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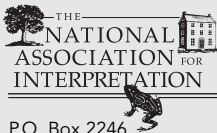
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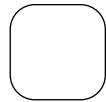
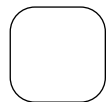
**A Note from  
the Editor**

This issue of the *Journal* covers a wide array of topics, from geointerpretation to cave interpretation. One article will introduce many readers to the concept of geointerpretation and the use and value of maps for improving the enriching the interpretive experience. Another article empirically examines a long-held belief that interpretation can increase the visitor's satisfaction with a recreation experience. The third article focuses on the principles of successful guided cave interpretation. There is also an "In Short" article that discusses the role of heritage interpretation in connecting people to place. There is wide variability in these articles, from their topics and the theories that ground the approach to the methods used to answer the question.

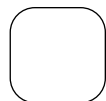
I would like to announce a call for submissions in all three categories of the *Journal* (research articles as well as "In Short" and "In My Opinion" pieces) surrounding the topics of training programs, certifications, accreditations, and academic programs in interpretation. What are we training our new recruits? How is training being streamlined and standardized? What does accreditation and certification really mean? What is the relationship between academic programs and the training needs in the field?

I look forward to the future developments of our field through your quality submissions to *JIR*.

—C



**R E S E A R C H**



# Isolating the Role of On-site Interpretation in a Satisfying Experience

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## **Abstract**

The role of interpretation in tourist experience is widely acknowledged. However, little research has been conducted to directly document or precisely quantify the influence that the interpretive dimensions of experience have on tourist satisfaction. A purpose of this study was to determine whether these dimensions could be isolated and quantified in the experiences of 727 national and international tourists in the Panama Canal Watershed (PCW). Results revealed that the global satisfaction of PCW tourists was due primarily to their satisfaction with the interpretive dimensions of their visit, as opposed to other services and setting attributes. Respondents' satisfaction with five interpretive services correlated more highly with a global satisfaction measure than did any of six non-interpretive services and explained nearly half the variance in global satisfaction. Respondents' satisfaction with non-interpretive services explained only 23% of the variance. These findings suggest that the interpretive dimensions of tourist experience can exert a positive influence on global satisfaction. This relationship was especially strong for visitors traveling as part of a guided tour. Factor and reliability analyses confirmed validation of a single "interpretive satisfaction" construct, providing evidence that an interpretive dimension of tourist satisfaction can be empirically isolated. Practical implications and suggestions for further research are offered.

## **Keywords**

interpretation, tourism, satisfaction, visitor experience

### Isolating the Role of On-site Interpretation in a Satisfying Experience

The role of interpretation in tourist experience is widely acknowledged (e.g., Armstrong & Weiler, 2002; Beck & Cable, 1998; Arnould & Price, 1993; Cameron & Gatewood, 2000; Cohen, 1985; Geva & Goldman, 1991; Ham, 2002; Ham, Housego & Weiler, 2005; Ham & Weiler, 2002; Weiler & Ham, 2002; Weiler & Ham, 2001; Ward & Wilkinson, 2006), and based on the premise of this relationship, private businesses and government tourism authorities have begun to invest strategically (e.g., South Australian Tourism Commission, 2003; Tourism Tasmania, 2003). While few question whether such a relationship exists, little research has been conducted to directly document or precisely quantify the influence that the interpretive dimensions of experience have on tourist satisfaction. The only known studies of interpretation's influence on tourist satisfaction are those by Pearce and Moscardo (1998), who found that the interpretive components of visitor experiences in an Australian rain forest contributed positively to overall satisfaction, and Hwang, Lee, and Chen (2005), who reported relationships between satisfaction with interpretive services and feelings of involvement and place attachment among tourists in Taiwan. This study examines visitors' satisfaction with the interpretive and non-interpretive elements of their experiences at several sites within the Panama Canal Watershed (PCW) and the contribution of each element to overall tourist satisfaction.

The article reports selected findings from visitor research conducted during the high-use season at five tourist sites within the PCW. One of the aims of the research was to examine whether variation in global satisfaction could be associated with specific components of the experience, both interpretive and non-interpretive. "Interpretive components" are defined as non-personal media such as signs, exhibits, visitor centers, etc. or personal, face-to-face presentations by area staff or guides that are specifically and primarily aimed at communicating with visitors about the place and its natural and/or cultural features. "Non-interpretive" components include visitor services not specifically aimed at communicating with visitors about the place and its natural and/or cultural features (e.g., parking areas, restrooms, camping areas, walking trails, etc.).

Tourist satisfaction surveys typically ask respondents to assess their satisfaction with specific services and setting attributes or "experience components" as well as their overall or "global" satisfaction. A rationale for this approach is that since variation can occur in satisfaction levels associated with particular components of a tourist's experience, such measures can provide insight into what drives satisfaction and lead marketing researchers to explore whether satisfaction levels with particular service attributes can be related to other variables (such as sociodemographic and trip characteristics) for market segmentation purposes. The research reported here adopts this approach by analyzing the satisfaction measures of 11 components of PCW tourists' experience, grouped into five interpretive components (visitor centers, brochures, maps, presentations by area staff, and exhibits) and six non-interpretive components (parking areas, camping areas, fishing, swimming, restrooms, and trails) in order to ascertain the relative contribution of each category to tourists' global satisfaction. A secondary aim of the research was to determine whether relationships existed between reported satisfaction levels and selected sociodemographic and trip characteristics in the context of PCW visitor experiences.

In previous research, tourists' experiences and levels of satisfaction have been found to vary with their background characteristics, such as their own past travel experience and background knowledge (see, for example, Mazursky, 1989). Sociodemographic characteris-

tics have also been associated with differences in satisfaction levels in a number of tourism studies (Hughes, 1991; Mossberg, 1995; Yu & Weiler, 2006). Mossberg (1995), for example, found that tourists' satisfaction with the performance of tour leaders varied according to their previous travel experience and sociodemographic characteristics.

Tourists' country of origin, nationality, and culture also have been associated with differences in satisfaction levels. Yuksel (2004), for example, reported differences between domestic and international visitors' evaluation of services delivered in stores and shops. In the hotel sector, Armstrong, Mok, Go, and Chan (1997) found significant variation among visitors from different cultures with respect to their expectations for hotel services. Specifically related to interpretation, Ham and colleagues (1992, 1993) have analyzed a number of factors that differentiate between domestic and international tourists' satisfaction with on-site interpretive services.

Past studies have also found that previous visits to a tourism destination are associated with higher visitor satisfaction, partly because satisfaction often leads to repeat visitation (Geva & Goldman, 1991; Tian-Cole, Crompton & Willson, 2002; Yuksel, 2001). Not surprisingly, studies conducted by Gyte and Phelps (1989), Tian-Cole, et al. (2002), and Yuksel (2001) found that visitors who had past experiences in the visited place were more likely to be satisfied than first-time visitors.

Thus, in addition to determining the relative contribution of interpretive services to visitors' global satisfaction levels, the study explored whether variations in PCW tourist satisfaction could be associated with sociodemographic characteristics and descriptive trip variables. Toward this end, data on nine sociodemographic and trip variables were collected to explore differences in PCW visitors' reported satisfaction with the 11 aforementioned interpretive and non-interpretive services and setting opportunities, as well as differences in their global (overall) satisfaction. The sociodemographic and trip variables included respondent's gender, age, education level, individual income, country of residence, native language, number of previous visits, group size, and group type (family, friendship, mixed family-friendship, or tour group).

## **Background and Context**

The PCW is an area of 3,300 square kilometers in the Republic of Panama. In addition to the historical, cultural, and economic importance of the PCW to the country, it is one of the highest biodiversity zones in all of the Americas, and is renowned in particular for its unusually abundant and colorful bird life. For all of these reasons, the PCW offers an appealing range of nature-based tourism experiences both for Panamanians and international visitors from more than 30 countries. These opportunities include areas of very high visitor use (e.g., viewing of the Panama Canal Locks) and areas of medium to low use (such as nature trails at Soberanía National Park).

Tourists represent a strategically important audience within the PCW. Annually, more than one million Panamanian and international tourists visit the PCW, both in private groups and via commercially guided tours (IPAT, 1999). For this reason, a comprehensive survey of visitors was undertaken to determine (1) the types of tourists who visit five popular nature-based tourism sites in the PCW, (2) the patterns and characteristics of their uses of these sites, both currently and in the past, (3) their satisfaction with the interpretive and non-interpretive services currently available at these sites, and (4) how improvement or expansion of current interpretive services at PCW tourist destinations might more effec-



tively target these tourists with messages on sustainable watershed management as well to enhance their on-site experiences.

This paper presents the findings pertaining to PCW tourists' satisfaction with the on-site interpretive and non-interpretive services offered, along with the empirical relationships between the nine sociodemographic and trip variables and tourists' service-specific and global satisfaction levels. A comprehensive report of additional findings is available in Ham and Weiler (2000a).

## Methods

A bilingual (Spanish and English) post-visit questionnaire, designed according to Dillman's (1978) "Total Design Method," was used to collect the data. Before data collection commenced, drafts of the questionnaires were reviewed by the national tourism authority, the protected area management agency and two bilingual social scientists. In addition, bilingual data collectors were trained both in sampling and questionnaire distribution and retrieval methods to ensure standardization of procedures. The results of these efforts produced a data collection instrument and procedures that strengthened both the validity and reliability of the data. After pre-testing, the final 10-minute, self-completed questionnaire was personally administered at the five sites.

During the 13-week period of February 1 to April 30, 2000, a combined sample of 773 randomly selected tourists was approached (as they were leaving the site following their visit), of which 94% completed the questionnaire. This yielded a final usable sample size of 727. Systematic random sampling of both days of the week and visitors on these days over the three-month period minimized sampling bias and facilitated the generalizability of findings to the population of PCW visitors. In this procedure, one of the five sites was chosen at random to start the process of determining where data collectors would be on certain days. Then a second site was chosen at random, and so forth until all five sites had been selected in random order. Then, one day of the week was randomly chosen for the first week at the first site. Once this was done, a systematic selection of sampling days was accomplished by taking the next day and site in order (e.g., Sunday at site 1 was followed by Monday at site 2, and so forth). In this way, nearly equal numbers of all sampling days (both weekdays and weekend days) were assigned to the five sites. In addition, study respondents also were selected randomly on each sampling day. Sampling was carried out each day from approximately 8:30 am to 4:30 pm. Because no prior visitor use data existed, sampling was not stratified. The two layers of randomization and large sample size ensured statistically representative samples for the comparisons made.

Low refusal rates were encountered at each of the five sites, resulting in response rates ranging from a low of 76% at one site to a high of 100% at two sites. When a visitor did refuse to complete a questionnaire, however, the data collector used a standardized form to obtain the following information from the person in order to facilitate analysis of potential bias due to non-response: (1) reason for not participating in the study, (2) age, (3) gender, and (4) the tourist's overall satisfaction with his/her experience (which was identical to global satisfaction item in the questionnaire). About 90% of the non-respondents cited lack of time as the primary reason for not participating in the survey. Comparisons of respondents and non-respondents revealed no differences with respect to age, gender, or the global measure of satisfaction with their experience. Although males were more likely to decline participation at three of the data collection sites, the disparity was not statistically significant

(Chi-square 56.76,  $p > .05$ ). Overall, and at the individual sites, bias due to non-response does not appear to be a concern.

Respondents were asked to indicate their overall (global) level of satisfaction with their experience on a five-point scale ranging from “very dissatisfied” to “very satisfied,” with a mid-point of “neither satisfied nor dissatisfied.” Using the same rating scale, visitors were also asked to rate their level of satisfaction with the 11 interpretive and non-interpretive services they may have utilized while at the site. For these questions, an “I did not use it” option was provided to the right of each scale item. Responses in this category were coded as “missing values” so that they would be excluded from statistical analyses.

### Limitations of the Research

The results of this research pertain to the population of tourists visiting the PCW during the 13-week, high-use season under study. However, caution must be exercised in generalizing the results to other research populations or to PCW visitors during the low-use season. Because of the large random sample, sampling and coverage error at the five study sites was reduced but cannot be altogether dismissed. As with all studies involving measurement of psychological constructs, an unknown degree of measurement error could be inherent in the data. However, due to careful pretesting of the instrument and large sample size, there is no reason to suspect that any measurement error is systematic. In addition, the potential for non-response bias in the findings can be largely dismissed due to the high response rates and the finding of no difference in the satisfaction ratings between respondents and non-respondents.

### Results and Discussion

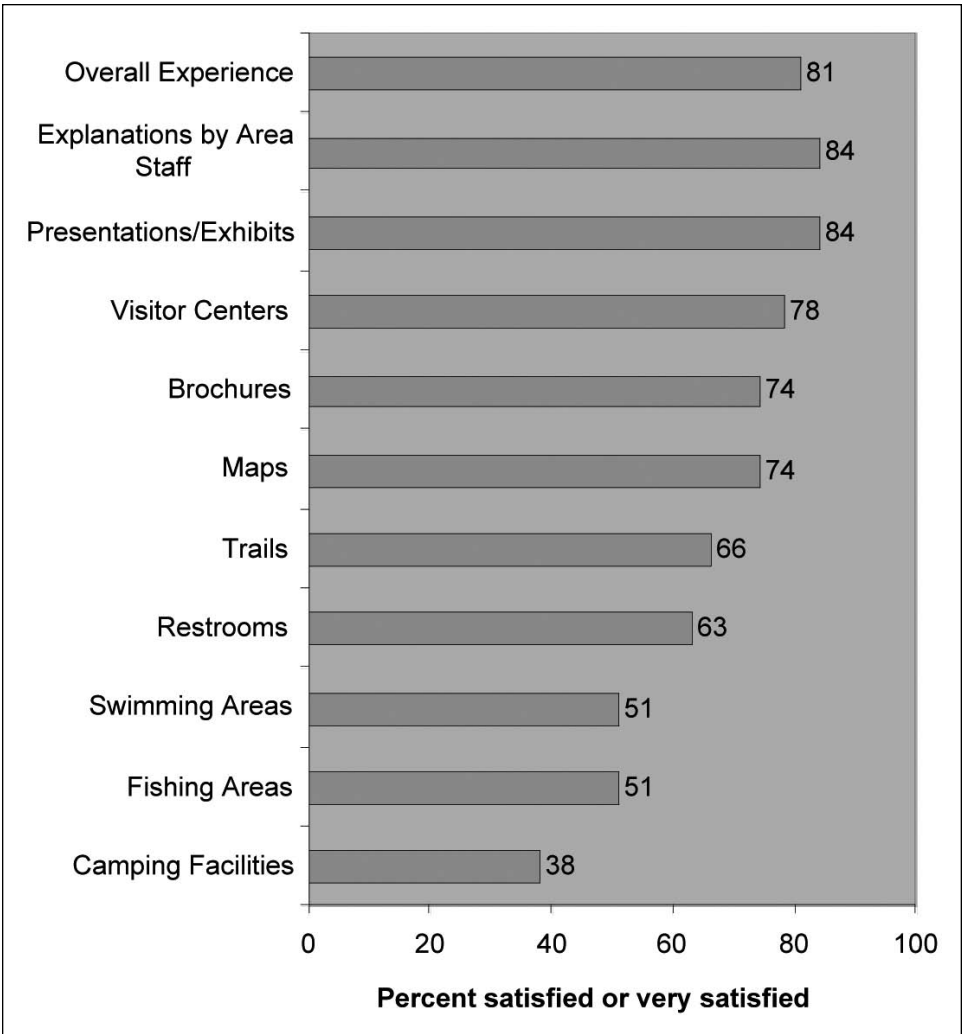
Overall, PCW tourists were evenly divided by gender (51% male and 49% female). The overall mean age of the tourists was 34.7 years. PCW tourists on the average had completed almost 16 years of *formal education* (15.7 years) which roughly corresponds to a university undergraduate degree. The generally high education level of PCW tourists corroborates a previous finding at another Central American protected area, Masaya Volcano National Park in Nicaragua, where the mean education of visitors was also about 16 years (Ham & Whipple, 1998).

