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# Comparison of survey methods to profile participants in emerging adventure recreation activities undertaken in wilderness

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## Introduction

Growth in 'adventure recreation', typically practised in protected areas, is occurring. Canyoning (cf. canyoneering), is one such activity. In the Greater Blue Mountain World Heritage Area (GBMWH), management was concerned that canyoning was causing environmental damage. However, there is a dearth of data, even on participation, because of the 'composite' nature of the activity, its recent emergence, and because adventure recreation is typically restricted to wilderness areas which renders visitor census problematic. Despite difficulties, management need to monitor such activities and a valid, reliable method of survey is required.

For emerging forms of adventure recreation, identification of a representative sample is especially problematic. Often members of enthusiasts' club are surveyed because sampling this demographic provides for an efficient and cost effective survey method, and wide geographical coverage. However, the representativeness of club members of the targeted population is questionable and thus results may not translate to valid/reliable outcomes. Despite issues, we found no concurrent studies of adventure recreation that compared club versus on-site sampling.

Although canyoning in the GBMWH (Australia) involves thousands of visits annually, no canyoning-specific clubs exist. A composite sport, it requires no specific equipment/clothing, and there are no formal competitive Australian events. The land managers are, therefore, faced with the issue of monitoring participation in, and developing policies for this, and other adventure recreation activities undertaken in wilderness. To inform management's survey methodology choice, we compared two survey approaches.

## Methodology

Results of nine questions common to two surveys of canyoning in GBMWH were compared: a once-off postal survey of canyoning clubs; and an on-site intercept survey at canyon track-heads administered in two successive canyon seasons. On-site, effectively all canyoning clubs who visited 25 canyons on one Sunday (weekends are most popular,  $\geq 90\%$  of weekly trips, Saturday/Sunday visitation equal), and one mid-week day/month. Sampling dates were randomly assigned for surveying in February 2000 (within 1999-2000 season), and between October 2000-April 2001. Onsite surveying occurred between 0800-1800 hours. Effectively all surveys were self-completed (anonymously) on-site.

Questions spanned respondent demographics, gender, age, size and composition of canyoning group, visit frequency and trends, and attitudes to management's proposed options to manage canyoning. On-site surveys were analysed between seasons, and were compared with club data collected concurrently in 1999-2000. Analyses were by t-test or Chi-square goodness-of-fit.

## Results

### *Comparison between years*

Of 24 clubs contacted, 62.5% participated (901 questionnaires mailed [percentage of canyoning clubs unknown] return rate of 22.9%). In the same canyoning season, 227 on-site usable questionnaires were collected (443 in 2000-2001,  $>95\%$  participation both seasons).

There was no significant difference between years for gender, age, experience level, visit frequency or trends in canyoning frequency, and attitudes to management policy options (Table 1). Typically canyoning clubs were male, aged between 30-35, lived within the State, were experienced canyoning clubs, canyoned with a small group encompassing 'family/friends', and canyoned  $\leq 2$  monthly (equivalent to previous year). They approved of on-park management intervention to limit/hold visitation at current levels rather than lowering use/non-intervention.

Table 1: Comparison of respondent demographics, canyon visit frequency, and attitudes of experienced canyoneers to proposed management changes across survey seasons (1999-2000, 2000-2001) and surveys (1999-2000) (sd=standard deviation; ns=not significant; \*= $p < 0.05$ )

