations will likely gain importance as protected area researchers and practitioners continue to uncover the many ways in which visitors' values influence protected area governance and management.

References

Borrie, W. T., Freimund, W. A., & Davenport, M. A. (2002). Winter visitors to Yellowstone National Park: Their value orientations and support for management action. *Research in Human Ecology, 9*(2), 41–48.

Brown, T. (1984). The concept of value in resource allocation. *Land Economics, 60*, 231–246.

Carson, H. H. (2005). *Access tradeoffs vs. social preferences: Upper Missouri River breaks national monument*. Unpublished master's thesis, University of Montana, Missoula, MT.

Cauley, L. (2004). *Integrating social equity into the measurement of human values in outdoor recreation*. Unpublished master's thesis, University of Montana, Missoula, MT.

DiStefano, C. (2002). The impact of categorization with confirmatory factor analysis. *Structural Equation Modeling, 9*(3), 327–346.

English, D. B. K., Marcoullier, D. W., & Cordell, H. K. (2000). Tourism dependence in rural America: Estimates and effects. *Society and Natural Resources, 13*, 185–202.

Fulton, D. C., Manfredo, M. J., & Lipscomb, J. (1996). Wildlife value orientations: A conceptual and measurement approach. *Human Dimensions of Wildlife*, *1*(2), 24–47.

Henneberger, J. (1996). Transformations in the concept of the park. *Trumpter, 13*, 127–133.

Hu, L., & Bentler, P. M. (1999). Cutoff criterion for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Kyle, G., Graefe, A., Manning, R., & Bacon, J. (2004). Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of Environmental Psychology*, *24*(2), 213–225.

Manfredo, M. J., Teel, T. L., & Bright, A. D. (2003). Why are public values towards wildlife changing? *Human Dimensions of Wildlife*, *8*(4), 287–306.

Manning, R., Valliere, W., & Minteer, B. (1999). Values, ethics, and attitudes toward national forest management: An empirical study. *Society & Natural Resources*, *12*(5), 421–436.

Manning, R. E., Freimund, W. A., & Marion, J. L. (2004). *Research to support application of the visitor experience and resource protection (VERP) framework to backcountry planning at Zion National Park: Final report*. National Park Service.

McKinney, M., & Harmon, W. (2004). *The western confluence: A guide to governing natural resources*. Washington, DC: Island Press.

Mislevy, R. J. (1986). Recent developments in the factor analysis of categorical variables. *Journal of Educational Statistics, 11*(1), 3–31.

Myers, C. G., & Close, E. P. (1998). Wilderness values and ethics. In D. L. Kulhavy & H. Legg (Eds.), *Wilderness & natural Areas in Eastern North America: Research, Management and Planning* (pp. 291–295). Nacogdoches, TX: Center for Applied Studies, Stephen F. Austin State University.

Olsson, U., Drasgo, F., & Doransm, N. J. (1982). The polyserial correlation coefficient. *Psychometrika, 47,* 337–347.

Raymond, C., & Brown, G. (2006). A method for assessing protected area allocations using a typology of landscape values. *Journal of Environmental Planning and Management, 49*(6), 797–812.

Ting Hsiang Lin, C., & Dayton, M. (1997). Model selection information criteria for non-nested latent class models. *Journal of Behavioral and Educational Statistics, 22*(3), 249–264.

Vaske, J. J., & Donnelly, M. P. (1999). A value-attitude-behavior model predicting wildland preservations voting intentions. *Society & Natural Resources, 12*(6), 523–537.

Vaske, J. J., Needham, M. D., & Cline Jr., R. C. (2007). Clarifying interpersonal and social values conflict among recreationists. *Journal of Leisure Research, 39*(1), 182–195.

Vining, J., & Saunders, C. D. (2004). Conservation psychology. In M. J. Manfredo, J. J. Vaske, B. L. Bruyere, D. R. Field, & P. J. Brown (Eds.), *Society and natural resources: A summary of knowledge* (pp. 46–57). Jefferson, MO: Modern Litho.

Yankelovich, D. (1991). *Coming to public judgment: Making democracy work in a complex world*. Syracuse, NY: Syracuse University Press.

Yu, C. (2002). *Evaluating cutoff criteria of model fit indices for latent variable models with binary and continuous outcomes*. Unpublished doctoral dissertation, UCLA, Los Angeles, CA.