PCW tourists fall into a wide range of 1999 income categories, ranging from about US \$6,000 (23%) to more than \$80,000 (4%). About one-fifth earned between \$33,000 and \$51,000, while 12.5% earned more than \$51,000.

PCW tourists come from a wide range of countries (about 30), but two countries predominate, Panama and the US. Panamanians accounted for 59% of the sample, while US tourists accounted for an additional 14%. Not surprisingly, the most common native languages spoken by PCW tourists are Spanish (72%) and English (21%).

About 60% of the tourists were first-time visitors at the site where they were sampled, while about 40% had visited the site at least once during the previous three years. About 25% were visiting for at least the third time, and 16% had visited the site five or more times in the previous three years. On average, PCW tourists' length of stay was about two hours, depending on the specific site visited.

Overall, about 13% of the tourists were traveling with a tour operator, while 87% were traveling independently. Of the independent travelers, 68% were transported in a private vehicle, about 14% came by public bus, and 18% arrived by other means



**Figure 1. Visitor satisfaction with interpretive and non-interpretive services**

(primarily by privately owned boat, taxi, hotel shuttle, on foot, or on bicycle). Almost half of the independent travelers arrived in groups of two to four people. Only about 3% of the tourists traveled alone. Typical were family-related groups (43%) and friendship groups (26%).

**Satisfaction Levels of PCW Tourists**

A global satisfaction measure was used to gauge the 727 tourists’ overall satisfaction with their experience (Figure 1). More than 80% reported that they were either “satisfied” or “very satisfied” with their experience. Less than 7% reported being “dissatisfied” or “very dissatisfied.” More focused measures of tourist satisfaction with specific services and site

Type of service rated	Overall sample <i>r</i>
Presentations/exhibits in a visitor center	.66*
Visitor centers	.64*
Maps of the area	.61*
Brochures about the area	.60*
Explanations by area staff	.57*
<i>Interpretive services together R (R<sup>2</sup>)</i>	<i>.69* (.48)</i>
Trails	.37*
Restrooms	.34*
Fishing areas	.31*
Parking areas	.26*
Camping areas	.18
Swimming areas	.18
<i>Non-interpretive services together R (R<sup>2</sup>)</i>	<i>.48* (.23)</i>

\* = significant correlation ( $p < .05$ )

**Table 1. Overall sample correlations between satisfaction with services and global satisfaction (n=727).**

features produced similar results with the majority of users being “satisfied” or “very satisfied” with many of the services and site features offered, including all five of the interpretive services. Overall, the highest-rated services were presentations and exhibits in visitor centers (84% satisfied or very satisfied), explanations by area staff (84% satisfied or very satisfied), brochures about the area (78% satisfied or very satisfied), visitor centers (78% satisfied or very satisfied), parking areas (75% satisfied or very satisfied), and maps of the area (74% satisfied or very satisfied).

However, fewer proportions of visitors were satisfied or very satisfied with the quality of the non-interpretive services and opportunities at these sites. For example, only 38% were satisfied or very satisfied with the camping facilities. About half to two-thirds of the respondents were satisfied or very satisfied with the fishing areas (51%), the swimming areas (51%), the restrooms (63%), and the trails (66%).

### Isolating the Interpretive Dimensions of Satisfying Experience

Given the high percentage of respondents reporting being satisfied or very satisfied with their overall visit, the fact that they were less satisfied with the six non-interpretive services, and more satisfied with the five interpretive services, suggests that the interpretive services offered to PCW tourists may together exert a degree of influence on their satisfaction with the overall experience not contributed by the other factors.

A direct test of this relationship involved determining the amount of variation in global satisfaction explained by respondents' satisfaction with the interpretive and non-interpretive services, respectively. Results (Table 1) revealed that respondents' satisfaction with the five interpretive services correlated more highly with the global satisfaction

Type of service rated	Tour group only <i>r</i>
Presentations/exhibits in a visitor center	.67*
Visitor centers	.66*
Explanations by area staff	.63*
Brochures about the area	.63*
Maps of the area	.58*
<i>Interpretive services together R (R<sup>2</sup>)</i>	<i>.76* (.58)</i>

\* = significant correlation ( $p < .05$ )

**Table 2. Correlations between satisfaction with interpretive services and global satisfaction for tour group visitors only (n=95).**

measure than did any of non-interpretive services rated by the sample. Collectively, satisfaction with interpretive services explained nearly half (48%) of the variance in global satisfaction, whereas satisfaction with non-interpretive services explained only 23%. From these data, it appears that the interpretive dimensions of PCW tourists' experiences account for twice as much variation in their overall satisfaction as do the non-interpretive dimensions.

It is important to note that these findings do not indicate that the non-interpretive aspects of the experience were unimportant or negligible. They mean only that the interpretive inputs were more important in contributing to visitors' overall satisfaction. Maintaining the quality of recreational infrastructure and keeping restroom facilities in good condition are essential. However, the greater importance of interpretive services in overall satisfaction suggests that they added value to PCW tourists' experiences beyond that provided by these other factors.

Two bodies of research on satisfaction corroborate this conclusion. Drawing on consumer satisfaction research by Swan and Combs (1976), Pearce (2005) contrasts "expressive" experiential attributes (those that add intangible psychological meaning to an experience) with "instrumental" attributes (those that provide a physical means to experience). He reasons that tourists' satisfaction with tangible infrastructure (restrooms, trails, facilities, etc.) does not capture their *enjoyment* of the experience in the same way it is captured by their satisfaction with the more expressive aspects of the experience. Research by Yu and Weiler (2006) supported Pearce's reasoning. They found that visitor satisfaction was explained largely by intangible or "expressive" factors, while dissatisfaction was determined mainly by tangible or "functional" factors. Thus, the two types of satisfaction (instrumental and expressive) contribute in different ways to global satisfaction. Our findings suggest that the global satisfaction reported by PCW tourists was influenced more by the expressive interpretive inputs than by the instrumental physical inputs. Similarly, Herzberg's (1959) two-factor theory of job satisfaction holds that certain factors (so-called "motivators") are capable of producing satisfaction but not dissatisfaction, whereas other aspects of one's experience (so-called hygienic factors) are basic expectations that can lead to dissatisfaction but not satisfaction. For example, a restroom in poor condition can lead to dissatisfaction, but a restroom in good condition would not necessarily lead to satisfaction. A plausible conclusion from our findings is

Type of service rated	Tour group mean (n=95)	Independent <sup>1</sup> travelers mean (n=632)	Significance (F)
Presentations/exhibits in a visitor center	4.64	4.12	p<.05
Explanations by area staff	4.49	4.17	p<.05
Brochures about the area	4.41	3.93	p<.05
Maps of the area	4.37	3.81	p<.05
Visitor centers	4.52	3.84	p<.05
Parking areas	4.24	3.84	p<.05
Fishing areas	4.05	3.25	p<.05
Camping areas	4.00	3.10	p<.05
Swimming areas	3.40	3.29	NS <sup>2</sup>
Trails	4.46	3.65	p<.05
Restrooms	4.15	3.43	p<.05
<i>Overall satisfaction</i>	<i>4.54</i>	<i>4.09</i>	<i>p&lt;.05</i>

<sup>1</sup>Independent travelers consisted of visitors in family, friendship, or mixed family-friendship groups.

<sup>2</sup>NS = not significant

**Table 3. Comparison of satisfaction levels of respondents in tour groups versus independent travelers.**

that perhaps interpretive services are seen as satisfiers by PCW tourists whereas the condition of the physical infrastructure is seen only as a potential dissatisfier. Both contribute to net global satisfaction, but tourists' satisfaction with interpretive services would be expected to vary more directly with their overall satisfaction, as the correlation coefficients in Table 1 demonstrate.

Given that the interpretive experience for independent visitors can be quite different than those on a guided tour, we further explored whether the relationship between interpretive satisfaction and global satisfaction varied depending on the type of group. Results (Table 2) revealed that the contribution of interpretive services to respondents' overall satisfaction increased even further when the satisfaction ratings of visitors on guided tours were analyzed separately. The satisfaction with interpretive services reported by these visitors explained almost 60% of the variance in global satisfaction.

In an attempt to account for differences in reported satisfaction levels, comparisons were conducted across the nine sociodemographic and trip variables identified in prior research as potentially influential in tourists' evaluation of satisfaction. Specifically, these included number of previous visits (first versus repeat), gender, age, education level, annual income, group size, group type (family, friendship, mixed family-friendship, or tour group), country of residence (Panamanian versus foreign and Panamanian versus US), and respondent's native language.

Six of these variables were unsuccessful in differentiating between satisfaction levels. Contrary to other studies that have reported higher satisfaction levels for repeat versus first-time visitors, no such differences emerged in this study. For all but one service, satisfaction levels also did not vary significantly with gender. Although men did report significantly higher satisfaction than women with respect to fishing areas, no other gender-based differences were found. Likewise, comparisons of satisfaction levels across the variables of age,

education, income, and group size produced no significant differences. Differences were found, however, when satisfaction levels were compared across respondents' type of group (independent versus tour group), country of residence, and native language. These findings are examined further in the following discussions (see also Weiler & Ham, 2005).

To further explore the differences in both global and service-specific satisfaction among guided tour visitors and independent travelers, we compared the mean scores using a one-way ANOVA (Table 3) to look for differences between satisfaction levels of visitors traveling independently (i.e., in family, friendship, or mixed family-friendship groups) and those of visitors traveling with a tour company. For every service except swimming areas, guided tour visitors reported significantly higher satisfaction levels than did visitors traveling independently. Although the *a priori* significance level of .05 is applied in the results reported in Table 3, it is perhaps noteworthy to some that almost all effect sizes were actually larger (most at the .001 or .01 level of significance). Not surprisingly, therefore, the global satisfaction of tour group visitors was also significantly higher than that of independent visitors ( $p < .001$ ). Thus, type of group (tour group versus independent traveler) emerged as an important discriminator between higher and lower satisfaction levels.

Significant differences in both service-specific and global satisfaction levels also emerged when comparisons were made across respondents' country of residence and native language. Panamanian visitors were consistently less satisfied than non-Panamanian visitors with almost all the services offered, including the five interpretive services. Other than for camping and fishing, foreign tourists reported uniformly higher service-specific and global satisfaction levels than Panamanians, and this pattern was repeated when Panamanian and U.S. visitors were compared. Similarly, native English speakers reported higher satisfaction levels for every service except camping and fishing, as well as higher global satisfaction levels. Among non-native English speakers, Swedes also reported a significantly higher global satisfaction level than native Spanish speakers. These findings are not surprising, given the different criteria that domestic and international tourists sometimes apply in judging their satisfaction with tourist services generally (e.g., Armstrong et al., 1997; Pizam & Reichel, 1996; Yuksel, 2004) and interpretive services specifically (Ham et al., 1993; Ham & Sutherland, 1992). Interpretive services in PCW-protected areas apparently are directed more to the tastes of the predominantly foreign tourist market than to nationals. Notwithstanding social equity questions about the degree to which a nation's protected areas might be expected to serve the recreational and interpretive interests of that nation's citizens, this finding makes sense from a service and marketing perspective, given that Panamanian national policy identifies the lucrative international market as a priority (IPAT, 1999). Because 97% of the Panamanians listed Spanish as their native language, it is not surprising that no differences in service-specific or global satisfaction levels were found between Panamanians and native Spanish speakers. Since the two groups consist almost entirely of the same individuals, results corresponding only to country of residence are presented in the remainder of this discussion.

The consistently higher satisfaction levels both of guided tour visitors and foreign visitors is potentially mediated by the degree to which Panamanians and non-Panamanians respectively utilize guided tour services. Our data revealed that while 79% of visitors arriving with tour groups were non-Panamanian ( $X^2 = 32, 1 \text{ df}, p < .05$ ), *both* groups make use of tour operators. This finding is corroborated by a separate study of Panama tour operators (Ham & Weiler, 2000b) which found that approximately one-fifth of the market was composed of Panamanians. Thus, although the higher satisfaction levels reported by guided

Type of group	Tour group global satisfaction mean (n=95)	Independent <sup>1</sup> travelers global satisfaction mean (n=632)	Significance (F)
Panamanians	4.27	3.90	p<.05
Non-Panamanians	4.62	4.14	p<.05

<sup>1</sup>Independent travelers consisted of visitors in family, friendship, or mixed family-friendship groups.

**Table 4. Comparisons of global satisfaction of Panamanians and non-Panamanians depending on whether they were in a tour group or traveling independently.**

tour visitors may to some extent result from the higher satisfaction levels of foreigners generally, at least some of the variation appears to be due to the nature of the guided experience itself.

To test this hypothesis, the global satisfaction levels of Panamanians in guided tour groups and those traveling independently were compared, as were the global satisfaction levels of non-Panamanians in the two respective groups. Results (Table 4) support the hypothesis that the higher satisfaction levels reported by guided tour visitors were not due simply to the higher satisfaction of foreign tourists, generally. Visitors in guided tours were significantly more satisfied with their overall experience than independent travelers, regardless of whether they were Panamanian or foreign. In addition, ANOVA comparing the global satisfaction levels of Panamanian (4.27) and non-Panamanian (4.62) tour group visitors revealed a non-significant difference ( $F=1.57$ ,  $p>.05$ ), as did a comparison of Panamanian (3.90) and non-Panamanian (4.14) independent travelers ( $F=0.81$ ,  $p>.05$ ). Thus, country of residence appears ineffectual in distinguishing between satisfaction levels when type of group is controlled.

