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Item Type	event;event
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Download date	2026-04-15 10:41:47
Link to Item	https://hdl.handle.net/20.500.14394/37271

EFFECTS OF VISITOR CHARACTERISTICS ON PERCEPTIONS OF CROWDING, CONFLICT AND NORMATIVE STANDARDS

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Abstract

The purpose of this study was to investigate visitors' perceptions of encounters, crowding, conflict and satisfaction during recreation experiences on the White Salmon River in Southern Washington. The study also intended to measure visitors' normative standards for acceptable levels of encounters and waiting times on the river. Previous studies of this site suggest that visitor perceptions of crowding on the river have increased consistently over the past 30 years, prompting managers' concerns regarding the experience of river visitors. In order to better understand the visitor experience, characteristics of whitewater rafters and kayakers were examined in relation to their normative standards and perceptions of crowding and conflict on the river. Analysis of the data indicates significant differences in perceptions of crowding and conflict when compared with visitors' characteristics, including motivations, past experiences, preferences and group type.

1.0 Introduction and Background

The lower White Salmon River was designated a National Wild and Scenic River in 1986 as part of the Columbia River Gorge National Scenic Act. The river runs from Mt. Adams, near Troutdale, Washington, to the Columbia River just north of Hood River, Oregon. The 7.7 mile section of the White Salmon between BZ Corner, Washington, and Northwestern Lake has become an increasingly popular whitewater boating destination since the early 1980s.

Recreation use on the White Salmon River has grown substantially in the last 20 years. This trend has been illustrated in two empirical studies. A 1988 study by Allen and Ratcliffe measured annual recreation use on the White Salmon River. The investigators estimated that whitewater boating had increased from 1,785 users in 1984 to 2,471 users in 1986, and 6,067 users in 1988. By 1991, 11,190 boaters utilized the White Salmon River (Shelby & Wing 1993), exceeding the level of use projected (9,000) by the former study for that year.

In addition to use levels, Shelby and Wing (1993) examined the impacts of increased recreation use on the White Salmon, most notably the levels of crowding perceived by whitewater boaters on the river. They collected data on users' perceptions of the frequency and duration of encounters, as well as waiting times at the boat launch and rapids. Most boaters on the White Salmon believed the river had acceptable levels of perceived crowding, but due to the growing trend in use, the investigators recommended "continued monitoring of use patterns and users" (Shelby & Wing 1993). Despite the recommendations of this study, and the estimation that recreation use on the White Salmon grew at least 20 percent per year throughout the 1980s and early 1990s, there have been no further investigations of crowding on the White Salmon River.

The aim of this study is to re-evaluate the effects of recreation use on a protected recreation resource.

2.0 Methods

Data for this study were collected as part of a larger study funded by the USDA Forest Service designed to understand the perceptions of rafters, kayakers, and canoeists on the White Salmon River. These recreationists may be visiting the river as clients of commercial outfitters or in a self-guided capacity. Survey respondents were asked about their recreation experience concerning their activity, whether their user group was commercial or private, their place of residence and when they planned this trip. Data were collected from recreationists using on-site interviews at the two main takeout points on the White Salmon River. A purposeful sampling method was utilized to obtain a total of 1260 interviews. All interviews were conducted between June 2008 and October 2009. Surveys were administered in two waves. The first wave was collected during Summer and Fall of 2008. The initial instrument was a replication of the 1993 Shelby and Wing survey instrument. The second wave of data collection, conducted in Summer and Fall of 2009, included a broader range of items, including all survey items used in creating latent variables for conflict, crowding and satisfaction. Due to the short length of the survey, the response rate was quite high, with an estimated 90% of respondents agreeing to be interviewed.

2.1 Norm Violations

Visitors on the White Salmon River were asked to report their normative standards concerning waiting times, number of boats encountered and percent of time in sight of other boats while on the river. These normative standards can be effective tools for management, provided that most of those surveyed are able to report a standard, and that there is some level of group agreement among those standards. These two concepts are referred to as norm prevalence and norm crystallization, respectively. Previous literature has suggested that when there are high levels of prevalence and crystallization, a social norm exists and can be used by natural resource managers to establish appropriate standards of quality (in this case, use limits or social carrying capacity) within a recreation setting (Manning et al. 1999).

