

Where did all the visitor research go? A systematic review of application areas in national parks

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Abstract

Despite tourism researchers continually collecting new data on visitors, academic understanding of the utilisation of this knowledge remains fragmented. Using a sample of 407 national park studies published from 2014 to 2018, this paper applies the systematic quantitative literature review method in a novel way to confirm the main components of visitor research and investigate its potential integration into protected area management activities. Visitor research encapsulates data about visitors' socio-demographic and psychographic attributes; travel arrangements and pre-visit information; visitor use patterns at the destination; experience outcomes and visitation-related impacts. The results indicate most of the research leads to recommendations for applications in management activities that exhibit a strong visitor interface, such as enhancing the visitor experience, managing visitor use, improving visitor interpretation and communication, and monitoring and evaluating social and environmental conditions. There is an association between different types of research and its management applications. Most studies included recommendations for application in an identifiable management problem, but research evaluating past management decisions or practices were less common. Studies involving embedded researchers were more likely to include practical recommendations, an important result with the apparent decline in embedded research capacity worldwide.

Keywords: Visitor research; Visitor management; National parks; Knowledge utilisation; Research-practice gap; Systematic review

1. Introduction

What visitors do and why they do it are important to those making decisions about visitors, academics studying such behaviour, and the visitors themselves (Pearce, 2005). In protected areas, visitor access and -use decisions are inherently complex and require insights from environmental and social science research, management experience, and professional judgements (Marion, 2016).

Those involved in visitor management decision-making often lack experience in dealing with complex visitation-related problems. Most technical managers were historically trained in environmental management; however, the social, political, and economic components

involved in social systems cannot be addressed by the classic paradigms of normal science (Blahna et al., 2020). Through the past two decades, scholars have acknowledged the critical role of information about visitors, their behaviours, motivations and opinions for the effective planning and management of protected areas (Griffin et al., 2008; McCool, 2012; Newsome et al., 2013; Wardell & Moore, 2004). Visitor research has been applied in different management activities including, but not limited to park-, tourism- and visitor management plans; decisions about site, facility and visitor program designs; measuring visitor impacts and their associated causal and non-causal factors; resource allocation; visitor interpretation; improving visitor experiences; marketing and public liability (Booth, 2006; Marion, 2016; Newsome et al., 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018).

The utilisation of visitor research in practice has not been without challenges. As early as 2001, Buckley et al. highlighted the need to increase the application of visitor research, yet shortcomings continued. The lack of formal frameworks to assist with the management, dissemination and utilisation of knowledge across various departments within protected area agencies has contributed to weak absorption of visitor research into park management tools (Darcy et al., 2007). There is an overreliance on visitor use statistics and satisfaction data but limited use of research on visitor activities and movement, motivations, expectations, and attitudes (Griffin et al., 2008). Few studies have successfully integrated environmental and social science data when studying visitor impacts and their underlying causes (D'Antonio et al., 2013). A frail link exists between monitoring programs and stated management priorities (Buckley et al., 2008). Despite these acknowledgements, the utilisation in management decision-making remains inadequately evaluated, judging from the dearth of literature. Visitor management frameworks in protected areas rely on an adaptive management-by-objectives approach (Pierce & Manning, 2015). Yet, it is unclear if and how visitor research informs the formation of these objectives. Furthermore, researchers have not fully described the types and nature of research utilised, leaving a gap in the current understanding of knowledge utilisation and a lack of appreciation for visitor research's diversity and usefulness.

Knowledge utilisation literature refers to three types of knowledge use: instrumental, conceptual and symbolic or political (Landry et al., 2001; Weiss, 1979). Instrumental use refers to the application of research in a behavioural or action-oriented way to find solutions to a specific, identifiable problem. An example would be research that leads to a change in policy or decisions. Conceptual use implies the application of knowledge in the development of new theories, hypotheses or conceptual thinking about the problems at hand, but without necessarily directly changing policy or decisions (Cherney & McGee, 2011). Symbolic or political use entails applying research to justify a political position or practice or defend prior decisions (Cherney & McGee, 2011; Xiao & Smith, 2007). We know little about the extent to which visitor research is dedicated to conceptual, instrumental or symbolic use in public lands management.

This paper sought to address these gaps. Using a systematic quantitative literature review, it first i) describes the nature of academic visitor research produced in protected areas, using national parks as case studies. It then ii) examines the potential integration of such research into management decisions and actions, and next, iii) outlines how researchers envision

knowledge utilisation. The paper then investigates whether associations exist between iv) research types and the management application areas recommended and v) the number of research types used and the number of application areas recommended. Lastly, vi) it looks for a significant difference between the number of application areas in studies conducted exclusively by external researchers versus those undertaken by a combination of embedded and external researchers.

2. What does visitor research comprise?

Visitor research for protected areas is multidisciplinary in nature, incorporating social, economic, environmental, and other use-related aspects of visitation (Manning, 2011). Pearce (2011) identified the dimensions involved in analysing tourist behaviour and experiences that could be applied to visitor research for protected areas, with research on (i) pre-travel factors, (ii) tourists' on-site experiences and (iii) post-travel outcomes all relevant. There is a plethora of research on each of these dimensions by researchers in protected areas in terms of volume and variety.

Research on topics relating to pre-travel factors include studies examining socio-demographic characteristics of park visitors (e.g. Cini & Saayman, 2014), motivations towards visiting national parks (e.g. Hermann et al., 2016); sources of information of nature-based tourists (e.g. Dey & Sarma, 2010); visitor expectations (e.g. Botha et al., 2016); cultural differences in beliefs about participation in nature-based tourism (e.g. Stone & Nyaupane, 2016); attitudes toward the natural environment, conservation and tourism (e.g. Xu & Fox, 2014) and towards risks in a national park (e.g. George, 2010); visitors' environmental values (e.g. Pickering & Rossi, 2016); and underlying beliefs (e.g. Brownlee & Verbos, 2015) in national parks. Research on on-site experiences and behaviour of protected area visitors have generated data and information on, among others, the characteristics of the visits, including the length of stay, frequency of visits, size of the travel group, mode of transport (e.g. Kruger & Saayman, 2014); visitor spending (e.g. Cini & Saayman, 2014); on-site wildlife watching behaviour (e.g. Marschall et al., 2017); non-compliance of visitor behaviour (e.g. Goh et al., 2017) and pro-environmental behaviour (Esfandiar et al., 2020) as well as visitor use statistics (e.g. Levin et al., 2017). Research on post-travel outcomes include remembered experiences of park visitors (e.g. Barnes et al., 2016); levels of satisfaction (e.g. Jarvis et al., 2016) and other perceived benefits of visitation (e.g. Sandifer et al., 2015); loyalty to national parks (e.g. Pinkus et al., 2016); intention to return (e.g. Barnes et al., 2016; e.g.; Jarvis et al., 2016) and willingness to pay (e.g. Frontuto et al., 2017) among protected area visitors; increased knowledge and awareness due to interpretive experiences in national parks (e.g. Tubb, 2003); place attachment (e.g. Steckenreuter & Wolf, 2013) and sense of place (e.g. Barendse et al., 2016) in national park settings; perceptions towards recreational conflicts encountered in protected areas (e.g. Hung & Hsieh, 2014); opinions on protected area management practices (e.g. Arnberger et al., 2012); reports of visitor safety incidents (e.g. Gstaettner et al., 2018) and the social, environmental and economic impacts of visitation on protected areas and its underlying causes (e.g. Marion et al., 2016; Ng et al., 2018).