A final test of this relationship involved the use of discriminant analysis to assess the degree to which a discriminant function based on the 12 satisfaction measures (one global and 11 service-specific) could correctly classify respondents as Panamanian or foreign as compared to how well it could correctly classify them as being either independent travelers or in a guided tour group. Again the results (Table 5) support the conclusion that the higher satisfaction of tour group visitors is not mediated by their country of residence. Of the two classification analyses, the satisfaction-based discriminant function was correctly able to classify respondents as Panamanian or foreign only 53% of the time, or about the same as chance alone (i.e., 50% given that there were two classification groups). The same function, however, was correctly able to classify 80% of respondents as traveling independently or belonging to a tour group. As observed by Klecka (1980), discriminant function classification results are susceptible to error if the probabilities of actual group membership are widely discrepant. This was the case with both classification variables since Panamanians accounted for 59% of the sample (versus only 41% foreigners) and independent travelers constituted 87% of the sample (versus just 13% tour group members). Accordingly, these prior probabilities of actual group membership were incorporated into the discriminant function in order to improve the accuracy of prediction, and the classification analysis was repeated. This procedure resulted in no change in the proportion of correct classifications for Panamanians versus



Classification groups <sup>1</sup>	Percent correctly classified (unadjusted) <sup>2</sup>	Percent correctly classified (adjusted) <sup>3</sup>	Canonical correlation coefficient
Panamanian versus non-Panamanian	52.5	52.8	.75
Independent traveler versus member of tour group	80.3	81.7	.73

<sup>1</sup> Since using the same cases in the classification analysis as those used to build the discriminant function has been shown to artificially inflate the classification analysis results (Hull & Nie, 1981), separate computer-generated random samples of the 727 cases were used in the two procedures.

<sup>2</sup> Analysis assumed equal probability that a respondent was a member of any group (Panamanian / foreigner or independent traveler / tour group member)

<sup>3</sup> Analysis based on actual group membership probabilities (59% Panamanian vs. 41% foreign, and 87% independent travelers vs. 13% tour group members)

**Table 5. Results of discriminant function classification analyses comparing country of residence (Panama versus foreign) and type of traveler (independent versus tour group).**

Type of service rated	Explanations by area staff	Brochures about the area	Maps of the area	Visitor centers
Presentations/exhibits in a visitor center	.812	.846	.841	.827
Explanations by area staff		.748	.736	.712
Brochures about the area			.930	.808
Maps of the area				.764
Visitor centers				

**Table 6. Bivariate correlation matrix for interpretive satisfaction measures (r).**

foreigners (again 53%) but produced an increase in correct classifications of independent travelers and tour group members (to about 82%). Thus, knowing how satisfied a visitor is, both with specific services and overall, is more indicative of whether the visitor arrived independently or in a tour group than it is of whether the person is a Panamanian or foreigner.

The observed difference between tour group respondents and independent travelers in their satisfaction with restrooms (Table 3) raises the possibility of a sort of Maslowian explanation for the greater interpretive satisfaction level of tour group visitors. Since the basic biological needs of tour group visitors are attended to by their guides, one might argue that they are consequently freer to enjoy and engage with interpretive services more so than independent travelers (who must attend to their own needs). However, the Maslowian hypothesis was not supported by the results of a correlation analysis which revealed that the interpretive satisfaction of independent travelers was actually more strongly related to their satisfaction with restrooms ( $r^2 = .77$ ) than was the interpretive satisfaction of guided tour respondents ( $r^2 = .40$ ). Therefore, the higher interpretive satisfaction level of tour group visitors is due to other factors associated with their guided tour experience.

### Validation of an Interpretive Satisfaction Construct

Large intercorrelations were found among the five service-specific interpretive satisfaction measures (Table 6), suggesting that a high level of “multicollinearity” exists in the data. High

multicollinearity is usually indicated when several bivariate correlations ( $r$ ) reach .80 or higher (Lewis-Beck, 1980), as they do in our data. Of the 10 variable pairs, six produced an  $r$  of .8 or higher and the other four exceed 0.7. The presence of high multicollinearity in the data was further confirmed using the SPSS collinearity diagnostics subprogram.

Depending on a researcher's focus, high multicollinearity can confound regression analyses aimed at producing predictive models since large proportions of shared variance among variable pairs can artificially impact the magnitude of terms in a regression model. It is important to note, however, that high multicollinearity does *not* impact the magnitude of  $R$  or  $R^2$ . Thus, the proportions of explained variance reported in the foregoing analyses are accurate. In addition, since constructing a predictive model of satisfaction was not a purpose of this research, the presence or absence of multicollinearity in the data was not, in and of itself, centrally relevant to the study.

Nevertheless, the strong intercorrelations among the five interpretive satisfaction measures do indicate that they are, in part, measuring the same thing and may, therefore, fit together as a composite construct of interpretive satisfaction for PCW tourists. This reasoning is underscored by the fact that the five services studied were the *only* interpretive services available to PCW tourists. Therefore, if the five satisfaction measures are highly but not perfectly collinear, and if they can be shown to be a strong and reliable grouping of measurements around a larger, more comprehensive satisfaction variable (i.e., "interpretive satisfaction"), this would provide evidence that not only can the contributions of interpretation to tourist satisfaction be empirically identified, but that they can be isolated in aggregate form as a single interpretive satisfaction construct. Tourist satisfaction predictive models might then be able to utilize such a construct to arrive at a more detailed understanding of the relative contribution and causal influences of interpretation in a satisfying experience. In addition, the multicollinearity problem would be eliminated since the five measures would become only a single term in a regression or structural equation model (Lewis-Beck, 1980).

To determine whether such a construct might be extracted from the five service-specific interpretive satisfaction measures, three analyses were conducted. First, since multicollinearity is especially sensitive to sampling error (Blalock, 1979; Lewis-Beck, 1980), it would be helpful to eliminate sampling error as a probable cause of the high intercorrelations. The very large random sample of tourists included in the study ( $N=727$ ) and the high response rate (94%) greatly reduce this possibility. Second, since high multicollinearity impacts the relative magnitude of individual terms in a regression model, but not the variance explained by the model itself, a recommendation by both Lewis-Beck and Blalock is to reduce the number of terms in the model by collapsing the highly intercorrelated variables into fewer factors, and separating out or eliminating others (e.g., those that explain little variance or are unreliable). Following guidelines for multidimensional scaling and construct validation offered by Carmines and Zeller (1979), Kruskal and Wish (1978) and Spector (1992), this was accomplished using a principal component factor analysis of the five service-specific satisfaction measures in order to determine whether the list of five could be reduced to a fewer number. The analysis produced a single solution comprising all five of the interpretive satisfaction variables (eigenvalue 4.2, KMO sampling adequacy of 0.85) that explained 83% of the variance in the overall factor structure. Finally, we examined the reliability of the five-variable grouping to determine whether the individual contributions of each variable to the larger factor varied consistently and whether the factor would be more

	Item-specific satisfaction measure	Correlation with overall construct (r)	Alpha if item removed
	Presentations/exhibits in a visitor center	.90	.93
	Explanations by area staff	.80	.95
	Brochures about the area	.91	.93
	Maps of the area	.87	.94
	Visitor centers	.84	.94
	<b>Overall construct alpha: .95</b>		

**Table 7. Reliability analysis for interpretive satisfaction construct.**

reliable if any of them were eliminated. Results (Table 7) confirm that all five variables belong in the overall construct. First, each of the item-specific satisfaction measures is highly correlated with the overall construct, indicating that each strongly taps some dimension of interpretive satisfaction. Second, the variation in item-to-whole correlations (from .84 to .91) suggests that they are not all tapping the same thing. Finally, the reliability of the five-variable grouping is confirmed by the very high alpha coefficients associated with each item-specific satisfaction measure (all exceed .90). Notably, in no case would the reliability of the overall interpretive satisfaction construct ( $\alpha = .95$ ) be improved if one of the five service-specific satisfaction items were eliminated from it.

Taken together, these results establish the validity and reliability of the multiple-item interpretive satisfaction construct for PCW tourists. Additionally, because the five interpretive services studied represented the universe of interpretive services available to PCW tourists, the high multicollinearity of their respective satisfaction measures, and the cohesive and reliable factor structure they produce, suggest that they collectively constitute the “interpretive dimension” of PCW tourists’ overall experience satisfaction. A final test of the new construct was whether it could explain the same amount of variance in global satisfaction as the five service-specific satisfaction measures collectively explained (see  $R^2$  in the lower first half of Table 1). The “interpretive satisfaction” construct was calculated by summing the values of the five service-specific satisfaction scores. The bivariate correlation between the summated construct and the global satisfaction measure is .67 as compared to the multiple correlation coefficient ( $R^2$ ) of .69 reported in Table 1. Thus the single multidimensional construct explains almost the same proportion of variance in global satisfaction (45%) as was explained by the multiple correlation analysis (48%). Although a negligible reduction in explained variance results, an advantage of using the summated interpretive satisfaction construct in future research and model development is that it avoids the problem of multicollinearity.

### Conclusions and Implications

Four main findings emerged from this research. First is that the global satisfaction of PCW tourists appears to be due mainly to their satisfaction with the interpretive dimensions of their visit, as opposed to other services and setting attributes. Second, findings indicated that only three of nine sociodemographic and trip variables (type of group, country of residence, and tourist’s native language) were capable of discriminating between higher and lower satisfaction levels. Third, we discovered that the relationship between service-specific satisfaction and global satisfaction was especially

strong for visitors traveling as part of a guided tour, as opposed to those traveling independently. Although we found significantly higher satisfaction levels to be associated both with foreign visitors and those in guided tour groups, the hypothesis that the tour group effect was magnified by the dominance of foreigners in guided tour groups was not supported. Tour group visitors had consistently higher satisfaction levels than independent travelers both with interpretive and non-interpretive services and setting attributes, regardless of whether they were national or foreign tourists. Finally, the research succeeded in isolating an interpretive dimension in the global satisfaction of PCW tourists. Taken together, these findings appear to provide evidence that (1) the interpretive dimensions of tourist experience can be identified, (2) these dimensions may collectively comprise a multidimensional construct of interpretive satisfaction, and (3) interpretive satisfaction can exert a positive influence on global satisfaction in a tourist's experience.

Results also suggest that travel as part of a guided tour group can positively influence visitor satisfaction with a range of services and experience attributes. Whether this is a function of the quality of the tour guide, the content of the tour, the itinerary, the length of the trip, the interaction with group members during the tour, pre-trip expectations created by the tour company, or some other aspect of the guided tour cannot be determined from this study's analysis and would be a fruitful avenue for further research. However, previous research on guided tours has supported the notion that it is the presence and quality of the tour guide that most influences visitor satisfaction with guided tours. As we have discussed elsewhere (e.g., Ham & Weiler, 2002; Weiler & Ham, 2001), the degree to which a guide influences the tourist's experience remains an important question for research. Although we found significantly higher satisfaction levels to be associated both with foreign visitors and those in guided tour groups, a conclusion that the tour group effect was inflated by the dominance of foreigners in guided tour groups was eliminated through several post-hoc analyses. These findings appear to provide evidence that being part of a guided tour can exert a positive influence on visitor satisfaction. How and under what circumstances this influence can be expected to manifest itself seems worthy of further investigation.

The extent to which satisfaction with particular experiential components drives global satisfaction, while the subject of prior research (Tian-Cole et al., 2002; Yu & Weiler, 2006; Yuksel, 2000), needs to be further pursued. With the exception of the present study and Pearce and Moscardo (1998), analyses of the relationships between satisfaction and the interpretive and non-interpretive components of visitor experience have not been published. A sharper understanding of these relationships would be of benefit to those charged with allocating limited funds and managing these resources in ways that maximize visitor satisfaction. Taken in isolation, the results of this study suggest that investment in interpretation services in the PCW might enhance overall visitor satisfaction. Whether this would hold elsewhere would require replication of this research in those settings.

However, the findings reported here do suggest that interpretive services can add value to an experience that goes beyond visitors' satisfaction with the condition of physical infrastructure such as restrooms, parking lots, trails, camping, swimming and fishing facilities. In times of austerity, a frequent justification for omitting or eliminating interpretation from recreation management budgets is that there just isn't enough money to pay for everything and that what visitors want most are clean restrooms and access. Although there may sometimes be some truth in such a claim, this study brings into

question whether the issue is really one over the other. As Garcia (1998) found in her study of visitors' reactions to a pilot fee paying program at Mount St. Helens National Volcanic Monument (MSHNVM), visitors want *both* things. However, when asked how the new revenues from fee payment should be used, a strong majority of MSHNVM visitors mentioned visitor services in contrast to infrastructure. Such findings do not imply that basic recreation facilities are unimportant or that they are less important than interpretive services. Rather they suggest that visitors perceive interpretive services as adding net positive levels of satisfaction not provided by basic infrastructure. Therefore, eliminating either potentially diminishes visitors satisfaction, but for different reasons. Our finding that non-interpretive factors contributed significantly less to PCW tourists' global satisfaction than did interpretive services supports the conclusion by others (Pearce, 2005; Swan & Combs, 1976; Yu & Weiler, 2006) that basic instrumental factors such as restrooms and facilities do not contribute in a net positive way to overall satisfaction but rather have only the potential to break even or dissatisfy. Interpretive services, however, have the potential to satisfy (depending on their quality) by impacting directly on the psychological experience of visitors. Our results suggest that the interpretive services offered in the PCW are contributing positively to tourists' satisfaction.

A theoretically relevant outcome of the research was that a single "interpretive dimension" of PCW tourists' experience was empirically isolated and validated. Because the five interpretive services studied represented the only interpretive services available to PCW tourists, the strong intercorrelations and cohesive factor structure of the satisfaction measures corresponding to these services suggests that they comprise an "interpretive dimension" of the overall satisfaction PCW tourists derive from their experience. This finding, while important in that it provides data-based evidence of interpretation's contribution to tourist experience, requires additional exploration. First, the validity of the construct outside of the PCW is untested. Other tourism settings certainly might offer interpretive services that were not available to tourists in the PCW, and some of the PCW interpretive services might not be present elsewhere. In addition, interpretive services offered in any one setting can be expected to change and evolve over time. It is, therefore, doubtful that the service-specific satisfaction measures employed in this research would apply equally in most other situations. In fact, it is doubtful that any single study could produce a universal or generalizable construct of interpretive satisfaction simply because of the myriad forms interpretation can take and the number of factors that can vary from situation to situation. But over time, several studies could succeed in identifying a range of common elements that might comprise a more generalizable interpretive satisfaction construct. The current research has demonstrated that such a construct exists, that it is likely to be multidimensional, that it can be validly and reliably operationalized, that it can explain considerable variation in tourist satisfaction, and that it can be applied in predictive modeling.