A series of independent t-tests were conducted to examine the relationship between encounters, normative standards and perceived crowding. In order to conduct the analysis, respondents were split into two groups based on whether or not they reported an encounter variable greater than the corresponding normative standard they provided (hereafter referred to as a norm violation). The variables we examined were encounters and normative standards for waiting times at the launch site at Husum Falls, acceptable number of boats in sight, and acceptable percent of time in sight of other boats. Because only respondents surveyed during the first wave of the study were asked about their wait time at Husum Falls, analysis concerning that relationship is limited to surveys collected during the Summer and Fall of 2008. The remaining three variables were examined using surveys collected during both periods of data collection.

2.2 Path Modeling

A path model was created using a series of regression analyses to examine the relationships between encounter variables (waiting times at the launch site and Husum Falls, number of encounters and percentage of time in sight of other boats) and latent variables for crowding, conflict and satisfaction (Figure 1).

<Insert Figure 1 about here>

3.0 Results

Respondents were asked how crowded they felt the White Salmon River was during their visit on a 9-point Likert scale (Table 1). These results show that 84.9% of all users who responded to this item (1068 of 1260 users) felt either “not at all crowded” or “slightly crowded.” A smaller group of users (14.2%; $n = 179$) felt “moderately crowded,” with a score of 5, 6, or 7 on the 9-point scale. Finally, only 11 respondents (0.9%) felt “extremely crowded,” giving a score of 8 or 9. These figures present a notable increase from the number of visitors reporting any feelings of crowding during the previous crowding study; a total of 40.4% reported some degree of crowding in the present study (a response between 3 and 9) compared with only 16 percent in the previous study (Shelby & Wing 1993).

<Insert Table 1 about here>

An examination of encounters, norms, and perceived crowding revealed significant inverse relationships between visitor perceptions of crowding and any norm violation (Table 2). Visitors who experienced a norm violation while on the river reported significantly higher crowding scores than those who did not ($t = -13.002$, $p < .001$). More specifically, visitors who reported a norm violation concerning waiting time at the launch site ($t = -4.04$, $p < .001$), number of boats seen on the river ($t = -11.63$, $p < .001$) or percent of time in sight of other boats ($t = -15.49$, $p < .001$) reported significantly higher crowding scores than those visitors who did not. The same analysis of norm violations regarding waiting time at Husum Falls did not reveal a significant difference, but this may be attributed to a much smaller sample size compared to the other variables ($n = 195$, compared to $n = 1260$ for other variables).

<Insert Table 2 about here>

The results of the path analysis demonstrated a significant inverse relationship between both crowding ($B = -.521$, $p < .001$) and conflict ($B = -.289$, $p = .000$) and the satisfaction variable ($R^2 = .58$, $p < .001$) (Table 3). The relationship between conflict and satisfaction is significant, but partially mediated by crowding. Accordingly, conflict ($B = .684$, $p < .001$), as well as encounter variables for number of times other boats were seen by paddlers ($B = .110$, $p < .001$) and percent of time in sight of other boats ($B = .097$, $p < .001$) were significant predictors of the crowding index ($R^2 = .52$, $p < .001$). In addition, the variable measuring percent of time in sight of other boats was a significant predictor of the latent conflict variable ($B = .161$, $p < .001$). The relationship between percent of time in sight of other boats and perceived crowding was partially mediated by conflict.

<Insert Table 3 about here>

4.0 Discussion

These results compare favorably to a recent study of perceived crowding that examined 181 crowding studies conducted over 30 years (Vaske & Shelby 2008). All studies included in this meta-analysis utilized the standard 9-point

crowding scale used in the current study. The percent of visitors reporting some degree of crowding in the current study (40%) was either at or below the average percent for most recent studies (40% for studies conducted between 1995 and 2005), studies in the same region (49% for Pacific U.S.) or at the national level (45% for the entire U.S.). In addition, the percent of visitors reporting some level of crowding was less than that of other non-consumptive activities (45%) and comparable to other studies of rafters (35%) and kayakers (44%). A review of the literature reveals those recreation settings most similar to the White Salmon (whitewater boating on rivers in the Northwestern United States: the Deschutes, Rogue and Snake) displayed some of the highest perceptions of crowding. On these rivers, between 53 and 100 percent of survey respondents reported perceptions of crowding on the river (Shelby & Heberlein 1986).