To logically arrange this diversity of research areas into workable groups, the categories developed by Booth (2006) and Newsome et al. (2013) (Table 1) were used as a basis to develop a more integrated set of categories to use for the systematic review.

Table 1. Visitor research categorisations by Booth (2006) and Newsome et al. (2013).

Booth (2006)	Newsome et al. (2013)
Visit numbers.	Visit or visitor numbers.
Visit and visitor characteristics.	Visit characteristics.
The visitor experience (from motivation through satisfaction).	Visitor characteristics or profiling, including motivations, expectations and preferences.
Visitor impacts.	Data to identify and quantify site-specific impacts.
Recreational benefits.	Visitor outcomes which encompass visitor satisfaction, experiences, future intentions and behaviours.
Recreation resource demand and supply.	
Recreation management processes and techniques.	

Table 2. Visitor research types and definitions.

	Visitor research type	Data and information on:
VR1	Socio-demographic attributes of visitors	Gender, age, culture, place of residence, ethnic group, income level, employment, level of education, marital status, children and so forth.
VR2	Psychographic attributes of visitors pre-visit	Attitudes, expectations, motivations, preferences, perspectives, pre-trip knowledge and awareness, beliefs, values and mindfulness.
VR3	Travel arrangements and pre-visit information	Sources of information, sources of influence on purchasing decisions, booking channels used, travel companions, distance travelled to destination.
VR4	Visitor use patterns and behaviour at the destination	Statistics on the demand for and actual use of experiences, facilities & services; visitor spend; temporal and spatial use patterns including frequency of visits, length of stay and occupancy rates; visitor behaviour on site.
VR5	Visitor experience outcomes as a result of visitation	Visitor experiences, emotions, satisfaction, loyalty and safety incidences as a result of visitation; changes in place attachment and sense of place; post-trip knowledge and awareness; future intentions (intention to return or volunteer, willingness to pay, willingness to recommend, support towards management interventions) and appreciation of natural resources.
VR6	Visitor impacts as a result of visitation	Social, environmental and economic impacts of visitation, whether positive or negative.

Source: Taken from Booth (2006), Newsome et al. (2013), Pearce (2011), Pickering et al. (2018).

While both combined visitors' characteristics into one category, the breadth and depth of data and information available today on visitors' psychographic dimensions, their experiences, and post-trip reflections (Pickering et al., 2018) arguably warrants it to be treated as a distinct category of research. Neither categorisations cater to knowledge of pre-trip travel decisions and arrangements, such as preferences towards travel bookings channels (Douglas, 2016) and other travel decisions before visiting a protected area (Gutiérrez et al., 2017). The authors of this study added a category to accommodate this type of information. Table 2 lists the final categorisation used in this study.

3. Methods

3.1. Study approach

This study employs a Systematic Quantitative Literature Review (SQLR) methodology (after Pickering & Byrne, 2014) to examine peer-reviewed journal articles containing case studies of visitor research in protected areas. The review focuses on Category II protected areas (IUCN, 2019), commonly known as national parks, as they are the most popular and occur globally. As a result, most visitor research is likely to be from national parks, and the patterns found here arguably reflect broader literature. Different interpretations of what a national park is, exists globally. Due to the scale of the review, it was not possible to screen and validate all studies to determine protected areas' alignment to the International Union for Conservation of Nature's definition of a category II protected area (IUCN, 2019). Instead, we looked for mentions of the phrase 'national park' in an article and examined the names of the locations where data was collected. Protected areas named a 'national park' were automatically included. A few protected areas with other naming conventions appeared in the search results, such as state parks and nature parks. The authors included these only if they could verify them as a category II protected area.

Although case studies of visitor research can be found in published or unpublished documents, books, reports, and articles, much of the research produced internally by national parks is not publicly available. Hence collecting all literature in the field systematically and consistently would not be practical. Subsequently, this review focuses on case studies in academic journals only, a common strategy for the systematic review of literature (Pickering et al., 2015). The timeframe of publications included further delimits the study. The review was performed in 2019 and used articles published in the preceding five years (2014–2018) to determine the nature of and integration of visitor research. Using this approach, and further limiting the search to case studies published in the English language, means this review does not consider all available visitor research, but should be considered a sample of visitor research.

This paper first describes recent visitor research along the following dimensions: the research approaches used; types of data utilised; visitor research types involved; the number of visitor research types captured per study; types of researchers involved; countries where the research was conducted; and the types of academic journals in which they were published. Next, we describe visitor research in relation to the way it could be applied in management and the types of knowledge utilisation suggested. Lastly, associations are tested between variables.

3.2. Search strategy, review protocol and PRISMA 2009 Flow Diagram

The search term ((visitor OR tourist) AND “national park”) was used to search for journal articles published in the English language, from 2014 to 2018, in four databases: EBSCO Host, ScienceDirect, Scopus and Web of Science Core Collection. The search identified a potential 6853 records. Duplicate records were removed, and the remaining abstracts screened for the phrase “national park” or “protected area”. After removing additional duplicates not detected in the first step, the authors screened 1642 abstracts for eligibility and further assessed 749 full-text articles. This sifting process resulted in a total of 424 eligible journal articles. The PRISMA flow chart (Fig. 1) describes the search strategy and review protocol of the SQLR.