Research also is needed to determine whether the PCW is representative of other tourism destinations with respect to the prevalent role that interpretive satisfaction plays in global satisfaction. This is especially important for organizations and businesses that have made interpretation a central part of their marketing and product-delivery strategies. Tourism Tasmania (2003), for example, has invested heavily in the notion that connecting visitors strongly to its core attributes (nature, culture, and wine and food) through effective interpretation will significantly enhance satisfaction, word-of-mouth advertising, and repeat visitation. To the extent that tourists' satisfaction with interpretation in such places is

strongly predictive of their overall trip satisfaction, strategies such as the one Tourism Tasmania has adopted will produce positive results.

Continued research into the interpretive dimensions of a satisfying tourist experience is needed. Based on the results of this research, especially important would be to identify the factors that apparently allow visitors' satisfaction with interpretive services to compensate for, or overshadow, their comparatively lower satisfaction levels with other aspects of the on-site experience. A more informed understanding of such relationships would permit tourism providers to be more strategic in how they plan, design, and deliver interpretive services in accordance with tourists' desired experiences. Government tourism planning bodies and private operators whose strategic tourism plans call for the integration of interpretation in the development and delivery of tourist experiences would benefit from deeper investigation into the relationships between interpretation and tourist satisfaction. In particular, the psychological pathways through which interpretation can influence tourist satisfaction remain largely unexplored. While theoretical explanations of these effects have been offered (e.g., Cohen, 1985; Goldman, Chen & Larsen, 2001; Ham, 1992, 2003; Moscardo, 1996, 1999; Ward & Wilkinson, 2006; Weiler, 1999; Weiler & Ham, 2001), further research is needed to isolate the mechanisms involved and to partition out the ways through which they impact tourist experience.

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**Voices from the  
Profession:  
Principles of  
Successful  
Guided Cave  
Interpretation**

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**Abstract**

Cave tourism is a significant sector of natural area tourism in many parts of the world, and in most situations cave guides play an integral role in the visitor experience, providing interpretation and information. The field of heritage interpretation has a significant body of professional literature and practice, yet little relates to subterranean landscapes. This research explores the guided interpretive methods used and experiences created to interpret Australian tourist cave sites. It taps the voices of experienced Australian cave guides to identify the current personal interpretive practices and identifies some key principles for successful guided cave interpretation. This study is qualitative in nature and utilized a participatory workshop with experienced cave guides, followed by a formal peer feedback process. Nine principles were articulated through the research process. Ham's (1992) four qualities of successful interpretation were affirmed and a further five principles emerged from the workshop discussions: group management, protection, two-way communication, holistic approach, and emotion. The first four principles are variously presented in the existing literature but the fifth, emotion, is less well articulated in the literature.

## Keywords

caves, tourism, cave guides, interpretation, emotion, tour guiding

## Introduction

Tourism to caves is a distinct component of natural area tourism and protected area management. Worldwide, 12% of landmass is classified as karst, that is landscape in which caves are formed (Yugi, 1998), and in many karst areas the intriguing and amazing cave decorations, such as stalagmites and stalactites, have led to profitable tourism industries (see for example Mammoth Cave in USA, Lascaux Cave in France, and Mulu Caves in Borneo). Historically, tour guides have played an important part of the visitor experience in caves for a number of reasons. Originally guides were needed to show the way and ensure that the visitor didn't get lost or fall down internal rock walls; the guide was also an interpreter of the site, explaining to the visitor what it was they were witnessing and experiencing; and additionally, early in the development of cave guiding in Australia the guide also took on the role of protector of the cave (Horne, 1994). Initially their role was to protect the cave from the common behavior of souveniring the limestone decorations, but more recently from harm caused by touching the decorations. Guides continue to be a central component of the visitor experience in caves by providing, among other things, an introduction to the cave environment, interpretation, ensuring the safety and protection of visitors and the environment, and group management. The paucity of research on cave guiding and interpretation was noted by Davidson (2005) during the course of her research that examined staff's and visitor's relationship to place. The participatory study described in this paper was developed to address some of these knowledge gaps and to explore the guided cave experience from the guide's perspective. This study is the first to seek out the voices and perspective of cave guides working in Australian tourist caves and provides an insight into client-guide relationships.

The aim of this study was to identify the key principles of guided cave interpretation used in the field. Whilst we were keen to explore the specific cave environment we also wanted to hear what practitioners, that is cave guides, experienced and what guidelines they used to construct an effective guided tour. As such, the key research question, answered through a workshop with experienced cave guides, was: what are the key principles or guidelines that lead to an effective guided cave tour?

## What the Literature Says About Cave Guiding and Interpretation

Australia has a smaller proportion of karst landscape than other countries, yet there are many popular cave sites such as Jenolan Caves and Buchan Caves that are managed for tourism and to celebrate and protect these significant sites. Whilst cave tourism is a significant industry and cave (or karst) science is a very specific discipline, which informs the management of caves, the literature focusing on visitor management and cave guiding is relatively small. As there is a lack of discussion in the broader tourism or interpretation domain that acknowledges or focuses on karst, the topic of cave guiding can only be found in the broader karst literature. The karst literature is predominantly focused on "scientific" research and discussions that explore the geological genesis, ecology of cave arthropods, and so forth (Davidson, 2005). This is a very particular way of understanding places such as caves, a way of relating to landscape which matches Urry's (1999) concept of scientization. Another section of the karst literature is specific to management issues (or what we call

karst management literature). The management issues discussed include: the impacts of the visitor on the karst environment and how to manage these impacts (e.g. Worboys & Butz, 2003), how to facilitate learning or deliver information (Middleton, 2003; Dunkley, 2003a), visitor motivation and satisfaction (Butz, 2003; Hamilton-Smith, 2003a; Veldman, 1997; Campbell, 1998; Doorne, 2000 and 2003), and a discussion of a diversity of approaches to cave guiding (Hamilton-Smith, 2003b and 2003c; Williams, 2003).

It is from this cave-focused discussion that we glean an emphasis on the aesthetics and multi-sensory elements of caves, and it is on this work that we build. For example, in reference to Plitvice cave in Yugoslavia, Hamilton-Smith (2003b) says: "I would argue that the key to the remarkably impressive management of this park lies in the focus upon the aesthetic appreciation . . ." The significance of the aesthetic to the guided cave experience is discussed later in the paper. The cave management literature also emphasizes the significant role the cave guide has to the visitor experience. Dunkley (2003b), for example, reminds managers that "it is the guide that makes the difference". Hamilton-Smith, McBeath, and Vavryn (2003) also made this point, stating that "the guide is fundamentally important to all cave visitors; each tour should be based in the relationships between tour group and the individual guide(s)" and finally Doorne's (2000) work also identifies that rapport between the visitor and the guide is one of the three visitor satisfaction variables.

The above work is drawn primarily from the karst (or cave) management literature, but there is clearly a significant body of knowledge around heritage interpretation and tour guiding that can inform guided cave interpretation. The most commonly used interpretive technique in cave tourism is the personal guided tour, which is considered in the broader interpretation literature to be more effective than non-personal interpretation. According to McArthur (1998) this is because the interpreter can respond to changing conditions, is more effective at delivering complex and abstract ideas, and is regarded by audiences as more interesting and of greater value. Interpretation theory is described and detailed in a range of literature including Ham (1992), McArthur (1998), Knudson, Beck, and Cable (1999) and Pierrsené (1999).

### *Principles of Interpretation*

A number of authors have identified key principles or qualities for effective and successful interpretation and the content of these principles remains a subject of ongoing discussion and debate (eg, Tilden, 1977; Lewis, 1981; Beck & Cable, 1998; Ham, 1992). According to Tilden (1977), who wrote the first seminal work on interpretation, there are six principles of interpretation (see Table 1). In 1992, Ham suggested that interpretation should have four qualities: to be enjoyable, relevant, organized, and thematic. Later, in 1998, Beck and Cable reworked the principles elucidated by Tilden and Mills and added others. More recently Crabtree (2000), using Ham's principles as a basis, suggested emphasizing pleasure, relevance, and provocation.

As part of this study a review of selected key texts and papers in the interpretation and tour guiding literature was undertaken to identify a common set of key principles of successful interpretation and guiding. Eight sources offered principles of successful interpretation and tour guiding, and are summarized in Table 1. The principle mentioned in all the studies was that interpretation should be a process of revelation or bringing things to life in the minds of the visitor. Six of the sources identified the need for interpretation to be relevant to the audience and environment, and five of the sources mentioned the importance of

Principles of successful interpretation	Author	Beck & Cable (1998)	Crabtree (2000)	Ham (1992)	Knudsen, Beck & Cable (1999)	Lewis (1981)	Pastorelli (2003)	Tilden (1977)	Weiler & Ham (2001)
Accuracy						✓			
An art		✓			✓			✓	
Appreciation of natural/cultural environment/beauty		✓					✓		
Enjoyment			✓	✓					✓
Ethical							✓		
Good communication							✓		
Holistic		✓			✓			✓	
Involvement						✓	✓		
Organized				✓		✓			✓
Passion		✓				✓			✓
Provocation		✓	✓		✓		✓	✓	
Promote optimal experiences		✓							
Relevance		✓	✓		✓		✓	✓	✓
Revelation / brings to life		✓		✓	✓	✓	✓	✓	✓
Safety						✓			
Specific for children		✓			✓			✓	
Thematic				✓					
Use high-tech gadgetry		✓							
Use right amount information		✓							

**Table 1: Principles and guidelines of successful interpretation and tour guiding**

provocation. It is interesting to note that the principles most commonly mentioned were those put forward by Tilden in his seminal work. This suggests that many key authors in the fields of interpretation and tour guiding continue to see the relevance and benefit of Tilden's original principles, although it might be time the interpretation field looked more critically at these principles.

### *Tour Guiding*

The dominant experience for the visitor of caves is the guided cave tour. Although guides are employed across a wide range of natural and cultural environments, a tour guide is generally defined as a person who guides groups or individual visitors around the buildings, sites, and landscapes, providing inspiring and entertaining interpretation (European Federation of Tour Guides Associations, 1998). Tour guides are expected to perform a wide

	Almagor (1985)*	Cohen (1985)	Haig (1997)*	Holloway (1981)	Hughes (1991)*	Pond (1993)	Weiler & Davis (1993)*
Access to non-public areas		✓	✓				✓
Cultural broker / mediator		✓		✓	✓	✓	
Information giver		✓	✓	✓	✓		✓
Interpreter / educator	✓	✓	✓	✓	✓	✓	✓
Leader	✓	✓	✓	✓		✓	✓
Motivator of conservation values/role model		✓	✓	✓		✓	✓
Navigation/safety	✓	✓		✓			
Public relations/company representative		✓		✓		✓	
Social role/catalyst		✓	✓	✓	✓	✓	✓
Tour & group manager / organizer		✓	✓		✓		✓

\* Empirical studies based on ecotourism and nature-based tours.

**Table 2: Key roles and attributes of general and ecotour guides identified in selected studies** (Source: Black, R. S. (2002). *Towards a model for tour guide certification: An analysis of the Australian EcoGuide Program. Doctoral thesis, Monash University, Melbourne, Australia.*)

range of roles in facilitating the tourist experience, which might include leader, information giver, navigator, health and safety officer, organizer, and mediator. These roles are summarized in Table 2 (see Holloway, 1981; Cohen, 1985; Pond, 1993; Weiler & Davis, 1993), which is based on a review undertaken by Black (2002) of the key literature on the roles of general, ecotour, and nature guides. A summary of the review findings is presented in Table 2.

To date, most of the tour guiding research has focused on the guides' performances, tourist satisfaction, and guides' roles (for example Geva & Goldman, 1991; Hughes, 1991; Forestry Tasmania, 1994; Ham & Weiler, 2002) and limited research has been undertaken from the tour guides' perspective as to what makes, for example, a good guide or a good guided experience (Ballantyne & Hughes, 2001). Arguably all of these roles are expected of the cave tour guide, especially the roles of educator, information giver, motivator of conservation values, navigator, cultural broker, and group manager (Hamilton-Smith, 2003b and 2003c; Williams, 2003; Hamilton-Smith, McBeath & Vavryn, 2003; Dunkley, 2003b). We argue there are two gaps in the literature, the first being the nexus between general tour guiding and cave tour guiding. Karst and cave guiding theory and discussion has been

presented to karst-specific audiences with little delivery and attempt to inform the broader interpretation and guiding community. The second is the limited effort to draw on guides' own experiences. Even the general tour guiding literature rarely hears the guides' voices, in particular about the client-guide relationship and the constraints placed upon them in delivering a tour. Haig (1997) suggests that further research is needed to hear the "voice" of the guides themselves, particularly to assist in identifying the skills that guides feel contribute to the success of their tours. Thus, this research attempts to identify the key principles of successful guided cave interpretation from the perspective of practicing cave guides.

## Method

The research position began with an assumption that practitioners in the field of cave guiding would be able to draw on their experiences to answer the question: what are the key principles of interpretation that lead to an effective guided cave tour? We facilitated a process where professional cave guides and managers provided the data and were participants in the analysis, ultimately aiming to involve the cave guide community in a formal reflective process. The intention of this approach was to provide a conduit and synthesis for knowledge previously only available anecdotally at practitioner forums—that is, knowledge and understanding that had not yet been documented or reviewed in the context of existing interpretation and guiding literature. We felt that a participative approach could best achieve this. Wadsworth (1998) explains that participatory research is where the researcher(s), researched, and researched-for overlap to some extent. That is, the researcher(s), researched and researched-for (or what Wadsworth calls the *critical reference group*) are the same people at various stages. Whilst the two authors took on researcher roles not adopted by others (for example, facilitating the workshop, collating the data, physically organizing the printing of the report) their roles also extended to researched-for (the findings would inform their day-to-day practice of teaching). The researched (cave guides participating in the workshop) were also the researched-for (cave guides that would use this synthesized knowledge) and were at all times the same group, or a subset of the same group.

Reflecting on Kemmis and McTaggart's (2005) first attribute of participatory research—which is shared ownership of the research—we acknowledge that the responsibility for this research clearly fell with the authors of this paper, but also feel there was a shared ownership of the research data, and certainly a shared ownership of research outputs. Consistent with a participatory approach (Kemmis & McTaggart, 2005) the researchers—Charles Sturt University academics and workshop participants—were all concerned about the links between theory and practice. Each participant's personal and individual experience provided an interpretive framework to assess what was "good" interpretive guiding practice; and this knowledge was added to by their observations of other guides' practices. They located their own survival and success as an interpretive guide within this social and historical map. They had their own stories of what worked and what didn't and had developed their own criteria for assessing a "successful" guided cave tour.

A central part of the method was the organization of a workshop for practitioners held at a cave guide conference titled "Cave gatherings at Mole Creek, Tasmania". The cave guide conference is a biennial gathering of cave guides from Australian and New Zealand, hosted by one of the cave management agencies and the Australasian Cave and Karst Management Association. The workshop for this study, "Cave tourism and the use of senses," was attended by 25 cave guides and managers from across Australia and New Zealand (approxi-

mately 30 attendees at the conference overall). Many of these people had been working in the industry at various levels for 10 or more years. The workshop discussion constituted the core data for this study, which were then analyzed by the authors of this paper. The workshop participants as well as a further six practitioners and one academic in the field reviewed this synthesis of the workshop results.