4.1 Visitor Characteristics

Overall, visitors' experiences on the White Salmon River appear to be very positive. Visitors generally feel uncrowded and are highly satisfied. However, a closer examination of visitors with specific characteristics reveals significant differences in responses. Differences in visitors' reports of crowding, conflict and satisfaction were analyzed with respect to differences in motivation, user group (activity-based), group size preference, residence, use history and time spent planning the trip. Significant differences in reports of both perceived crowding and satisfaction were found between groups categorized by user group, use history, group preference, residence, and planning. Significant differences in crowding and conflict were found in groups categorized by motivations (Table 4, Table 5). Those visitors who reported higher levels of crowding tended to be visiting without the assistance of a commercial outfitter, were residents of Oregon or Washington, were returning visitors to the river, had spent less than one month planning their trip, preferred to visit the river with a group of less than 6 paddlers, and were motivated to visit the river for the place itself (rather than activity-based or social reasons). Visitors reporting lower levels of satisfaction shared all of the same characteristics, with the exception of the motivation characteristics. Visitors with a place-based motivation reported significantly higher levels of conflict.

<Insert Tables 4 and 5 about here>

The examination of these visitor characteristics provides an additional narrative to the study. A look at these unique groups of visitors highlights what could be potential areas of concern for river managers. The results of these analyses provide a profile of the visitor who is more attached to the river: a local, returning user who planned their own trip, prefers smaller groups, and is motivated to visit by the river setting. When accounting for all types of visitors, we find that use levels on the White Salmon are not a detriment to the visitor experience. Managers are, however, charged with providing enjoyment of the resource for all visitors, which means that the responses of these user groups should also be considered when making decisions about the management of the river's recreation opportunities.

4.2 Discussion of Normative Standards

Normative standards were examined with respect to corresponding reports of encounter variables. For each normative item, an encounter item asked participants to report the waiting time, number, or percent for the corresponding norm item. When a visitor's reported encounter score is greater than his or her corresponding normative standard, that individual has experienced a norm violation. Analysis of mean crowding scores in relation to norm violations supports the relationship between encounters, norms, and crowding that has been presented in several studies (Vaske & Donnelly 2002). These relationships suggest that normative standards are an effective way to examine the visitor experience and establish parameters for management (such as use limits) that will promote enjoyable use of this natural resource for the public. In addition, high levels of norm prevalence and crystallization were found among visitors' survey responses. These results, combined with the results of the aforementioned t-tests, provide support for the idea of social norms, which may be a valuable tool in determining a carrying capacity for a public land or waterway.

4.3 Discussion of Inferential Relationships

A series of regression analyses examined the relationships involving both manifest and latent variables for encounters, conflict, crowding, and satisfaction among visitors to the White Salmon River. As noted earlier, there were limitations in using the encounter variable for waiting time at Husum Falls because responses were only collected during the first (2008) wave of data collection (n = 195). In addition, the concept of conflict was only used in the analyses of latent variables, because only 19 of the 1260 visitors surveyed reported encountering conflict when asked directly. It appears that boaters on the river may have trouble conceptualizing conflict when asked directly, perhaps assuming it means that an argument or altercation occurred, rather than a more general idea concerning goal interference.

The traditional model involving crowding and satisfaction presents a line of prediction from contacts or encounters to perceived crowding and from crowding to satisfaction (Heberlein & Vaske 1977, Graefe et al. 1984). This study's analyses of the relationships between encounter variables (manifest) and latent constructs for conflict, crowding and satisfaction support this model (Table 4). Encounter variables for number of boats seen and percent of time in sight of boats were both significant predictors of the latent crowding variable (B = .110 and .097 respectively, $p < .001$). Number of boats seen was also a significant predictor of the latent satisfaction variable, but was fully mediated by the latent construct for crowding. Crowding was the most significant predictor of satisfaction (B = -.52, $p < .001$).