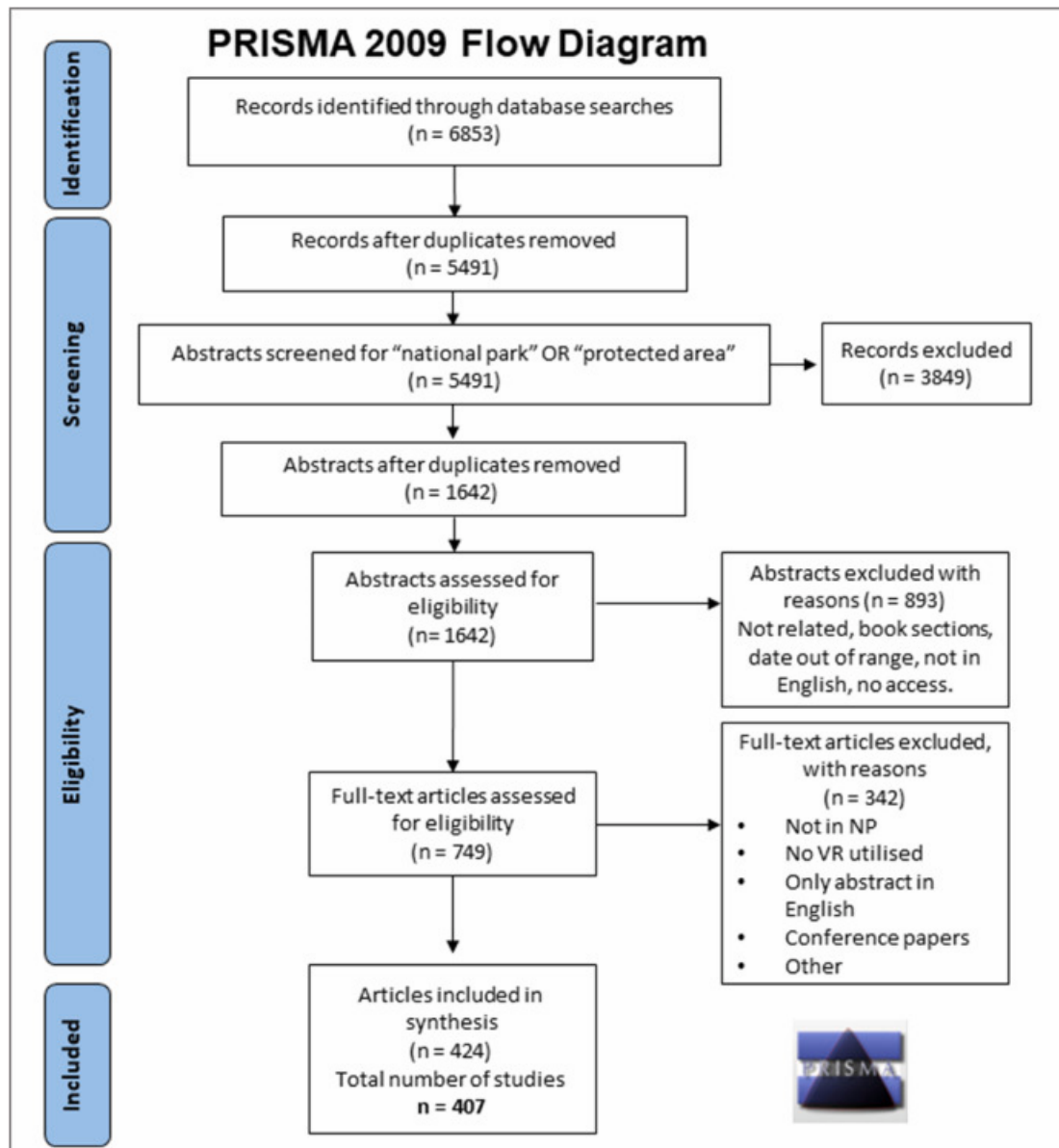


Fig. 1. PRISMA Flow Diagram of the study.

**Not in NP* refers to studies where the research scope was not specific to a national park context or the study was not conducted in a national park. **No VR utilised* refers to studies where no identifiable type of visitor research was involved in the production of the article.

Since multiple journal articles may arise from one research study using the same data, treating each journal article as a separate record can overinflate numbers of visitor research types. To counter this, the authors carefully examined each article's study location and data collection periods. Articles from the same study were combined and captured as a single record. Thus, the results of this review are based on the number of studies and not the number of articles. Using this approach, the final number of records (studies) reviewed was 407.

3.3. Data capturing and coding

Several pre-determined variables were extracted from the text of each study and captured into a Microsoft Excel spreadsheet: Title; authors; year of publication; journal name; place of study (country); types of researchers involved (embedded/external/combined); research approach used (qualitative/quantitative/mixed); types of data used (primary/secondary/both); visitor research types involved; management application areas recommended; whether clear, practical recommendations were provided; and types of knowledge utilisation recommended. Each row in the spreadsheet represented an individual case while each variable's associated categories (for example, MAN1, MAN2, etc.) were captured in a separate column. After coding, most data were of the discrete type (either 1 or 0), with the following exceptions being categorical data: author and journal names, year of publication. These methods are in line with those proposed by Onwuegbuzie and Frels (2016) and Pickering and Byrne (2014) for systematically analysing literature.

During data capturing, the authors were confronted with several coding challenges that had to be addressed in a consistent manner. Coding visitor research types was not a straightforward task as a single piece of data could belong to multiple categories. The authors addressed this challenge by carefully examining the type and timing of the data collected in each study; how the questions were phrased; as well as their intended context. For example, data measuring the factors that influence a visitor's choice of transport mode before the actual visit qualifies as travel arrangements (VR3) but could also be viewed as psychological data (VR2) if the decision involved perceptions or underlying beliefs (VR2). If a visitor was asked (during or post-trip), what mode of transport they used in the park, it contributes towards understanding visitor use patterns at the destination (VR4). Similarly, data on the impacts of visitation (VR6) can include attitudes, perceptions or opinions of visitors (VR2), since social impacts in particular are primarily measured through perceptions and not hard scientific evidence. There is, therefore, much overlap between visitor research types. Furthermore, some studies utilised both visitor research and non-visitation related research. We report only the characteristics of the visitor research in this review.

Countries were coded based on the location of the national park where the study took place. To code the type of knowledge utilisation, the authors operationalised the definitions of Xiao and Smith (2007) and Cherney and McGee (2011). A study could exhibit multiple types of knowledge use. If the research was applied towards the justification of actions,

policies, practices or decisions, it was coded as 'symbolic'. If applied in ways that directly influence practitioner decision-making or policy design, it was regarded as 'instrumental'. Utilisation was considered conceptual if it was directed towards an enhanced understanding in the form of theories, concepts or hypotheses; or for redefining problems; without necessarily changing policy. All published articles made a conceptual contribution of some kind, even if just enhancing thinking of a particular problem. If utilisation was exclusively conceptual, with no indication of it being applied to influence or justify any policies or practices, the study was coded 'conceptual only'.

To code how visitor research was applied in management, an iterative process was followed, explained next.

3.4. Refining the management application areas through an iterative approach

To code how visitor research was applied in management, nine management application area categories were developed. Their construction was an amalgamation of areas firstly identified from visitor management literature and secondly, results of the SQLR process. The authors consulted literature describing visitor management strategies and activities (see Manning et al., 2017; McCool et al., 2007; Newsome et al., 2013) and the production and use of visitor research in protected areas in Australia, New Zealand, United Kingdom (see Booth, 2006; Newsome et al., 2013; Wardell & Moore, 2004) and North America (see Marion, 2016; Ziesler & Pettebone, 2018).

The categories were refined by performing a crosscheck pilot study. This involved four experienced tourism researchers who independently coded the same five journal articles. Although researchers captured most variables consistently, the management areas were adjusted further (Table 3) to form nine management areas allocated to three broader management categories. This included strategic management decisions that involve high levels of complexity and require commitments that span over many years (long term) (Evans et al., 2012). Determining the protected area's recreational objectives and value and revenue generation and pricing strategies were regarded as strategic. Enhancing the visitor experience, visitor use management, interpretation and communication-related activities, marketing and human resource management were categorised as tactical and operational management activities, which involve the implementation of strategy and other day-to-day operational activities (medium to short term planning and activities) (Evans et al., 2012). A third category was created to reflect the monitoring and evaluation of natural and social conditions; and visitor management effectiveness. Such activities can be seen as tactical or operational too. However, the high prevalence of monitoring and evaluation undertakings in national parks justifies such classification.

Table 3. Management application areas and descriptions.