The workshop process and analysis proceeded as follows:

1. A three-hour participatory workshop with experienced cave guides and managers was held at a cave guide workshop in Mole Creek Tasmania. An overview of current interpretation and tour guiding principles: the authors provided a brief summary of Ham's (1992) interpretation principles as the starting point for reflecting on participants' experiences. We offered an overview of existing theory because we wanted to go beyond this theory, and the exercises that followed this introduction were designed to provoke ideas and stories around cave guiding that drew on different language and went beyond the accepted framework. Ham's work was chosen for the introduction because it is accepted by the industry and was familiar to many of the cave guides, as he has delivered many workshops throughout Australia. The weakness of this method was that by beginning with existing principles we would be setting them up to be an ongoing framework for any following reflections of the guided experience.
2. Participants reflected on what made guided cave interpretation unique, and from their experience identified what made successful guided cave interpretation. Participants were asked to interview another workshop participant about a "satisfactory" cave tour experience, and the possibilities for future guided cave interpretation. Information was collected from individuals, and synthesized in small groups. The collations from the small groups were then presented to the larger group to build a list of significant features or qualities of successful guided interpretation.
3. Post-workshop, the researchers reduced the data by looking for common themes (Crotty, 1998; Miles & Huberman, 1994) that did not fit into Sam Ham's categories.
4. The resulting themes and principles were then circulated to workshop participants and other practitioners in the field for review and refinement. As such, the majority of active cave guides in Australia and New Zealand had the opportunity to comment on these findings. The draft report was sent to every known cave tourism site in Australia and New Zealand for comment. No amendment was suggested to the broad set of categories that were identified, but clarification and comment was made regarding the suggestions that had been included. During this stage we also asked for examples of how these principles were applied, as we wanted to produce a report that went beyond a conceptualization of guided cave interpretation and offered concrete examples of how these principles could be applied.
5. The researchers amended the set of principles according to comments from practitioners and disseminated the principles to workshop participants and the wider cave management community (Davidson & Black, 2005).

The result of this process was an expanded understanding of what makes an effective guided cave tour derived from those people who collectively have at least 200 years of cave guide experience among them. The responses focused on the relationships between guide and



visitors. As such the findings are not specific to the individual cave environments that each cave guide works in, but might be appropriately generalized to other cave environments or guided environments. As researchers our task was to provide a forum to articulate, and synthesize these stories and to communicate these to the broader discipline (Davidson & Black, 2005).

### **Results: Principles of Successful Guided Cave Interpretation**

Nine principles of successful guided cave interpretation were articulated through the participatory process described above. We began with four principles outlined by Ham (1992), which the cave guides affirmed as being valuable and relevant to cave interpretation and their experience. The discussion then moved away from the literature to draw on the experience of the cave guides themselves. Five additional principles were identified, all of which, to some extent are explicated in the guided interpretive literature, but offer a different focus to the guided experience. The final nine principles provide a framework for a positive and effective guided tour experience from the perspective of the cave guide and managing organization.

The four qualities for successful interpretation which served as the starting point for this study are:

Principle 1: Visitor enjoyment: Interpretation activities should be designed for visitor enjoyment; this principle is sometimes called “entertainment” (Pierssené, 1999).

Principle 2: Relevance to the audience and site: Interpretation needs to be both relevant to the audience and to the actual feature being interpreted.

Principle 3: Organized: Interpretation must be well-organized so visitors can easily follow what is being presented.

Principle 4: Key theme: Interpretation should have a key theme/message that has the capacity to tie all the key pieces of information together (Ham, 1992).

Five additional guided cave interpretation principles emerged from the analysis of the workshop discussions. The principles are grouped into five categories:

1. Group management: The guide strives to make each person feel recognized as an individual but also belonging to the group.
2. Protection: The guide provides an experience in which participants feel safe but also one in which the environment itself is safe.
3. Two-way communication: The interpretive exchange works best if two-way communication is used (i.e. the guide is an active listener, and the group participates in sending messages).
4. Holistic approach: the guide provides an interpretation of the site that demonstrates the site’s relationship beyond the immediate area (this may be ecologically, socially, or other).
5. Emotion: The guide is facilitating an experience that has emotional dimensions to place and people.

Four of the principles, group management, protection, two-way communication, and a holistic approach to interpretation, are discussed in the existing literature on interpretation and tour guiding. However one of the principles, emotion, is less clearly articulated in the literature and, according to guides in this study, is a key component of guided interpretation. The five principles we have identified as particularly relevant to cave-guided interpretation seem to have a commonality of “relationship,” between tour guide and visitor, between visitor and visitor, between people and place, and between place and place.

### **Principle 5: Group Management**

The cave guides noted that a central part of effective interpretation is the application of interpersonal and group management skills, a principle that has been identified in the literature as one of the key roles and/or skills of tour guides (see Pond, 1993; Pastorelli, 2003; Black & Weiler, 2005; Yu, Weiler & Ham; 2001). This is particularly important where the audience is captive—once individuals have joined a cave tour they are often locked into a cave and obliged to continue being part of the audience. The relationship between guide and visitors begins at the first meeting where visitors are briefed on the environment they are about to visit, and the expectations of the guides for the activity are made clear. The guides illustrated that the aim of group management is to facilitate rapport between guide and visitors, and between visitor and visitor, as well as to achieve other desired outcomes of safety for visitor and site, and increased awareness. Some examples of group management strategies are:

In some places it is possible to string the group out through a large cave or chamber and let the visitors wander and discover for themselves, rather than having the group traveling tightly clustered together. The guide can then move freely along the “people string” encouraging, answering, questioning, and managing the entire group unobtrusively.

New computerized lighting can assist in group management. Lighting can “massage” the lighting pull or attract the attention of the visitor group, and also push the visitor flow by dimming lighting progressively off. These developments, if well designed, can ease the need for a guide to be continually shepherding the visitor.

The guides also talked about emotion management of the group—that is, creating an environment in which the group felt physically and emotionally safe as well as developing a relationship and rapport with the group. In terms of establishing rapport with the group, the guides mentioned techniques such as providing a friendly demeanor, respecting each group member, taking a relaxed approach to structure and management of the group, and using humor (Davidson & Black, 2005). For example, one guide said:

To avoid friction between families and visitors without children it is important to harness the children’s energy, enthusiasm and curiosity. Sending them ahead as “the advance party” or “our fearless leaders” to find the next point of interest is fun for them, frees their carers to concentrate on the cave and is often greatly appreciated by those without children.

### Principle 6: Protection

A cave tour involves interactions between the tourists, cave guide, and cave environment. Both the tourists and the guide need to be “safe” in the relationship that exists for the brief time of the tour. The cave guides in this study emphasized that the tour experience should be one where the group feels physically and emotionally safe, indeed that it *is* safe. However, the cave is an environment that does hold potential dangers and can also provoke fears and feelings of claustrophobia. The tangible dangers of falling down internal cliffs or becoming lost are managed by the infrastructure of paths, rails and lighting. But these techniques don’t necessarily calm the perceptions of danger, and so the cave guide needs to develop skills in preparing the group for the environment they are about to enter, and in reading signs of discomfort or panic. As with the concept of group management, managing the perception of safety during the cave tour experience becomes a core part of the guides’ roles. What is perhaps not explored in the literature that argues guides perform an important role as motivator of environmentally responsible behavior and conservation values (Pond, 1993; Weiler & Davis, 1993; Haig, 1997) is the immediate task of protecting place and visitor that is performed by the guide. One guide described an effective tour that he/she had participated in:

The tour was participatory and the guide made sure the group felt safe. It was well structured and he demonstrated safety and impacts on the cave.

Another guide commented:

The guide can use body language to help facilitate a satisfying experience and build group safety. They can encourage by using emotional language, creating comfort, a different atmosphere, safety, and an expectation and excitement at the beginning of the tour. Safe but exciting.

### Principle 7: Two-way Communication

Most definitions refer to interpretation as a form of communication (see Ham, 1992; Interpretation Australia Association, 1996; Brochu & Merriman, 2002). The guides in this study suggested effective interpretation incorporates an emphasis on a two-way process of interaction and communication. This principle has already been alluded to in terms of group management and facilitating safety; it is a core component of relationship development and managing the group, but it is also the very essence of sharing knowledge with the tour group. This principle suggests that for guides it is just as important to “listen” to the group as it is to give them something to listen to, not forgetting that listening might be more about body language than words. The cave guides emphasized the need to be able to interpret the body language of the audience and be aware of their own body language; they suggested the aim is to involve the group in the tour in a manner that allows them to be participants, not just an audience; this might be through encouraging and answering questions. It is also appropriate for visitors to be silent, as this provides the opportunity for visitors to experience the cave with less mediation from the guide. A successful tour feels like a shared experience for both visitors and guides. As one guide said: “The guide is part of the tour; they shouldn’t be the tour.” Examples described by the guides are:

This tour was special because it provided excellent information in an enthusiastic and question-and-answer style for the whole tour. The guide only spoke briefly, and asked what was of interest to the people. The guide then spoke on what had been requested.

Communication can be enhanced when guides fulfill a range of roles: ticket seller, where they talk with visitors and answer pre-tour questions, leading or accompanying tours, and then being available after the tour to answer post-tour questions. Two-way communication can be particularly enhanced when the guide accompanies the tour rather than leads or directs it.

### **Principle 8: Holistic Approach**

The interpretation of karst or caves is similar to other aspects of environmental interpretation—each feature is irrevocably connected to environmental and social processes and events outside the immediate area. Effective interpretation, whilst providing specific and detailed information about the site, is also able to explain how a site connects to the broader ecology, geology, geography, or social aspects of the landscape. This is particularly relevant in the interpretation of caves, as the processes that form and influence caves are both above- and below-ground environments. One can't understand the karst environment without understanding these links and connections. The cave guides in this case are emphasizing Tilden's (1977) fifth principle that any interpretation should present a whole rather than a part. While this principle is not new and is mentioned in the interpretation literature (Tilden, 1977; Knudson, Beck & Cable, 1999; Beck & Cable, 1998; Pierssené, 1999) this research supports the previous findings and more uniquely presents it from the perspective of the guides themselves. This principle suggests that using an holistic approach, a guide can connect together different parts of the cave system such as the rock formation process (geology) with water movement through above- and below-ground landscapes (hydrology). The cave guides suggested that cave interpretation in particular draws upon a multitude of knowledges (they called them "ologies," eg. ecology, geology, biology, and so forth). The principle is explained by one cave guide:

I like to try to link the above ground with the underground—particularly good with the Orient Cave because we can go up track, and if there's time for a short above-ground walk, I can talk about the dissolving process on the surface, and the features of rock. That helps people to understand the terrain and that the process starts on the surface. I will identify unique surface features which might be associated with particular plants or animal droppings. Sometimes a rare bird is associated with a particular plant that lives on the limestone—for example the rock warbler, or we might see possum droppings, or feathers. If I hear a lyrebird I'll tell that group. I point to where we will be inside the hill. "That is where we will be" and sometimes I will do it in the cave. This way, the guide-visitor relationship is starting to evolve before I go into the cave.

### **Principle 9: Emotion**

Cave guides in this study suggested that they aim to provide the participant with an emotional experience. They did this by promoting the aesthetics of the cave and fostering an emotional experience through deliberate stimulation of the senses: sight, sound, smell,

space, and touch. Whilst the cave environment provides much in the way of visual delights, it also provides an absence of vision—black voids that are not lit by the sparse lighting or guide’s torch. The absence of vision is a powerful component of the cave experience, and perhaps for this reason the cave tour can be a more complete aesthetic experience—an experience that reveals beauty beyond the visual. The guide makes a conscious effort to move beyond a focus on visual engagement in order to stimulate other senses for the visitor. For example, the cave guide can ask the group to be silent and listen, they can control the light and take away vision, and by limiting other sensory stimuli they can introduce the visitor to the haptic (sense of touch) experience of constant temperature and enclosed spaces. One guide gave an example of the impact of the tour on a young visitor:

A teenager’s response on her first-ever caving trip (after going) back into the cave alone to sit in the darkness ... said to her mother afterwards “I could hear the earth thinking.”

Other guides ensure that there is space and time for visitors to “feel” the cave:

Darkness, glow-worms, cool air, and sound of the stream can be used to create an experience. Rather than talk about glow-worms, I gave people a few minutes standing in the darkness to look at them, I bought foam mats for people to sit on and get comfortable ....

Guides are also very aware of the emotional impact of the knowledge about caves, as well as their physical presentation:

The size, time scale, and majesty of a cave can be humbling to many visitors.

The interpretation and tour guiding literature certainly highlights the benefits of appealing to the senses as an effective method of presenting interpretation and connecting with the visitor. It is mentioned by a number of authors (see Lewis, 1981; Sharpe, 1982; Pond, 1993; Beck & Cable, 1998; Moscardo, 1999) as a means of providing variety to enhance the interpretive experience. Moscardo (1999) refers to Brockmeyer, Bowman, and Mullins’s study (1983) that suggests that visitors encouraged to use their senses on a nature walk gave a tour a significantly higher rating of enjoyment than visitors who took a walk where observation and listening to the guides were the main activities. However, what distinguishes the findings of the present study from others is that cave guides placed a considerable importance on delivering an emotional experience, rather than an intellectual or learning experience, and at the very least aimed to achieve an aesthetic knowing. The guides did not perceive providing an emotional experience as a tool or method of enhancing the tour, but as their core agenda; the guides wanted the experience to be a “feeling” experience. One guide said:

... this is special, and I say I want you to get right up close and look and enjoy it ... and then I’ll shut up as being silent gives people a chance to experience the cave.

And another guide recounted their experience as a visitor:

The guide created a sense of adventure and mystery. There was lots of the unexpected, and it was magical among the glow worms, the lights, the quiet, and the build up ....

### Discussion

Using Australian cave guides as a case study group this study sought the voices of guides in order to identify key principles for successful cave guiding, and guiding more generally. This paper presents a set of principles for successful guided cave interpretation based on the knowledge and experience of professional cave guides. To date, the voices of tour guides have rarely been heard (Haig, 1997; Ballantyne & Hughes, 2001) yet their perspectives and views can offer a valuable and alternative way of viewing the client-guide relationship, the constraints in delivering tours, and the guide-environment relationship. The study has provided an opportunity to seek guides' views and perspectives on the key principles for successful guided cave tours, hopefully informing guided tours more generally. Based on the explicit or tacit feedback they experience every day of their working life, guides participating in this study have reaffirmed the significance of the accepted knowledge in the interpretation and guiding literature, and have also raised questions around the emphasis of some dimensions in relation to what makes an effective guided experience. Whilst this was essentially a case study of Australian cave guide experiences, the findings reaffirm general interpretation principles, and the questions raised would likely be applicable to interpretive tours in general, as well as cave guiding in other countries.