An additional finding of this analysis involved the latent conflict variable. Manning, Valliere, Wang and Jacobi (1999) identify 'type of encounter' (i.e. encounters that do or do not involve conflict) as one of the three variables that most strongly influence perceived crowding. However, the traditional encounter-crowding-satisfaction model found in existing literature does not include a conflict variable. The effects of conflict on satisfaction are partially mediated by the latent construct for conflict in this study's path model. The strong statistical results of this study demonstrate the value of adding the conflict measure to the traditional crowding-satisfaction model (Heberlein & Vaske 1977, Graefe et al. 1984). These findings also provide empirical evidence to support a conceptual argument previously proposed by Manning et al. (2000), who asserted the idea that encounter type is a practically significant predictor of crowding. The study also provides direction for future monitoring and management decisions on the White Salmon River and publicly-managed natural resources in general.

<Insert Figure 2 about here>

5.0 Study Limitations

Taking note of this study's limitations may provide direction for future research. The study lacked a measure of actual user density on the White Salmon River. A comparison of density and reported encounters may better inform researchers and managers. In addition, this study was limited by the small pool of items used in creating the latent constructs measuring crowding, conflict and satisfaction. Expanding the number of items for these constructs will provide a more accurate measurement of these concepts. Finally, the responses to survey items concerning norm violations were skewed because very few of the respondents reported a norm violation. This is obviously an unavoidable limitation, but skews the results nonetheless.

5.1 Summary and Future Research Directions

This study found an increased, but not necessarily problematic perception of crowding among visitors to the White Salmon River. Overall, 40 percent of survey respondents reported some level of crowding on the river, compared to 16 percent in 1993 (Shelby & Wing 1993). While crowding has increased over the 15 years between studies, levels remain on par or below the findings of similar crowding studies (Vaske & Shelby 2008). Among managers, concern over increased use levels can often translate into a concern regarding crowding, conflict, or a need for carrying capacity limitations. In the case of the White Salmon River, a steady increase in use has been documented in past studies, and continues to be a concern for management. While perceptions of crowding appear to be increasing as well, crowding does not seem to be problematic in terms of interfering with satisfactory recreation experiences. This is likely due in part to the characteristics of the river itself. The White Salmon is a narrow, fast-moving river with limited opportunities to slow, stop, or play in the rapids. In addition, these results are also likely due to the limit on the number of commercial outfitter permits (10). Problems associated with high use appear to be reduced by this management strategy. Outfitters are aware of use levels, move visitors on and off of the river efficiently and also work to stagger trips, which are effective means of reducing conflict and crowding on the river.

The findings of this study highlight the need for future monitoring of encounters, normative standards, conflict, crowding, and satisfaction by recreation land managers. In particular, instances of conflict should continue to be measured, particularly in relation to other variables such as encounters, trip preferences, crowding and satisfaction. This study demonstrates the value of examining experiences by specific user groups. Significant differences were found between different user groups (separated by motivations, user type, user history, group preferences and place of residence). Managers should continue to monitor the experiences of all user groups in order to provide a quality experience for all visitors. The findings of this study also indicated a strong relationship between conflict and crowding, providing a new aspect to the traditional model of contacts / encounters, crowding, and satisfaction. These concepts should be measured using multiple methods, including the use of manifest and latent constructs, to ensure a more complete understanding of the visitor experience. As seen in this study, latent constructs are valuable for providing survey respondents with items they can comprehend, and they also offer researchers a more comprehensive metric; while users seemed to have difficulty understanding and responding to a single item measure of conflict, many were able to accurately respond to the specific items included in the latent construct. Future studies should expand the number of latent variables to improve measurement of this important concept. Improvements made to this conceptual framework will improve the framework's contribution to the literature, as well as researchers' and professionals' understanding of recreation users' experience, particularly in relation to use level, encounters, conflict, crowding, and satisfaction.

4.0 Citations

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Figure 1. Proposed Model

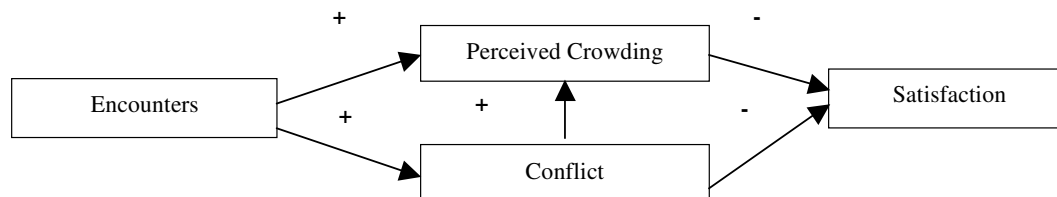


Table 1. Frequency Distributions for Ordinal Perceived Crowding Measures

Crowding Category	Frequency	Valid Percent
Not At All Crowded (1 - 2)	750	59.6
Slightly Crowded (3 - 4)	318	25.3
Moderately Crowded (5 - 7)	179	14.2
Extremely Crowded (8 - 9)	11	0.9