	Management application area		Description
Strategic	MAN1	Determining the PA's recreational objectives and value.	<i>Developing statements pertaining to PA recreational objectives; determining the desired natural and social conditions; determining the PA's recreational value, including economic impact assessments.</i>
	MAN2	Revenue generation and pricing strategies.	<i>Developing new strategies for increased revenue generation and/or pricing strategies.</i>
Tactical & Operational	MAN3	Enhancing the visitor experience by understanding visitor needs.	<i>Understanding visitor needs in order to link the demand and supply of recreational opportunities for purposes of improving visitor experiences.</i>
	MAN4	Visitor use management.	<i>The tactical and operational management of human use to maintain or achieve desired conditions or experiences and respond to the potential negative impacts of visitation.</i>
	MAN5	Visitor interpretation and communication.	<i>Through various methods, communicate information to the visitor that is essential for a satisfactory experience and help visitors form intellectual and emotional connections with the meanings and significance inherent in the resources. Includes visitor signage and environmental education.</i>
Monitoring & evaluation	MAN6	Marketing.	<i>Marketing of visitor experiences.</i>
	MAN7	Human resource management.	<i>Human resource planning (staffing & training) for all areas of visitor management.</i>
	MAN8	Monitoring & evaluation of natural & social conditions, including visitor use monitoring.	<i>Analysing, describing and monitoring existing natural and social conditions to measure visitor use and the impacts thereof.</i>
	MAN9	Monitoring & evaluation of visitor management effectiveness.	<i>Monitoring and evaluation of the effectiveness of visitor management frameworks, strategies and practices.</i>

Source: Authors' conceptualisation.

Next, the lead author coded data from the first 10% of the studies as an additional step to test the data fields and categories (after Pickering et al., 2015). Final changes were then made, and the remaining 90% of studies coded. The database searches, sifting and screening of articles, and capturing and coding of data took approximately seven months to complete and was conducted from January 2019 to July 2019.

3.5. Analysis of the data

First, the authors performed exploratory data analysis (Saunders et al., 2012) and calculated descriptive statistics to summarise the main characteristics of visitor research. Three associations are tested with inferential statistics. The Pearson correlation coefficient (de Winter et al., 2016) is used to test the relationship between the number of research types employed in a study and the number of management application areas recommended. To examine relations between each of the research types and management application areas, Chi-square tests of independence (Saunders et al., 2012) are performed. This test is commonly performed to test the equality of two proportions obtained from independent samples relations. In most cases, the Pearson Chi-Square test (χ^2) was used, and Fischer's exact test when the assumption of adequate cell count was violated (Yates et al., 1999). The effect size or strength of the relationships are tested using the *phi* coefficient (ϕ) and used in combination with Cohen's (1988) criteria of small ($0.10 \leq \phi < 0.30$); medium ($0.30 \leq \phi < 0.50$); and large ($\phi \geq 0.50$). While χ^2 may indicate the relationship's statistical significance, ϕ allows for interpretation of the substance of the relationship, making it meaningful at a practical level (Pallant, 2010). Lastly, the authors tested whether the mean number of management application areas differed significantly between studies produced by external researchers only and those involving a combination of external and embedded researchers using an independent samples *t*-test (Leedy & Ormrod, 2014).

4. Results

4.1. Who does the research, what methods and data are used and where is the research conducted?

The majority of visitor research studies were conducted exclusively by staff from external organisations (83%), predominantly academic institutions. Just 16% of studies involved a combination of external and embedded researchers or staff working for a national park or park agency, with only four studies (1%) conducted entirely by embedded researchers or staff only.

Researchers published national parks visitor research in more than 170 different journals covering various fields of study, including tourism, hospitality and recreation; geography; environmental, health and business sciences.

The research is conducted in national parks in 65 countries but predominantly in the United States of America with 94 studies (Fig. 2), with considerable numbers from South Africa (48) and Australia (41). Six other countries, Poland, Malaysia, Canada, China, Taiwan and Germany, produced between 10 and 20 studies each, but the remaining countries had few studies.

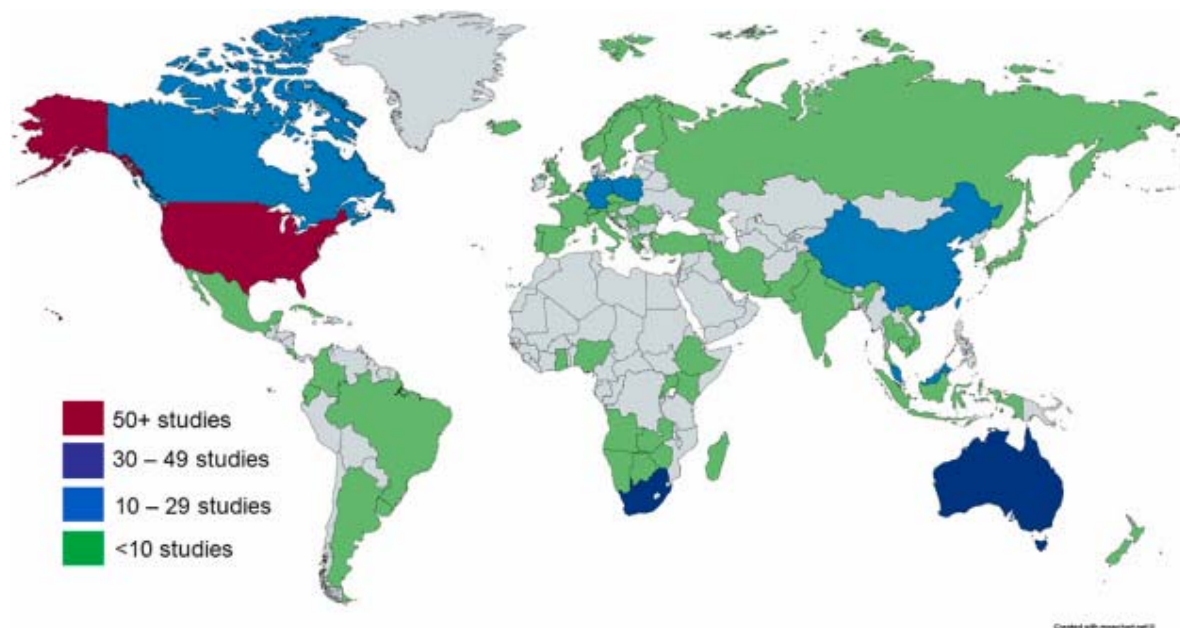


Fig. 2. Number of studies of visitor research in national parks per country based on original research papers published in English between 2014 and 2018.

Of the 407 studies, nearly all involved quantitative research (84%). In contrast, qualitative only and mixed methodology were less common (8% respectively). The majority of studies utilised primary data (78%), while only 6% used both primary and secondary visitor data. There were various data collection techniques used, with survey methodology most prevalent (63%) (Table 4).

Table 4. Research approach, types of data, and methods utilised in national park visitor research studies (2014–2018).

	n	%	Notes
Type of research approach used			
Quantitative only	341	84	
Qualitative only	33	8	
Mixed methods	33	8	
Types of data utilised			
Primary	317	78	
Secondary	65	16	
Both	23	6	
Data collection techniques used ^a			
Survey	256	63	
Existing databases & records	65	16	
Field research	50	12	Scientific fieldwork studying the environmental impacts from visitation.
Spatial data (GIS)	43	11	
In-depth interviews	42	10	
Observation of visitors	41	10	Observing the on-site behaviour of visitors.
Social media data	16	4	
Experiment	12	3	E.g. testing the impact of light pollution on visitors in a lab setting.
Document analysis	11	3	Data extracted from management reports, plans and other official documents.
Photo elicitation techniques			
Focus groups	4	1	
Other	11	3	

^aMultiple techniques could be used in one study.