Attribute	On-site 1999-2000	On-site 2000-2001,	Club 1999-2000	On-site between years	On-site versus Club survey
Gender (%)	<i>n</i> =227	<i>n</i> =443	<i>n</i> =206	$\chi^2_1=0.225, p=0.64, ns$	$\chi^2_1=4.36, p=0.04^*$
Male	71.8	72.8	64.9		
Female	28.2	27.2	35.1		
Age (mean $\pm$ sd)					
Overall	31.6 $\pm$ 11.3	32.7 $\pm$ 12.1	37.3 $\pm$ 11.0	$F_{1,631}=1.15, p=0.28, ns$	$F_{1,409}=26.50, p<0.01^*$
Male	32.2 $\pm$ 11.9	34.1 $\pm$ 12.3	37.7 $\pm$ 11.1	$F_{1,457}=2.50, p=0.11, ns$	$F_{1,281}=16.10, p<0.01^*$
Female	30.2 $\pm$ 9.8	28.9 $\pm$ 10.7	36.4 $\pm$ 10.7	$F_{1,172}=0.56, p=0.45, ns$	$F_{1,126}=11.90, p<0.01^*$
Residency (%)					
Home state	95.7	92.6	100.0		
Interstate	2.9	2.4	0.0		
International	1.4	5.0	0.0		
Experience (%)				$\chi^2_2=3.59, p=0.17, ns$	$\chi^2_2=263.52, p<0.01^*$
Novice	26.0	26.2	4.4		
Intermediate	20.3	23.7	15.5		
Experienced	53.7	50.1	80.1		
Trends					
Frequency current season				$\chi^2_3=7.66, p=0.05, ns$	$\chi^2_3=4.14, p=0.25, ns$
Visitation trend				$\chi^2_2=6.07, p=0.05, ns$	$\chi^2_2=15.27, p<0.01^*$
Attitudes to changes				$\chi^2_3=1.08, p=0.78, ns$	$\chi^2_3=21.56, p<0.01^*$

## Comparison of on-site/club surveys

Whereas there was no significant difference between years in any parameter tested with on-site participants, all parameters were significantly different between on-site and club-based surveys sampled concurrently, except for visit frequency (Table 1). Differences between surveys included a higher proportion of females (seven percentage points) in clubs, compared to on-site respondents; mean age was higher; and most club-based respondents were experienced canyoneers (80.1% versus 53.7%). In contrast, while <25% of the on-site respondents canyoned with a club, between 44.4-53.1% (depending on experience) club-based respondents canyoned as a club activity. Additionally, novices were more likely to canyon with a commercial group, and only experienced canyoned with friends/family. Frequency of percentage of experienced canyoneers was similar between club and on-site respondents, although typically on-site respondents visited more frequently (35.2%) currently than in previous seasons compared to those (19.2%) surveyed on-site. A substantially higher percentage (18%) of club-based respondents than those surveyed on-site favoured immediate lowering of usage by management - not a popular option among on-site respondents.

## Discussion

On-site survey responses were equivalent in both canyoning seasons but differed between on-site and club-based surveys. Canyoneers presented with a different profile for all except current canyoning frequency. Since on-site response rate was conservatively estimated at >95%, we assumed this sampling instrument robust, and results from our first canyoning season's on-site survey were a valid basis to compare the club survey's similar-sized respondent base, sampled concurrently. No previous comparison between instruments appears to have occurred. Although many researchers have simultaneously collected data, typically it is pooled for analyses (e.g., mountain biking - Chiu & Kriwoken, 2003) although, unlike our data, club-based respondents were drawn from members of a club specifically focused on mountain biking. Even under these circumstances differences occur. For example, Goeft and Alder (2001) found that racers more frequently belonged to bike clubs than non-racers.

Survey of club membership offers benefits of ease, speed, and cost of obtaining data. Such benefits are increasingly enhanced with online methods, particularly web-based surveys. However, despite the increasing ease of surveying off-site, our data demonstrated that such information may provide erroneous results, particularly when contact is sought with emerging forms of adventure recreation without well-established profiles/behaviour. Despite the issues, accurate quantification of such data are required if land managers seek to relate environmental impacts with visitation levels (Burgin & Hardiman, 2012). The differences revealed between club/on-site surveys here are potentially important for managers when developing policy, and/or multi-use facilities, or even seeking to identify changing participation trends (Hardiman & Burgin, 2011).

However, since such intensive sampling is often unrealistic, survey methods should be carefully assessed for potential bias, and conclusions determined accordingly.

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