Table 2. Relationship between Norm Violations and Perceived Crowding

Normative Standard	Mean		t
	No Violation	Violation	
Acceptable Wait at Launch Site	2.67 n = 767	3.89 n = 37	-4.042***
Acceptable Number of Boats Seen	2.27 n = 325	4.54 n = 89	-11.628***

Acceptable Percent of Time in Sight of Boats	2.21 n = 896	3.91 n = 279	-15.487***
‡Acceptable Time to Wait at Husum Falls	2.39 n = 168	1.93 n = 14	.956
Any Norm	2.16 n = 869	3.81 n = 333	-16.126***

*** p < .001

Table 3. Results of Multiple Linear Regression Analysis for Encounters, Conflict, Crowding and Satisfaction

Predictor Variables	Dependent Variable: Satisfaction R ² = .58***		
	R	β	t
Perceived Crowding	-.732***	-.521***	-14.78***
Conflict	-.670***	-.289***	-8.12***
Predictor Variables	Dependent Variable: Crowding R ² = .52***		
	R	β	t
Conflict	.702***	.684***	26.98***
Percent of Time in Sight of Other Boats	.242***	.097***	3.523***
Number of Other Boats Seen	.157***	.110***	4.095***
Predictor Variables	Dependent Variable: Conflict R ² = .023***		
	R	β	t
Percent of Time in Sight of Other Boats	.150***	.161	4.345***

*** p < .001

Table 4. Between-groups ANOVA to determine differences in perceptions of crowding, conflict and satisfaction by visitors with varying motivations and time spent planning the trip

	Crowding F = 3.51*		Conflict F = 2.91*		Satisfaction F = 1.55	
	n	Mean	n	Mean	n	Mean
Place Based ^A	127	1.83	117	1.89	111	4.61
Activity Based ^B	521	1.62	478	1.63	458	4.69
Social Based ^C	233	1.61	215	1.68	206	4.68
Close to Home ^D	38	1.84	38	1.83	34	4.55
<i>post hoc</i>	A – B = .21 ; p = .05		A – B = .26 ; p < .05			
	Crowding F = 3.60*		Conflict F = 1.58		Satisfaction F = 3.55*	
	n	Mean	n	Mean	n	Mean
≥ 1 Month ^A	236	1.57	220	1.62	218	4.74
1 – 3 Weeks ^B	223	1.70	203	1.71	213	4.66

< 1 Week ^c	361	1.75	336	1.76	310	4.62
<i>post hoc</i>	C - A = .18 ; p < .05			A - C = .12 ; p < .05		

* p < .05

Table 5. Independent t-tests to determine differences in perceptions of crowding, conflict and satisfactions by visitors with varying user groups, use history, residence and group preferences

	Crowding t = -2.77**		Conflict t = -.55		Satisfaction t = 3.13**	
	n	Mean	n	Mean	n	Mean
Commercial	669	1.62	613	1.69	623	4.70
Private	290	1.78	275	1.73	227	4.57
	Crowding t = 3.00**		Conflict t = .737		Satisfaction t = -3.18**	
	n	Mean	n	Mean	n	Mean
First Time Visitor	392	1.76	364	1.73	317	4.59
Returning Visitor	564	1.60	521	1.69	534	4.71
	Crowding t = -3.55***		Conflict t = -1.37		Satisfaction t = 3.60***	
	n	Mean	n	Mean	n	Mean
Non-Resident	242	1.52	227	1.61	229	4.76
OR / WA Resident	668	1.71	626	1.71	572	4.64
	Crowding t = 3.04**		Conflict t = 1.02		Satisfaction t = -2.27*	
	n	Mean	n	Mean	n	Mean
≤ 5 people	375	1.81	351	1.77	314	4.60
≥ 6 people	388	1.63	363	1.70	355	4.70

* p < .05 ; ** p < .01 ; *** p < .001

Figure 2. Final Model