The process of seeking cave guides' views and experiences reaffirmed the established interpretation and guiding literature, but what emerged from the voice of the profession is a different emphasis and an articulation of "emotion" that until recently was subdued in the existing literature. Interpretive theory has referred to "emotion" with terms such as "passion," "enjoyment," and "provocation," and argued that "emotion" is a tool to achieve heightened awareness and knowledge of place (see Table 1 review of literature). Effective interpretation provides as much an emotional experience as an intellectual experience; it is able to facilitate wonder, inspiration, mystery, and sense of adventure. More recently the emotional dimension of interpretation has been made more explicit as a core component of the interpretive experience. For example, Brochu and Merriman (2002), drawing on ideas from a seminar conducted with Larsen, emphasize emotion by suggesting that effective interpretation creates opportunities for people to form their own intellectual and emotional connections to the meanings and significance associated with a place. The profession is also according higher status to emotion. For example, the US National Association for Interpretation has recently revised its definition of interpretation to more explicitly highlight emotion:

Interpretation is a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource (cited in Brochu & Merriman, 2002, p.14).

However, the findings of this study suggest that cave guides seek to explicitly create an emotional experience for the visitor for its own sake; for example, the guide creating a sense of adventure and mystery and making visitors feel as though it was also their first tour (Davidson & Black, 2005: 15). The guides reversed the order of importance, suggesting that a core outcome is the emotional experience and that a greater knowledge

of the place would be considered a bonus rather than essential. We propose that the centrality of emotion to guided interpretation is common to all guided experiences, and not exclusive to cave guiding. It is hard to believe that people would prefer their tour of the forest, the ghost town, or the wetlands to be a purely information and awareness raising experience. The authors believe the proposed principles provide a different emphasis to Ham's by going beyond a cognitive focus and emphasizing the emotional and sensual aspects of the experience that are relevant to both cave guided interpretation and general guided heritage interpretation.

There are two elements to the emotional experience. The first is the emotions produced by the aesthetic experience, and the second is emotions as part of the brief experience of belonging to the group and the relationship with the guide. The use of aesthetics and multi-sensory communication methods is accepted practice in interpretation as a means of achieving a more effective learning experience (Hamilton-Smith, 2003d; Moscardo, 1999; Wearing & Neil, 1999). In this study, the guide did not just stimulate the senses as a method or technique to enhance the learning experience. Rather, they sought to facilitate an emotional experience that was based not just on visual stimuli but a more complete aesthetic experience. The emotional experience was not so much a tool for learning as an end point in itself, for example the guides in this study indicated they felt they were "successful" if they fostered an emotional response of excitement, awe, or wonder.

The engagement of multiple senses in the experience not only opens the experience to the affective domain, it also contributes to a shift away from a focus on the "visual" and knowledge as visually acquired. Whilst we undoubtedly use all our senses in "making sense" of our experiences, our cultural and biological emphasis is on the visual and results in a hegemony of vision (Porteous, 1996; Urry, 1999, p. 35). It is not so much that we have failed to use senses other than sight; rather we gather most of our cognitive information from the visual sense and the *discourse* of understanding and sensing is dominated by the ocular. That is, we value the visual and express our knowledge in ocular terms. We believe that recognition of the full range of senses to achieve an affective outcome is part of a shift toward recognizing the body in the tourism experience (Markwell, 2001; Veijola & Jokinen, 1994), and according greater legitimacy to affect in the interpretive experience.

The second element of the emotional experience mentioned by the cave guides was the need for emotion management to ensure that visitors felt physically and emotionally safe. This is particularly important in a dark, enclosed cave environment that can be confronting for a visitor. It also involved the development of a relationship or rapport with the visitors, a relationship where the visitor felt valued as an individual, and not just another body to take through the caves. This aspect of emotion management deserves further exploration following on the lines of Arlie Hochschild's work in the service industry of airlines (Hochschild, 1983).

## Conclusion

Our participatory study has revealed that cave guides emphasize the emotional experience for the visitor, presenting it as a core component of the guided experience rather than a tool to achieve more productive outcomes. We suggest that this emphasis is true not just for guided cave tours but for guided tours in general. The cave guide 'voice' also reiterated the

general principles of guided interpretation currently expressed in the literature. The more explicit acknowledgement of emotion, of valuing the emotional experience and giving it priority reflects a current trend in the profession, and might be understood as a shift from a cognitive and visual emphasis to valuing the multi-sensual and emotional nature of the visitor experience.

This shift in emphasis has implications on how guides are trained and evaluated and how the industry of tour guiding in general presents itself. We are already seeing this shift in the redefinition of “heritage interpretation” in the UK and United States. The skills, knowledge, and understandings required by tour guides have been well documented in the tour guiding literature (Weiler, Crabtree, & Markwell, 1997; Crabtree & Black, 2000). However, this study suggests that if we value the emotional elements of guided tours then guides also need skills to facilitate, or make available, an emotional experience for visitors.

There are also implications for how the industry evaluates its success and success of guides. Evaluation of interpretive experiences in the future may place more emphasis on the success of an emotionally stimulating experience, and require a broader range of evaluative tools such as observing the delivery of a tour or testimonials from visitors or peers, rather than relying on exams or other documentation.

It is hoped that the findings of this study will contribute to a better understanding of guided interpretation and more specifically cave tours. Results of this study suggest areas for further research. The review of the literature revealed the paucity of published material available in the field of cave tour guiding, particularly from the tour guide’s voice. Opportunities exist for research, for example, to include a comparative study with guides working in terrestrial environments to determine if the emphasis articulated by the cave guides in this study is unique to this field. It would also be useful to do a comparative study across cave guiding in other countries. We support Ballantyne and Hughes’ (2001) call for work exploring how guides view their role, and the range of techniques guides use to interpret the natural and cultural environment. What do guides perceive as their strengths and weaknesses? How familiar are they with the principles of best practice guiding and interpretation? Other studies could investigate the tour guide’s perceptions of the emotional response of the visitors. Additionally, there is a need to explore emotion management, the guide-visitor relationship, and the guide-environment relationship. In amongst the volume of work that is yet to be done on guided interpretation we hope the element of emotion continues to be attributed a place of value and priority.

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# **Geointerpretation: The Interpretive Potential of Maps**

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## **Abstract**

Interpretive centers are well-known sources of geographic information—providing visitors with maps and facts about noteworthy places. Yet research on the effectiveness of interpretation in conveying geographic information is limited. Managing natural and cultural resources creates a need to communicate to the public about these places at both small and large scales. This raises the question of how people perceive different types of spaces and how they learn geographic and spatial information.

This paper reviews the literature on spatial cognition, providing a theoretical and empirical basis to suggest strategies for interpretation. The recommendations of this paper are to: 1) design geographic interpretation around the three components of spatial knowledge; 2) create interpretive maps by blending the principles of map and exhibit design; and 3) provide visitors with multiple opportunities to learn about a geographic setting. Maps have considerable potential as tools for connecting visitors to the meaning of places.

## **Keywords**

interpretation, geography, resource management, visitor maps, spatial knowledge

## Introduction

Maps are an underutilized resource in the interpretive profession. Maps have the power to connect people to natural and cultural landscapes that are too large to experience directly. This is important for park and natural resource managers who are tasked with helping people understand the significance of watersheds, habitat corridors, historic districts, and cultural regions. For instance, maps can help visitors see the complex environmental interactions that enable a rare species to flourish or provide water to a large city. However, due to the lack of knowledge in the interpretive profession about how visitors learn geographic information, many maps suffer from poor design and are not used to their full potential. Although experienced map users may be able to compensate for poorly designed maps (McKendry, 2000), the majority of visitors may miss important information.

Resource interpretation connects visitors to the meaning and spirit of places. Yet meanings occur at a variety of scales and may not be apparent to the casual observer. Visitors may therefore have a difficult time forming a personal connection with the resource—a fundamental goal of interpretation. Many sites do not currently facilitate spatial learning due to a lack of understanding about the spatial knowledge of visitors. Research on spatial learning is critical to developing techniques for connecting people to both small and large landscapes. This paper draws upon findings from research in spatial cognition—a subject that has received significant attention from the fields of geography, environmental psychology and cartography—to make recommendations for interpretation. Integrating this wealth of knowledge with the principles of interpretation may be the key to connecting visitors to important resources.

## Geographic Interpretation

The fields of recreation and tourism benefit considerably from the concept of *sense of place* that was adapted from the field of geography (Hall & Page, 2002). Sense of place refers to the attachment that people have to individual places. It follows that *sense of space* can be used to describe people's understanding of the meaning derived from the spatial relationship of places. Interpretive sites are more than just a collection of natural formations, historic buildings, or ancient ruins. These places interrelate spatially, giving the overall landscape a meaning of its very own. People relate to these large spaces in a different way than they relate to individual places (Peuquet, 2002). Visitors may connect to the setting as a whole and develop a sense of space through targeted geographic interpretation.

The trend in the world of geography is to shorten the word *geographic* to *geo* and combine it with other words to create new terms. Words like geocaching and geoinformation emphasize geographic or spatial ways of thinking about a subject (Longley, Goodchild, Maguire, & Rhind, 2005). In a more interpretive context, a tour of a city and the surrounding area is sometimes called a geohistoric tour (Kitchin, 1997). Similarly, geotourism is defined as sustainable tourism that enhances the geographical character of a place (National Geographic, 2006). It therefore follows that geographic interpretation should be known as *geointerpretation*.

## Maps and Interpretation

Nearly every visitor center, interpretive center, museum, or kiosk provides geographic

information in some form—usually a map. However, visitor maps frequently suffer from poor design and are not used to their full potential. This may be due to the fact that the use of maps specifically for interpretation has received limited attention from the research community. Knopf (1981) first addressed the subject by studying the role of geographic information in visitors' understanding of the events that took place at Gettysburg National Park. The author found that first-time visitors who participated in the Electric Map and Cyclorama programs in addition to a tour of the park reported significantly higher levels of clarity regarding events at Gettysburg. The Electric Map program combines a room-size model of the battlefield with audio narratives and light displays. The Cyclorama program takes place in a building with a 360-degree painting of the landscape and uses narration and lighting effects to emphasize landforms, battle events, and cause-effect relationships. Knopf (1981) considered the order of visitation and found higher levels of clarity in patterns that began with the Electric Map. A limitation of this study is that the results were based on self-reported perceptions of clarity without the use of pre- and post-tests. The author recognized this limitation and called for studies on the chain of interpretive experiences and the effectiveness of spatial orientation programs. To date this challenge has gone largely unanswered.

Spatial learning of first-time visitors has long been an area of study for tourism researchers; however, these studies primarily focus on urban environments. A study by Young (1999) aimed to extend this knowledge to include tourists' spatial awareness of natural environments. Visitors to Australia's Daintree National Park created sketch-maps of an area within the park. Results indicated that visitors experienced difficulty in conceiving the area spatially. Many visitors drew non-spatial representations, relying instead on symbolic impressions of the area. The spatial drawings were low in quality or drawn at an inappropriate scale. The author concluded that visitors possessed almost no spatial context within which to frame their experience. Although the ability to sketch a map depends on many factors, this study may point to a need for interpretation that focuses on the geographic setting of a place. Young (1999) asserted that the role of spatial knowledge in place interpretation remains unknown and recommended further research on the subject. Such research may aid in the production of meaningful maps and the interpretation of natural environments.

Advances in computerized geographic information led to a flurry of articles on the potential of using these technologies to enhance interpretive experiences. For example, Vander Stoep (1990) and Evans, Butcher, Dufficy, and Hamel (1999) recommended using remote sensing to provide visitors with a new perspective of the landscape. In addition, Clebsch and Curwen (2000) identified Geographic Information Systems (GIS) as a tool for connecting meanings and ideas to places. Similarly, Kerski and Reiter (2004) suggested using Global Positioning Systems (GPS) and U.S. Geological Survey (USGS) resources to interpret the landscape. However, studies on the effectiveness of these tools in communicating geographic information in an interpretive context have yet to be conducted.

Non-computerized geographic interpretation has also received some attention from interpretive professionals. *Living maps* were introduced by Bremen, Albrecht, Dale, and Hertel (1992) as a tool for providing visitors with a solid geographical foundation. *Living maps* are room-size maps that allow visitors to add props and manipulate the layout of features. These maps may be built into the floor, painted on canvas, or woven

into rugs or carpets. The living map program was developed in response to a visitor's complaint that brochure maps are too small, making it difficult to visualize large landscapes. The popularity of living maps has spread, but they are used primarily for children's programming. The interpretive potential of living maps deserves further research and experimentation.

The topics of orientation and wayfinding have also received some consideration in the interpretation and tourism literature. Gross and Zimmerman (2002) and Moscardo (1999) discussed the need to account for visitors' spatial orientation and wayfinding needs. Based upon a review of literature on cognitive mapping, the authors made recommendations for designing better maps to help visitors find their way around. These suggestions included eliminating unnecessary information, highlighting significant landmarks and routes, using less abstract symbols, aligning maps to the visitor's perspective, adding color, and avoiding the use of map legends. Similar recommendations were made by Pearce and Black (1984) following an evaluation of visitors' responses to National Park Service maps. They suggested creating color maps that are either three-dimensional or use artistic rendering to emphasize important features. Yet despite these recommendations, many visitor maps do not incorporate these design principles.

This literature review clearly demonstrates the pertinence of geointerpretation. It also identifies a lack of research on the role of various tools and techniques in contributing to the spatial learning of visitors. Further research will allow geointerpretation to progress with the support of empirical study. The following sections examine and synthesize the literature on spatial cognition and consider its contribution to the theory and practice of geointerpretation.

### Acquiring Spatial Knowledge

Spatial knowledge is defined as the "mental structures and processes which allow an individual to think, imagine, interact with, and communicate about space" (Medyckyj-Scott & Blades, 1992, p. 217). Spatial knowledge has three main components related to locations, routes, and areas. The first component is *declarative* knowledge. This relates to a person's ability to describe what a specific location is, along with its significance. The second component is *procedural* knowledge, which enables a person to travel a route using distance and direction. The final component is *configurational* knowledge. At this stage, a person understands the overall layout or configuration of an area (Golledge & Stimson, 1997). As an example, a person learning to navigate a new city typically begins by identifying a few significant landmarks, such as home, work, and school. The newcomer then learns which streets will permit travel between these locations. Over time, the newcomer explores the surrounding areas and learns the overall layout of the city. This level of comprehension may allow a person to devise shortcuts and new routes based on an understanding of spatial relationships (Peuquet, 2002). Theories concerning spatial knowledge are based on this idea of declarative, procedural, and configurational levels of knowledge.