4.2. Distribution of visitor research types, management applications and types of knowledge utilisation

The percentage of studies according to the six types of visitor research, nine management application areas; and the movement between them is assessed and visualised using a flow map (Fig. 3). The most common visitor research in the studies were psychographic attributes of visitors (58%), socio-demographic attributes of visitors (57%), and data about visitor use patterns and behaviour at the destination (54%). Data about visitor experience outcomes was also common among studies (46%), in contrast to research on visitors' travel arrangements and visitor impacts (23% respectively).

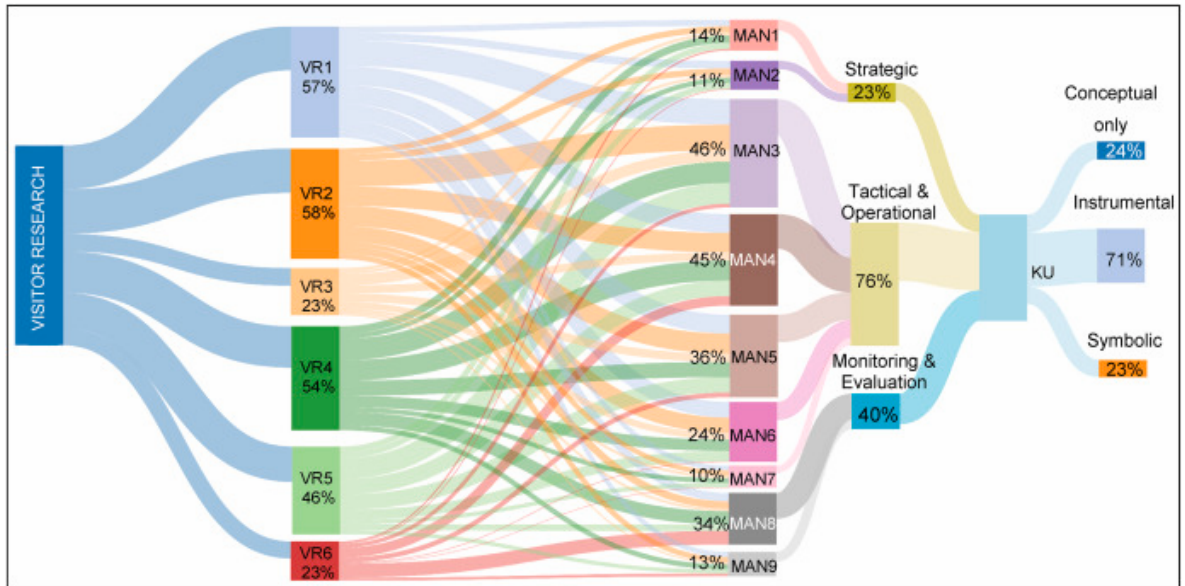


Fig. 3. Flow map showing the proportion of the 407 studies for each type of visitor research and management application area.

*The percentages and thickness of the lines represent the proportion of studies in that category.

VR1 = Socio-demographic attributes of visitors; VR2 = Psychographic attributes of visitors pre-visit; VR3 = Travel arrangements and pre-visit information; VR4 = Visitor use patterns and behaviour at the destination; VR5 = Visitor experience outcomes; VR6 = Visitor impacts; MAN1 = Determining the PA's recreational objectives and value; MAN2 = Revenue generation and pricing strategies; MAN3 = Enhancing the visitor experience; MAN4 = Visitor use management; MAN5 = Visitor interpretation and communication; MAN6 = Marketing; MAN7 = Human resource management; MAN8 = Monitoring & evaluation of natural & social conditions; MAN9 = Monitoring & evaluation of visitor management effectiveness.

KU = Knowledge utilisation.

Most studies utilise more than one type of visitor research (mean of 2.6 types per study) with 30% only looking at one kind. Nearly all studies involve one or more management areas (Table 5), with an average of 2.3 different management applications per study. A fifth of studies covered four or more management areas.

Table 5. Distribution of studies by number of management applications mentioned.

Number of management areas mentioned	n	%
0	32	7.8
1	101	24.8
2	104	25.6
3	92	22.6
4+	78	19.2
Mean		2.32
Mode		2

Visitor research is commonly applied in management activities related to enhancing visitor experiences (46%) and visitor use management (45%) (Fig. 3). More than a third of the studies involved visitor interpretation and communication (36%). Roughly the same

proportion of studies (34%) recommended monitoring and evaluating natural and social conditions in national parks, including counting visitor use. Almost a quarter of studies (24%) made recommendations for the marketing of visitor experiences. In contrast, some areas of management were uncommon, including determining protected areas' recreational objectives or recreational value (14%); monitoring and evaluating the effectiveness of visitor management strategies (13%); revenue generation and pricing strategies (11%); and recommendations related to human resource management (10%). Overall, 76% of the studies mentioned tactical and operational decisions and actions; 40% involved monitoring and evaluation, and 23% involved strategic planning activities.

Reflecting on the knowledge utilisation literature, it can be seen that most studies exhibit instrumental use (71%), where research findings are applied to an identifiable specific management problem, influencing practitioner decision-making or policies. A disparity is observed between the number of studies with an identifiable management problem (71%) versus those that provided at least one clear, practical recommendation in language management would understand (62%). Research making a conceptual contribution, but not used to influence or justify any policies are defined as conceptual only (24% of studies). Less than a quarter of studies (23%) exhibit symbolic use, the application of research to support existing political or strategic positions for the justification of actions, policies, practices or decisions.

4.3. Associations between visitor research types and management application areas

Certain types of visitor research are more likely to be applied in specific management areas. The results of the Pearson Chi-Square tests and the effect sizes are reflected in Table 6. Research examining visitor impacts and their underlying causes (VR6) is likely to be absorbed in monitoring activities (MAN8). This association was substantial. Knowledge of who visitors are (VR1), along with their opinions, attitudes, motivations and other psychographic attributes (VR2), was inclined to be taken up in marketing decisions (MAN6) and also actions that monitor social and environmental conditions and visitor use (MAN8). Data related to visitors' travel arrangements and other pre-trip information (VR3) was also associated with monitoring social and environmental conditions. These relationships were all of moderate strength.

The analysis revealed other associations, but with small effect sizes. Determining a protected area's recreational objectives and/or measuring recreational values (MAN1) was only associated with research on visitor experience outcomes (VR4). Socio-demographic attributes of visitors (VR1) and visitor experiences outcomes (VR5) are both likely to inform revenue generation and pricing strategies (MAN2). Interestingly, all six research types were linked to enhancing the visitor experience (MAN3) and marketing activities (MAN6). All but visitor use patterns and on-site behaviour (VR4) were associated with monitoring use and other natural and social conditions (MAN8). Staffing and training personnel (MAN7) are likely to absorb data on visitors' travel arrangements (VR3).

Activities related to visitor use management (MAN4) and the monitoring and evaluation of visitor management effectiveness (MAN9) showed no significant relationships with any research types.