Three main theories exist concerning how people gain knowledge at each of these levels (See Table 1). Shemyakin (1962) introduced the idea that individuals develop survey knowledge by progressing *consecutively* through the three stages of recognizing landmarks, defining routes, and understanding the relational characteristics of areas. A variation of this concept is the *anchorpoint theory* developed by Golledge and Spector



Theories of Spatial Knowledge Acquisition				Types of Map Information	
<i>Golledge &amp; Stimson (1997)</i>	<i>Shemyakin (1962)</i>	<i>Golledge &amp; Spector (1978)</i>	<i>Golledge (1992)</i>	<i>Chou (1997)</i>	<i>Bertin (1981)</i>
Declarative	Landmark	Location	Place Recognition	Point	Elementary
Procedural	Route	Path	Wayfinding	Line	Intermediate
Configurational	Survey	Area	Layout Comprehension	Polygon	Overall

**Table 1: Spatial learning and map design are based on three levels of knowledge/information.**

(1978), which suggests a hierarchical ordering of locations, paths, and areas. Finally, research on *wayfinding behavior* focuses on place recognition, wayfinding, and layout comprehension. Wayfinding is the process of planning out a route and traveling along a path to get from one location to another. Research on wayfinding behavior indicates that knowledge of the way places and routes are inter-linked emerges over multiple trials (Golledge, 1992). The important implication of these theories is that spatial learning requires *multiple experiences* and must progress *sequentially* from the declarative to the procedural to the configurational stage.

Visitors typically learn about a geographic setting through direct experience with the environment. Yet the study by Young (1999) presented earlier indicated that even after spending time in the park, tourists possessed almost no spatial context within which to frame their visit. *Direct* experiences alone may be insufficient to learn spatial concepts in the relatively short time most visitors spend in natural or historical areas. Guy, Curtis, and Crofts (1990) studied environmental learning of first-time travelers and found that visitors need to initially form a map in their minds to improve learning from other experiences. The authors further established that environmental learning can occur rapidly—an encouraging finding for the field of interpretation. Thus, *indirect* methods of communicating spatial concepts are necessary if visitors are to achieve a higher level of spatial knowledge.

The literature on spatial cognition provides a starting point for designing geointerpretive experiences. Researchers have experimented with methods for guiding people through the process of acquiring spatial knowledge. For instance, Herman, Herman, and Chatman (1983) used a mix of experiences to help visually impaired persons learn layouts. First, miniature representations of the objects used as landmarks allowed the participants to determine what the objects were in terms of shape. Second, a model showing the configuration of these objects allowed comprehension of distance and direction relationships. The third experience took place in a large room, where participants learned the effects of scale by walking between the objects. In this example, three distinct experiences allowed the participants to progress sequentially through the three components of spatial knowledge.

Is three the magic number? Returning to the study by Knopf (1981) discussed earlier, an interesting observation can be made. The author found that visitors partici-

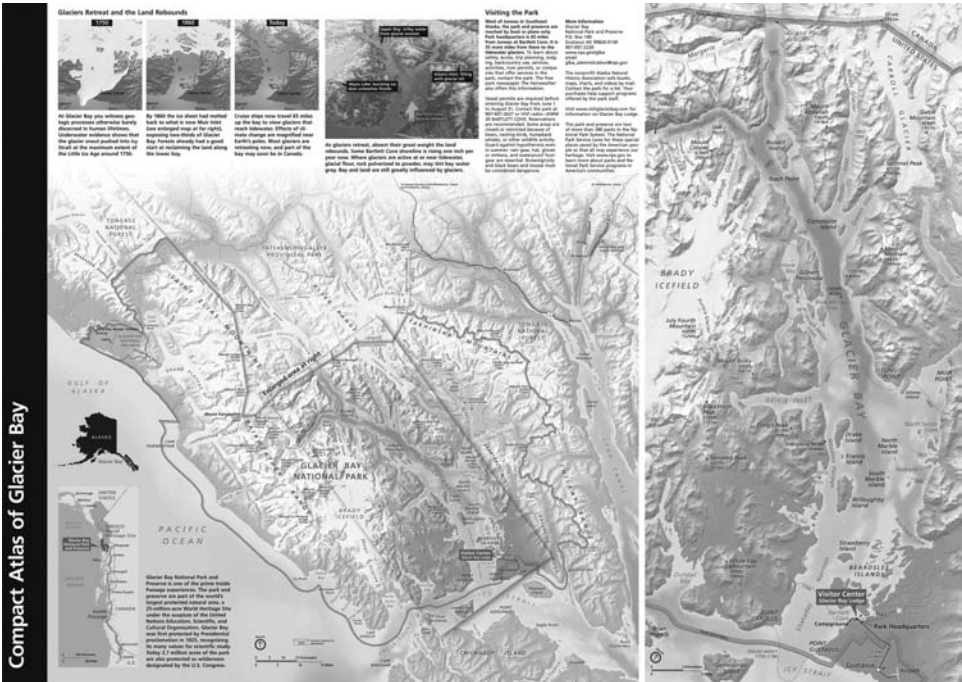
pating in three spatial experiences (Electric Map, Cyclorama, and Auto Tour) reported significantly higher levels of perceived clarity concerning the historical events at Gettysburg. This progression reflects a mix of indirect interpretive experiences and direct experience with the environment. The order was important—visitors reporting higher levels of clarity participated in the Electric Map program prior to the other two experiences. Knopf's (1981) results support the idea that the *sequence* of spatial learning is important and that *multiple experiences* are required to progress through this process. Living map programs offer an illustration of how this progression can be incorporated into interpretive programming. In one example, visitors actively participated in building a map—placing placards with the names of landmarks on the map, drawing boundaries and paths with yarn, and then using props to represent distributions of animals and Native American tribes (Bremen et. al., 1992). The key is to have each experience focus on one type of map information (landmarks, routes, or spatial relationships). Further study is required to verify this technique.

Maps are commonly used to communicate spatial concepts because they provide information on all three components of spatial knowledge. A map is composed of points, lines, and polygons. A *point* is a feature that specifies the location of a landmark; *line* features represent distance and direction; and *polygon* features represent the boundaries of areas (Chou, 1997). Together these components can communicate three levels of information: elementary, intermediate, and overall (See Table 1). The elementary level pertains to basic information such as the physical location of places. Intermediate information allows map-readers to recognize basic spatial patterns. The overall information level allows viewers to identify complex spatial interactions (Bertin, 1981). For example, at an elementary level, maps may pinpoint the locations of fire-scarred trees; at an intermediate level, the trees form a pattern that indicates historic fire activity; and at an overall level, the existence of a fire regime can be identified.

The *declarative > procedural > configurational* sequence of acquiring spatial knowledge provides a theoretical foundation on which to base techniques for communicating spatial concepts. Educating interpreters about how visitors learn geographic information from maps may go a long way in helping them communicate complex spatial concepts. The role of geointerpretation is to offer opportunities to experience landscapes indirectly through the use of secondary sources of spatial information. Experiencing large landscapes holistically is difficult; therefore, indirect experiences can facilitate the development of a higher level of knowledge (Golledge & Stimson, 1997; Peuquet, 2002).

### Indirect Experience of Space

A map may be the only media a visitor looks at while visiting a park. A visitor study at Yosemite National Park found that 90% of the groups surveyed used the park's map brochure, while only 25% used exhibits, and 8% attended a ranger-led talk (Littlejohn, Meldrum, & Hollenhorst, 2006). These results are typical of what other NPS visitor use surveys have found. Maps may be the only opportunity to communicate with visitors. Yet maps are often only thought of in the interpretive field as planning and management tools, rather than as interpretive media. As an example, the *Bibliography of Interpretive Resources* lists articles about visitor maps and living maps under the heading of "Management and Administration" (Basman, 2003). Similarly, Ham (1992) described a thematic map as a conceptual plan used for designing self-guided trails. Yet all maps can



**Figure 1: Visitor Map of Glacier Bay National Park, Alaska (<http://www.nps.gov/hfc/pdf/glbsa-map.pdf>).** The National Park Service redesigned the Glacier Bay map brochure in order to portray the striking geography of the park in a more engaging way to visitors (Patterson, n.d.). The new map illustrates the seven elements of interpretive map design. **Theme:** The map communicates the theme, “Glaciers Retreat and the Land Rebounds.” By showing retreating ice, braided river valleys, and fluctuating coastlines, the map reveals a major characteristic of glacial landscapes: change. **Type:** The map is printed on the largest brochure map size available to the National Park Service. The inset of the bay (right) is oriented to the perspective of the visitor, with the visitor center and entrance to the bay at the bottom of the map. **Levels:** The map of the bay (right) highlights significant landmarks or points of interest. The series of four smaller maps (upper left) illustrates the route of glacial retreat. The map of the entire park (left center) reveals the overall spatial pattern created by glacial activity in the area. **Design:** The map designers used larger font sizes, more vivid colors, and graphical embellishments to enhance the visual hierarchy and guide the map reader’s eyes. The effective use of labels and color allowed the designers to simplify the map and forego the use of a legend. **Text:** The map contains short blocks of text intended to acquaint visitors with the processes that formed Glacier Bay. **Visuals:** The map uses natural colors (blue, green, white, and gray) to create a stylized depiction of the land cover in the park. Shaded relief gives the map a more realistic appearance. **Interaction:** The map is viewed by visitors during a ranger-led talk about Glacier Bay, providing a more hands-on experience. In addition, the data was prepared in a way that allows the map to be transformed into an interactive computer map, a 3D panorama, fly-through animation, or a solid terrain model. (Patterson, n.d.)

be thematic and should not be thought of as just planning and management tools.

Maps can instead be viewed as interpretive exhibits. Just as exhibits and signs play a role in the overall strategic plan of a site, maps can and should be used more strategically to play a similar interpretive role. To design more effective geointerpretive products, the principles of exhibit design should be blended with traditional cartographic principles. Interpretive maps provide a stylized view of the world in order to more effectively connect with visitors. Thus, interpretive map design requires a somewhat different philosophy than conventional cartography (Patterson, 2002). This paper discusses the applicability of the following seven exhibit design principles (Ham, 1992) to interpretive map design: theme, type, levels, design, text, visuals, and interaction. Figure 1 provides an example of an interpretive map designed according to these principles.

### *Theme*

The space portrayed on a map has meanings that may not be readily evident to visitors. The role of geointerpretation is to provide a connection between visitors and the meaning of the space represented by the map. Themes are the mainstay of interpretation, and a map can convey a theme similar to an exhibit or interpretive program. Maps strictly created as reference tools may be missed interpretive opportunities (Kealy, 1998). Since a map may be the one thing a visitor looks at while visiting a park, it may be the only opportunity to communicate a story to the visitor.

The theme of an interpretive map should be based on the map's purpose and the intended audience (Patterson, 2002; Kealy, 1998). A thematic map title could answer one or more of the following questions: What is the significance of the area represented by the map? How have the individual places interacted over time? Was the space created by a certain phenomenon? Does the space provide the context for an event? Does the meaning at this scale differ from other scales? Does the configuration of this area influence human or natural processes? What would be different if the space were altered? The answers to many of these questions are probably already being interpreted by other means—hence, the spatial component can be incorporated into existing programs and exhibits. Geointerpretation thus has the potential to increase understanding of the significance of any site.

### *Type*

Maps and models are miniature representations of the world around us. Space can be represented in a multitude of ways and interpretive planners must determine the type of spatial representation that is desired. Flat maps are two-dimensional representations of space, topographic models are three-dimensional, and animations include the dimension of time (Peuquet, 2002). The majority of visitor maps are flat maps presented as a brochure, sign, or as part of an exhibit. These flat maps typically offer a birds-eye view of an area, yet research indicates that a 45- to 60-degree oblique view is preferred (Pearce & Black, 1984; Arthur & Passini, 1992). Oblique or panoramic maps are effective because they simulate a 3D view of an area and are more comfortable and engaging (Sobel, 1998). Although these maps can distort scale, they may be more effective in communicating certain information to visitors (Schobesberger, 2007). Another consideration is a map's orientation, which denotes whether a map is aligned to a local setting or a global coordinate system (Peuquet, 2002). Research indicates that visitor

maps should be aligned to the local terrain because they are much easier for visitors to use (Levine, Marchon, & Hanley, 1984). Often, a park produces a single visitor map and uses it throughout the park without consideration of the map's orientation relative to the local terrain.

The size of the spatial representation must also be considered in the design of visitor maps. Large and small spaces can be thought of as environmental space and object space, respectively (Freundschuh & Egenhofer, 1997). Object space is smaller than a human being, while environmental space is larger than a human and cannot be manipulated. Because people are able to manipulate maps, they are in a sense misrepresentations of large spaces (Freundschuh & Egenhofer, 1997). Increasing the size of the map or display used to communicate spatial knowledge may be one way to overcome people's misconceptions of large spaces. Freundschuh and Egenhofer (1997) suggested that wall-size displays are better suited to helping people understand large spaces. Similarly, the living maps developed by Bremen et. al. (1992) used room-size representations to more accurately represent scale. Thus, spatial concepts may be more effectively communicated using representations that are large enough to go beyond object space. All of these factors should be considered when determining the type of spatial representation that will be used to interpret a site.

### *Levels*

Exhibits succeed by breaking information down into small, easily digestible pieces. Ham (1992) defined these pieces as levels, or the conceptual components of an exhibit. Similarly, maps can benefit from breaking down information into smaller chunks that are easier for visitors to process. Maps are inherently complex, yet all of the information they contain is presented simultaneously to the viewer (Thorndyke & Stasz, 1980). The three map components (points, lines, and areas) provide a logical way for breaking down map displays into levels. Portraying each of these components sequentially rather than simultaneously may keep the visitor from being overwhelmed. Thorndyke and Stasz (1980) found that individuals who partition maps into conceptual categories are more likely to understand spatial relationships among map features. As previously established, at least three experiences may be needed for a person to achieve a higher level of spatial knowledge. Breaking a map up into its components (landmarks, routes, and spatial patterns) can lead to various ways of presenting the information. This might be accomplished with multiple signs, models, panels, or sub-themes in an interpretive program. Reorganizing spatial information by breaking it down into its components may help visitors achieve a higher level of spatial knowledge.

### *Design*

The design of any interpretive exhibit determines how easy it is to read and understand. Designing maps is especially challenging because of the numerous cartographic conventions that exist. For instance, multiple graphical variables can be used to symbolize spatial information. These include the size, value, color, shape, texture, arrangement, and orientation of point, line, and area symbols (Bertin, 1981). Using variations of each of these symbols creates a visual hierarchy by making more important information stand out (Dent, 1972). In addition, the placement of map titles, legends, scale bars, and feature labels must be considered. Cartographic design is challenging because people's

response to graphical symbols may produce unintended results. For instance, map-readers may accept printed color as a representation of real-world color. People may assume that a feature presented as green represents vegetation, while a light brown area is associated with sand (Shemyakin, 1962). Due to these issues, map designers should be well versed in cartographic design. Desktop publishing programs and geographic information systems enable anyone to make maps. To create truly effective communication tools, the map designer requires some degree of cartographic knowledge (Kealy, 1998).