Table 6. Significant associations between research types and management areas.

MAN categories VR code	MAN1 Recreational objectives and value	MAN2 Revenue and pricing strategies	MAN3 Enhance visitor experience	MAN4 Manage visitor use	MAN5 Interpret and communicate	MAN6 Marketing	MAN7 Human resources	MAN8 Monitor natural and social conditions	MAN9 Monitor and evaluate effectiveness
VR1 Socio- demographics	-	$\chi^2 = 24.259^{**}$ $\phi = .244^b$	$\chi^2 = 34.218^{**}$ $\phi = .290^b$	-	$\chi^2 = 11.840^{**}$ $\phi = .171^b$	$\chi^2 = 41.069^{**}$ $\phi = .318^c$	-	$\chi^2 = 54.420^{**}$ $\phi = -.366^c$	-
VR2 Psychographic	-	-	<i>Fisher's exact</i> $= 34.718^{**}$ $\phi = .290^b$	-	<i>Fisher's exact</i> $= 21.275^{**}$ $\phi = .227^b$	<i>Fisher's exact</i> $= 39.981^{**}$ $\phi = .301^c$	-	<i>Fisher's exact</i> $= 79.209^{**}$ $\phi = .439^c$	-
VR3 Travel arrangements	-	-	$\chi^2 = 16.190^{**}$ $\phi = .199^b$	-	$\chi^2 = 6.054^*$ $\phi = .122^b$	$\chi^2 = 12.092^{**}$ $\phi = .172^b$	$\chi^2 = 5.734^*$ $\phi = .119^b$	$\chi^2 = 19.279^{**}$ $\phi = -.218^c$	-
VR4 Use patterns and on-site behaviour	$\chi^2 = 6.056^*$ $\phi = .122^b$	-	$\chi^2 = 7.222^{**}$ $\phi = .133^b$	-	-	$\chi^2 = 4.000^*$ $\phi = .099^a$	-	-	-
VR5 Experience outcomes	-	$\chi^2 = 11.153^{**}$ $\phi = .166^b$	$\chi^2 = 22.221^{**}$ $\phi = .234^b$	-	$\chi^2 = 6.946^*$ $\phi = .131^b$	$\chi^2 = 5.394^*$ $\phi = .115^b$	-	$\chi^2 = 41.473^{**}$ $\phi = -.319^c$	-
VR6 Impacts of visitation	-	-	<i>Fisher's exact</i> $= 27.621^{**}$ $\phi = .256^b$	-	-	<i>Fisher's exact</i> $= 29.903^{**}$ $\phi = .245^b$	-	<i>Fisher's exact</i> $= 110.434^{**}$ $\phi = .529^d$	-

* $p < 0.05$; ** $p < 0.01$.

Effect size.

^aNegligible to none ($\phi < 0.10$).

^bSmall ($0.10 \leq \phi < 0.30$).

^cmedium ($0.30 \leq \phi < 0.50$).

^dLarge ($\phi \geq 0.50$) $N = 407$.

Studies utilising more types of visitor research tend to make more recommendations relating to different management areas, although the relationship was not very tight (Pearsons correlation coefficient, $\rho = 0.231$; $p = 0.000$).

The results further suggest that when the staff of national parks or park agencies partake in the research process, more management application areas are recommended for utilisation. Research produced by a combination of external and embedded researchers displayed significantly more application areas (mean = 2.61) than those produced by external researchers only (mean = 2.26, independent samples t-test $t = -1.776$, $p = 0.076$), but the effect was not great.

5. Discussion and implications

This section discusses the findings by considering the types of utilisation witnessed in academic visitor research and assessing whether it adequately serves the management activities occurring in protected areas. The facilitating role of embedded researchers is discussed before concluding with managerial implications. First, we establish the geographical representation of this study when compared to other systematic reviews.

5.1. Geographical coverage

There were clear patterns in the academic literature regarding where visitor research has been conducted, with geographical biases seen in other reviews (GodtmanKling et al., 2017; Pickering et al. 2018). However, hot and cold spots for research differ somewhat among reviews. Pickering et al. (2018) examined the proceedings of the first seven conferences on Monitoring and Management of Visitors in Recreational and Protected Areas (MMV), while GodtmanKling et al. (2017) reviewed international literature on trails research. Including the current study, all three reviews reveal a sizable portion of research from North America but far more so in the research on trails (40%, GodtmanKling et al., 2017) than on general visitor research (28% of studies here). North American research only accounted for 15% of the MMV conference proceedings (Pickering et al. 2018). There is also a large contribution from Europe (25% of this review), 28% in GodtmanKling et al. (2017) but 73% in Pickering et al. (2018). With the MMV conferences hosted in Europe, they are likely to attract more European authors. The current study only included visitor research from national parks, while much of the research in Europe originate from other protected area categories.

Trails research produces more papers from Oceania (18%, GodtmanKling et al., 2017) than the 11% in this review and the 6.1% in conference abstracts (Pickering et al., 2018). Visitor research from African national parks in this review contributed 18% to the overall sample, but a negligible 1.3% at the MMV conferences (Pickering et al., 2018) and trails research (0.9%, GodtmanKling et al., 2017). Africa is grossly underrepresented at the MMV conferences, which is surprising considering that South Africa is the country with the second-highest number of visitor research studies in this review.

While the current review captures a more balanced representation of research from North America, Europe, Africa, and Oceania than others, the absence of literature from certain continents and countries is notable; similarly seen in both the MMV conference abstracts

and the trails research. The low representation from Latin America and Asia is likely due to the delimitation of including only studies published in the English language, disregarding research from many other countries where the primary medium in higher education is not English.

Having established the degree of geographical representation of this study, we subsequently review the occurrence of different types of utilisation in our sample of academic literature.

5.2. Knowledge utilisation types

Against the backdrop of Weiss (1979)'s statement that instrumental use is rare and more often encountered in private rather than public organisations, the sizable proportion of recommendations towards instrumental use for park management is encouraging. Notwithstanding, recommendations do not automatically translate into implementation. Knowledge utilisation is influenced by many other factors apart from the provision of information (Rich, 1977, Rich, 1997). Still, given the difference in priorities between academic researchers and practitioners, a phenomenon known in knowledge utilisation literature as the two-communities metaphor (Xiao & Smith, 2007), the prevalence of instrumental use in the body of knowledge studied is noteworthy.

Generally speaking, academic structures prefer and reward conceptual and theoretical advancements (McCool, 2012), while practitioners look for simple, easy-to-use answers (Ritchie & Ritchie, 2002). More than a third of the studies reviewed did not provide clear, practical recommendations to practitioners. Practitioners are not the primary target audience of academic journals; therefore, researchers might have adapted their outputs through alternative dissemination mechanisms that clearly outline the practical implications in a language meaningful to practitioners (Landry et al., 2001). Managers have the right to question the motives of researchers applying to research their parks, but should also realise that not all studies have to provide a definitive endpoint since conceptual use adds to the body of theory for further testing (Rodger et al., 2015).

The low occurrence of symbolic use could be counterproductive to the concept of adaptive management, which promotes an ongoing cycle of learning by doing, improving and adapting strategies to incorporate new knowledge gained through experience (Moore & Hockings, 2013; Stankey et al., 2005). Research that results in symbolic use is helpful to assess past management decisions and should be prioritised in research agendas. More research is needed to understand how much symbolic research is conducted outside of the published literature realm.

The extensive occurrence of studies aligned to management problems suggests most academic researchers are accommodative towards the demand for management research. We discuss how visitor research currently serves different management activities and compare these with observations made by other authors.

5.3. The application of visitor research in protected area management

Visitor research informs protected area management activities in various ways. While there are indications of this in the literature (Booth, 2006; Marion, 2016; Newsome et al., 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018), this study is the first to identify, proportionally, the management areas where academic research is directed to. Most of the research leads to recommendations for applications in management activities that exhibit a strong visitor interface, such as enhancing the visitor experience, managing visitor use, improving visitor interpretation and communication, and monitoring and evaluating social and environmental conditions.

Table 7 compares this review's statistically significant findings with observations and recommendations made by Booth (2006), Marion (2016), Newsome et al. (2013), Wardell and Moore (2004) and Ziesler and Pettebone (2018), in countries such as Australia, Canada, New Zealand, the United Kingdom and the United States. There are many similarities with these observations, yet simultaneously, the comparison reveals that numerous management areas currently do not associate with the academic research types one expects it to. Potential reasons for these results are discussed at the end of the section. We first examine the four research types produced most often: socio-demographic; and psychographic attributes of visitors; data on visitor use patterns at the destination; and research on visitor experience outcomes. This is followed by a discussion of visitor impacts research, a critical component in informing visitor use and impact management (Marion, 2016). Lastly, we discuss information about visitors' travel arrangements and pre-trip information.

Academic research on visitors' socio-demographic and psychographic attributes is associated with the following management activities: enhancing visitor experiences, marketing, interpretation and communication, and monitoring social and environmental conditions. Several authors also mention its use in visitor use- and impact management practices, including site and facility design (Booth, 2006; Newsome et al., 2013; Wardell & Moore, 2004); judgements about the acceptability of impacts (Wardell & Moore, 2004); influencing visitor behaviours (Booth, 2006) and the drafting of visitor management planning frameworks (Newsome et al., 2013). These links were, however, not apparent in academic research. There was also limited evidence in our review of this research informing strategic park- and regional planning, park management and tourism plans (Newsome et al., 2013), measuring park performance (Wardell & Moore, 2004), and financial and human resource allocation (Booth, 2006; Newsome et al., 2013). Our review showed that psychographic attributes relate to revenue generation or pricing strategies, attributed to several studies capturing opinions on park access fees, willingness-to-pay for experiences and conservation efforts.

Table 7. The application of visitor research in protected area visitor management.

Visitor research type	Application areas in this review (significant associations)	Observations from Australia, Canada, New Zealand, United Kingdom and United States
Socio-demographic & psychographic attributes of visitors	Enhancing visitor experiences	Enhancing visitor experiences (B, N)
	Interpretation and communication	Interpretation (N, W) and communication (B)
	Marketing	Marketing (N, W)
	Monitoring visitor use environmentally & socially	–
	Revenue generation and/or pricing strategies	–
	–	Allocation of financial and human resources (B, N, W)
	–	Strategic- and regional planning; park management and tourism plans (N); park performance reporting (W)
	–	Visitor use- and visitor impact management, including visitor management planning frameworks (N); site and facility design (B; N, W); judgements about the acceptability of impacts (W); and influencing visitor behaviours (B)
	–	<i>Examples of applications provided in the text</i>
	–	–
Travel arrangements and pre-visit information	Enhancing visitor experiences	–
	Interpretation and communication	–
	Marketing	–
	Monitoring visitor use environmentally & socially	–
	Planning human resources	–
Visitor use patterns and behaviour at the destination	Defining recreational objectives or measuring a protected area's recreational value	Estimating the local and regional economic contribution of recreational spending (W, Z); Park and tourism management plans (N)
	Enhancing visitor experiences	–
	Marketing	Marketing (W)
	–	Allocation of financial and human resources (B, N, W)
	–	Estimating future use and resource degradation (Z)
	–	Interpretation (W, Z)
	–	Measure effectiveness of management strategies (B)
	–	Park performance reporting (B)
	–	Strategic and regional planning (W), park management and tourism plans (N)
	–	–

Visitor experience outcomes	Enhancing visitor experiences	Enhancing visitor experiences (N)
	Interpretation and communication	Interpretation (B)
	Marketing	Marketing (W)
	Monitoring visitor use environmentally & socially	Monitoring visitor use and visitor impacts (B, N, W)
	–	Visitor use and visitor impact management (B, N, W) and visitor management planning frameworks (N)
	Revenue generation and/or pricing strategies	–
	–	Measure protected area's contribution to society and broader governmental objectives (B)
	–	Park performance reporting (N, W)
	–	Resource allocation (W)
	Visitor impacts as a result of visitation	Enhancing visitor experiences
Marketing	–	
Monitoring visitor use environmentally & socially	Monitoring the extent and range of impacts (M)	
–	Measure effectiveness of management strategies (M, N)	
–	Modelling future use and resource degradation (M)	
–	Park management plans and tourism plans (N)	
–	Park performance reporting (W)	
–	Resource allocation (N)	
–	Visitor use and visitor impact management (B, M, N, W) including facility and site design (M, N) and visitor management planning frameworks (N)	

Sources: Booth (2006) (indicated as B in the table); Marion (2016) (M); Newsome et al. (2013) (N); Wardell and Moore (2004) (W) and Ziesler and Pettebone (2018) (Z).

Research incorporating visitor use statistics, such as temporal and spatial use patterns, and visitor spending data, is likely to be absorbed in three management areas: defining recreational objectives or measuring an area's recreational value, visitor experience management and, thirdly, marketing efforts. Previous literature identified multiple other, more diverse applications of this type of data. These include public accountability (Newsome et al., 2013); park performance measurement (Booth, 2006); allocation of financial and human resources (Booth, 2006; Newsome et al., 2013; Wardell & Moore, 2004); visitor use and impact management and visitor management planning frameworks (Booth, 2006; Newsome et al., 2013; Wardell & Moore, 2004); interpretation and education (Ziesler & Pettebone, 2018), as well as estimating future use and resource degradation (Ziesler & Pettebone, 2018).

Data about visitor experience outcomes are applied in visitor management planning frameworks (Newsome et al., 2013); visitor use and impact monitoring and management (Booth, 2006; Newsome et al., 2013; Wardell & Moore, 2004); and visitor experience management (Newsome et al., 2013). The current review similarly demonstrates the wide use thereof to improve visitor experiences and monitor natural and social conditions. Still, there was not enough evidence to prove a link with visitor use management activities. Visitor experience outcomes have reportedly been used to measure a protected area's contribution to society and broader governmental objectives (Booth, 2006); park performance reporting (Newsome et al., 2013; Wardell & Moore, 2004); and resource allocation (Wardell & Moore, 2004). Academic publications did not demonstrate these links. It did, however, reveal that this type of data is used in revenue generation and pricing strategies. Both the current study and other authors found this type of data is likely to be applied for visitor interpretation and communication (Booth, 2006) and marketing (Wardell & Moore, 2004).