### *Text*

Exhibit text focuses the visitor's attention on specific elements within the display and relates a story about these elements (Ham, 1992). In addition, text supports the double encoding of spatial knowledge, which occurs when people store information both verbally and visually. Research indicates that double encoding improves people's ability to remember information (Dransch, 2000). Verbal descriptions of maps may help visitors understand abstract spatial concepts. For example, a visitor may look at an image of a landscape without ever noticing spatial patterns and relationships. A verbal description may allow the visitor to recognize how the arrangement of features contributes to a certain phenomenon. Denhiere and Denis (1989) found that when text is used to describe spatial configurations, the order in which the statements are presented is important. Since the description may begin at any point, the researchers experimented with describing a layout in different ways. They discovered that descriptions that started on the left side and moved horizontally across the page produced the highest recall frequencies. Text that describes elements within a map systematically, as though the user is reading the map from left to right and down the page, may guide visitors in reading the stories hidden within maps and the landscapes they represent.

### *Visuals*

Visuals are powerful communicators and can add interest to an exhibit (Ham, 1992). While maps are often used as visuals within an exhibit, the map itself can benefit from the addition of visual elements (Pearce & Black, 1984). For instance, Thorndyke and Stasz (1980) found that pattern encoding is an effective technique for learning the configuration of a map. This involves seeking out shapes or patterns created by elements within a map and using them as mnemonics for remembering spatial information. For instance, astronomers seek out patterns or constellations in the stars to aid people in navigating the night sky. Interpretation could be used to help visitors see a map in a different way by identifying interesting patterns.

Using visual elements to highlight features on a map can help people remember spatial information (Pearce & Black, 1984). The National Park Service has recently adopted a new approach to creating visitor maps. The agency is attempting to bring realism to its maps by creating artistically inspired maps that offer a stylized view of the Earth. For instance, water is portrayed by tapering streams and adding sun glints to water bodies. Color and shaded relief add visual interest to interpretive maps and make map reading more intuitive (Patterson, 2002). In designing exhibits, Ham (1992) advises planners to consider whether a visual might work better than a word. Likewise, map designers might consider whether a visual element might be more effective than an abstract symbol or line.

### *Interaction*

One way to create multiple experiences is to encourage participation of the visitor. Redvale and Dickey (1995) defined three levels of visitor involvement: hands-on, interactive, and active participation. A hands-on display allows the visitor some level of tactile contact. An interactive exhibit responds to an action by a visitor, such as pulling a lever. Finally, active participation encourages the visitor to explore the effects of different variables in making something happen. The use of these three approaches may be improved by adopting techniques devised by other disciplines for communicating spatial information.

#### Hands-on

Hands-on interpretive experiences allow visitors to engage the sense of touch coupled with the sense of sight. The simplest hands-on involvement is allowing visitors to hold a map and rotate it until it is oriented to some place in the landscape. Research shows that the alignment of a map to the setting is crucial in wayfinding and the learning of routes (Arthur & Passini, 1992). This technique is more effective in spatial learning than orienting maps with north at the top (Warren & Scott, 1993). Interpretive map designers should take into consideration the alignment of the visitor to the landscape when they receive the map. For instance, a visitor entering a large park from the north will have a different perspective than a visitor entering from the south. Research indicates that people associate the top part of a map with forward movement (Levine et. al., 1984). Printing maps oriented to different entry points may be useful in helping the visitor navigate in an unfamiliar environment.

Interpreters can transform a stationary map mounted on a sign, tabletop, or exhibit panel into a hands-on activity by using pointing devices. When communicating information about the environment, pointing focuses attention on a place and is the simplest and most effective way of indicating direction (Golledge & Stimson, 1997). Pointing is a technique that could be easily incorporated into interpretive programs by allowing visitors to locate and point out features and their spatial relationships (Shemyakin, 1962). Thinking of maps as another type of hands-on experience reinforces the idea that maps should be designed with the same care afforded other interpretive products.

#### Interactive

Environmental learning is facilitated by either direct experience with the actual environment or a representation of that environment. This interaction should involve sensory perception, allowing a person to feel like they are moving through space. This can be accomplished vicariously by interacting with maps and models (Downs & Stea, 1977). Examples are solid terrain models, fly-through animations, and 3D maps with zooming and panning controls. Visitors can also use interactive play to take simulated trips over a map, enabling them to learn locations, routes, and layouts in the process (Shemyakin, 1962). Visitors can use environmental modeling toys and props to accomplish spatial tasks, simulate travel, or play games with a spatial component (Downs & Stea, 1977). Geointerpretation can thus facilitate interaction and environmental learning through the use of interactive exhibits.

#### Active Participation

Active participation allows visitors to initiate changes in spatial relationships by manipu-

lating different variables. An example is a computer simulation that alters the spread of wildland fire based on humidity, temperature, wind direction, and the slope of a hill. The complexity of these types of models usually requires computer programs that can quickly display the effects of a visitor's inputs. These maps are delivered via the internet or on other types of electronic devices. The programs typically offer user interfaces that allow visitors to manipulate multiple layers of information. Due to the expense and complexity of such tools, considerable research has been done on the design of computerized maps (Harrower, 2003; Gyllenhaal & Perry, 1998). The dynamic nature of these maps makes them particularly well suited to the task of interpreting complex spatial relationships and geographic patterns (Harrower, 2003).

### Recommendations for Applying Geointerpretation

The National Research Council (2006) recently published a 300-page report on *Learning to Think Spatially*. This report identified a need for increased spatial literacy and recommended the incorporation of spatial learning in the K–12 curriculum. The council recognized spatial thinking as one of the many forms of cognition that includes verbal and mathematical thinking—the current focus of curriculum in the United States. Given that the educational system is just now pondering the addition of spatial learning to the curriculum, the field of interpretation has an opportunity to be on the cutting edge of this development. Recognizing geointerpretation as a growing subfield and embracing the possibilities it offers will prove timely.

Thus, *geointerpretation* is defined as interpretation that provides opportunities to experience geographic settings through the use of maps and other spatial representations. In addition, *sense of space* is defined as an understanding of the meaning derived from the spatial relationships of places. The goal of geointerpretation is to foster a sense of space in the minds of visitors. Connecting people to the meanings of geographic settings has the potential to enhance resource interpretation. The primary recommendation of this paper is to incorporate the following techniques into interpretation and to conduct studies to test their effectiveness:

- Design geointerpretation around the three components of spatial knowledge: locations, routes, and areas (Shemyakin, 1962; Golledge & Spector, 1978). Maps can be broken down into their key components using a series of side-by-side maps and models that can be viewed sequentially or using a set of overlays that can be layered on top of one another. This can be accomplished using simple and inexpensive props or highly technical computerized displays. The key is to enable visitors to learn sequentially, starting with a few key locations, then adding significant paths or routes, and finally introducing important landscape patterns.
- Create interpretive maps by blending the principles of map and exhibit design. Treat maps and other spatial representations as exhibits—considering theme, type, levels, design, text, visuals, and interaction (Ham, 1992). These elements provide a framework that can be used in the planning and design of all geointerpretive products.
- Use geointerpretation to provide visitors with multiple opportunities to learn about an environment (Golledge, 1992; Peuquet, 2002). An exhibit area devoted to geointerpretation can offer multiple interactive opportunities for visitors to experience a landscape. A strong focus on geointerpretation at the beginning of a visit may allow



for faster orientation to the site and provide a spatial context for subsequent experiences. In the end, geointerpretation may significantly increase a visitor's understanding and appreciation of the site as a whole.

## Conclusion

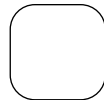
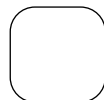
Specific techniques for communicating with visitors about geographic settings may help visitors understand natural and cultural resource management issues. To this end, the literature reviewed in this paper addressed the following questions: *How is spatial knowledge acquired? How can interpretation be used to effectively communicate geographic information?* Research conducted in the fields of geography, environmental psychology, and cartography provide a theoretical and empirical basis on which to base strategies for interpretation. The guidelines outlined in this paper may prove useful to any site that uses maps to convey information to visitors.

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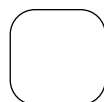
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**IN SHORT:  
REVIEWS  
AND  
REPORTS**



**Connecting to  
Home-Place  
through  
Community-  
focused  
Heritage  
Interpretive  
Planning**

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Interpreters have a fundamental role to play in addressing the current ecological crisis. David Orr (1997) stated this crisis “is first and foremost a crisis of mind, perception, and values” and therefore an educational response is required (p. 238). What is necessary according to Orr is a transformation toward educational approaches that develop ecological literacy: the capacity and willingness to establish ecologically, socially, and economically sustainable patterns of existence that work for a particular region. Thus ecological literacy in action requires an understanding of home-place in particular, as opposed to understanding environment in the abstract. For as Snyder (1990) suggested, “It is not enough to just ‘love nature’ . . . . Our relation to the natural world takes place in a place, and it must be grounded in information and experience” (p. 18). Adding to the significance of knowing local landscapes, Sobel (1996) argued that “authentic environmental commitment emerges out of first-hand experiences with real places on a small, manageable scale” (p. 32). Yet research indicates that in North America the level of bioregional knowledge, as well as opportunities

to gain it through first-hand explorations, is rapidly declining (Louv, 2006). For example, one study indicated that the average child in the United States could identify 1,300 corporate logos, but only 10 local plants and animals (Lukas, 1996). If first-hand experiences provide the matrix for landscape caring and action, then the interpretive profession is obviously well positioned to take a leadership role in the development of ecological literacy. Indeed, promoting a land ethic has been one of interpretation's long-standing goals. However, while this specialized form of communication often delivers "take-home" messages addressing sustainability issues, interpretation deeply rooted in community life is just beginning to evolve. Engagement with everyday heritage is the cornerstone of community interpretation.

In the past two decades, notably in Europe, interpretation has seen increased use by community members as a way to share their cultural and ecological heritage, not only with visitors, but with each other as well (Binks, 1989; Tabata, 1989; Pierssené, 1999; Clifford, 2000; Carter, 2001). Standing (2000) describes community interpretation as "local people investigating and appreciating the worth of their own roots and landscapes, and interpreting them to a wider audience" (p. 15). Community interpretation focuses on subtle expressions of local distinctiveness (Clifford & King, 1993) such as a roadside ditch that bursts with the courtship calls of spring peepers, or the corner grocery store with multi-generational links to Italy. These subtleties create complex layers of meaning and sensory richness that may be linked with individual and collective well-being, including a sense of belonging to a wider community of life. Yet links between landscape and lifestyle are often subconscious (Hester, 1990) and therefore require active participation in place to bring these connections to light. Awareness of relationships between landscape and community life also requires ongoing dialogue with knowledgeable residents who carry past and present place-based stories: the best place for stick boat races, when the wild blueberries are ready, where to go fishing, the significance of a building's name, how to make tea from nettles, and so on. Community interpretation addresses these needs by encouraging intergenerational engagement with local landscapes through community mapping, murals, festivals, community-based art, music, walking tours, story sharing, etc. In summary, interpretation for and by community members offers social spaces for neighbors to collectively experience home-place more deeply.

To aid the advancement of community interpretation, the authors have been working in collaboration with several rural communities in northwestern Ontario, Canada, to develop a community-focused heritage interpretive (CHI) planning framework (Curthoys & Clark, 2002; Curthoys & Cuthbertson, 2002). The CHI framework takes a bioregional approach to interpretive planning, recognizing that landscapes are holistic, fluid entities (Zonneveld & Forman, 1990), with cultural systems nested within natural systems (Bowers, 1999). It is based on the underlying assumption that every aspect of interpretive planning presents an opportunity to enhance ecological literacy by modeling respect for local life forms and cycles, seeking place-based knowledge, incorporating regional materials, and engaging local skills in the creation of interpretive experiences. Thus the planning guideline aims to focus attention on ecological and social dimensions of community at five stages: (1) assessment of interpretive potential through exploring community connections to place; (2) consideration of community aspirations, challenges, and sensitivities (ecological and cultural) that should guide planning decisions; (3) assessment of regional resources and ways to create capacity-building interpretive services; (4) evalua-

tion of planning process and products with respect to community well-being; and (5) celebration of place through community creations. The CHI framework is designed to complement existing interpretive planning models as a bioregional primer aimed at maximizing community self-reliance and minimizing interference to natural processes.

Writing on the topic of ecological design, Van Der Ryn and Cowan (1996) commented, "The collective memories of people who inhabit a place provide a powerful map of its constraints and possibilities. In a sense, ecological design is really just the unfolding of place through the hearts and minds of its inhabitants." (p.65) Preliminary findings (Curthoys, 2007) suggest that community interpretation taps into that creative force, providing local people a welcomed opportunity to share landscape connections. Through ongoing participatory action research, the authors will continue to explore the potential of community interpretation in relation to the complex goal of establishing sustainable life patterns along the most northern shores of Lake Superior.

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## APPENDIX

### Manuscript Submission:

### Instructions to Authors

#### Purpose

The purposes of the *Journal of Interpretation Research* are to communicate original empirical research dealing with heritage interpretation and to provide a forum for scholarly discourse about issues facing the profession of interpretation. The *Journal* strives to link research with practice. The *Journal of Interpretation Research* is published by the National Association for Interpretation, the preeminent professional association representing the heritage interpretation profession.

#### General Information

The primary function of the *Journal* is to disseminate original empirical research regarding interpretation. However, the *Journal of Interpretation Research* takes a broad view of the field of interpretation and publishes manuscripts from a wide-range of academic disciplines. The primary criteria for deeming a manuscript appropriate for the *Journal* are whether it adds to the current state-of-knowledge for practitioners, researchers, academics, or administrators who work in the field of interpretation.

In recognition of how diverse the relevant literature is, the *Journal* will also publish reviews of recent books, government publications, original literature reviews, and bibliographies dealing with interpretation. Abstracts from dissertations, private consultant materials, and reports from public agencies will be published in the *Journal* in a section called, "In Short: Reports and Reviews." This section will also provide an outlet for summaries of research studies with limited scope. Interpretation research often consists of small "in-house" program evaluations and basic visitor studies. The purpose of this section is to communicate current research activities, allow readers to identify colleagues with similar interests, and provide practitioners and administrators with useful information and direction for conducting their own mini-research projects. Submissions for the "In Short: Reports and Reviews" section should be limited to 800 to 1,000 words and will be reviewed by the editor and two associate editors.

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Ryan, C. & Dewar, K. (1995). Evaluating the Communication Process Between Interpreter and Visitor. *Tourism Management*, 16(4): 295-303.

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