Measuring and monitoring visitor impacts and examining their underlying causal and non-causal factors produce essential information for management to respond effectively to visitation effects on the environment, communities, tourist infrastructure and other visitors (Marion et al., 2016). Expectedly, visitor impact research from our sample displayed a strong link with monitoring changes in natural and social conditions. It is further likely to be applied in improving visitor experiences (also reported in Newsome et al., 2013) and marketing efforts. The fact that it did not associate with visitor use management, though, alludes to a gap between researching the impacts and formulating strategies and practices to address the impacts. We found numerous academic visitor impact studies that mentioned no managerial recommendations.

In contrast to visitors' attributes and their experience outcomes, we know little about where and how protected area management has applied data related to visitors' travel arrangements and other pre-trip information. Recommendations from the literature suggest this research type could, for example, be utilised as supplementary information in profiling visitors (Kruger et al., 2017) and determining demand (Avila-Foucat et al., 2017). Such data could also inform how visitors utilise protected areas through the choice of travel mode (Choe et al., 2017), the segmentation of visitors (Mehmetoglu, 2006) and valuations of recreational services through travel cost method analysis (Blayac et al., 2016). Our sample found this type of research is associated with five application areas, including improving the visitor experience; informing marketing; interpretation and communication; planning human resources, and monitoring visitor use environmentally and socially.

Despite the multifarious nature of applications of academic visitor research, some management areas appear to be underserved by the current body of knowledge. There is much less evidence of how academic research currently informs strategic planning activities than tactical and operational monitoring activities. Defining recreational objectives is a necessary step in high-level park management and visitor management planning frameworks (McCool et al., 2007), but few studies address this topic. Many studies in our sample addressed various aspects of visitor use management, but no relations with any specific research types unfolded. Perhaps more concerning, though, is the lack of studies that evaluate the effectiveness of current visitor management practices. There is further

little proof of research applications in revenue generation and pricing strategies, and human resource management planning. These knowledge gaps present an opportunity for future studies such as investigating utilisation at a more inclusive level, including non-published literature. It could also be explored at the agency level to understand the inclination of management to source and incorporate research into the various strategic, tactical and operational decisions.

Next, we discuss the importance of collaboration between the researcher and practitioner communities.

5.4. Collaborative research increases application

Involving staff embedded in protected areas in the research process leads to greater numbers of recommendations towards management applications of the research. In the face of research capacity of conservation agencies declining worldwide (Roux et al., 2019), research responsibilities are increasingly outsourced to external researchers, posing a risk of management research priorities being neglected (Kingsford, 2018). Investing in embedded research capacity improves knowledge exchange between practitioners and researchers as embedded researchers are committed to supporting management-related research (Roux et al., 2019). Embedded researchers' knowledge of the unique context of each area may help align research objectives with the practitioners' critical intelligence needs and ensure long-term research goals are not neglected (Roux et al., 2019). The domain of social-ecological systems is complex and require engagement between researchers, practitioners and decision-makers to address policy problems (McCool, 2012).

5.5. Managerial implications

This study raises awareness of the potential contribution of researchers and their research towards policy transformation in protected areas. There is growing concern about the underutilisation of tourism research by practitioners (Mairet et al., 2014) and a real need to decipher what the research community and protected area managers can do to improve it. An enhanced understanding of the role of research in visitation-focussed management strategies and practices can encourage protected area managers to re-evaluate current management and research approaches. The purposeful application of visitor research may lead to the development of alternative visitor management approaches (Mason, 2005) and provide more theoretical structures (Manning, 2011) to assist managers in determining the best course of action to manage visitor management complexities. The study highlights the importance of accommodating a diverse range of visitor research types for evidence-based decision-making in the value-laden process of managing visitors (described by Manning, 2011; Marion, 2016). Practitioners can be shown how to incorporate knowledge of visitor impacts and their causal and non-causal factors; visitor attributes, behaviours and use patterns; and the benefits of visitor experiences into planning and practice. Managers can motivate to acquire new research that assists them in managing visitor use and impacts more effectively. In doing so, they are better positioned to handle the sometimes opposing demands of its biodiversity and visitor experience mandates (McCool & Khumalo, 2015).

The substantial number of recommendations for instrumental use of visitor research found in this review corroborates the findings by Newman and Head (2015) that academics, in this case, outdoor recreation and tourism researchers, are adapting and embracing the demand for management research. However, the supply of academic research does not flow equally to all management activities. Gaps could be seen in strategic-level activities such as defining the area's recreational objectives or establishing the desired natural and social conditions. This could be ascribed to the nature of such strategic planning activities, i.e. not occurring frequently and typically involving mostly internal staff. Many of the decisions taken to inform planning frameworks have a long life span, which can in some cases be counterproductive to an adaptive management approach, particularly in a context highly influenced by societal changes such as that of tourism (McCool, 2012; McCool et al., 2007). Further investigation is needed on the dynamics around such planning decisions.

Marion (2016) reviewed recreation ecology research and illustrated how visitor use management absorbs environmental and social data on resource impacts, yet this link was not apparent in the academic research reviewed. Managers should work closely with researchers to facilitate knowledge transfer to practitioners and push for monitoring projects that deliver more management recommendations. Similarly, there is a lack of research that evaluates the effectiveness of management initiatives. Evaluating and reflecting on visitor management decisions of the past (Marion, 2016; Newsome et al., 2013) is a necessary component in the continuous feedback loop of an adaptive management context (Moore & Hockings, 2013).

On an aggregated scale, these findings further demonstrate that multiple uses of the same research type are possible and should be encouraged by practitioners (Buckley et al., 2001). Practically, however, and similar to the findings of Booth (2006), a large part of the data gathered is relevant only in site-specific applications, covering a range of different types of resource use and associated management approaches, limiting further applications. The varying structures and purposes for which data is collected in protected areas further complicate research uptake (Darcy et al., 2007). However, this review has shown that more research types lead to more significant numbers of management recommendations. This could counter the limitation of site-specific data (Booth, 2006) to some extent.

Lastly, protected areas should establish an embedded research capacity as this further stimulates management application of academic research.

6. Conclusion and recommendations

This paper provides a global perspective on the usability of visitor research in protected areas by examining case studies in national parks in over 60 countries. It applies the existing method of SQLR in a novel way to confirm the main components of visitor research gathered and its areas of use in management decisions and actions. This application's novelty is perhaps best seen in the measurement of different types of knowledge utilisation by studying the integration between the research produced in academic peer-reviewed publications and practical recommendations made towards supporting various management activities.

The review has shown that academic researchers in tourism and recreation frequently make recommendations towards instrumental use of knowledge and often suggest multiple areas of management application. However, the study also identified gaps in the research-practice interaction. There is little evidence of the absorption of academic visitor research into strategic management activities (similar to the findings of Darcy et al., 2007), despite other scholars documenting its usefulness in planning activities (Newsome et al., 2013; Wardell & Moore, 2004). Few studies assess the effectiveness of management decisions and practices, hindering adaptive management approaches. This review also suggests a weak connection between research that monitors environmental and social conditions in national parks, visitor use, and visitor impact management strategies.

Protected area management can meet the demand for knowledge, understanding and wisdom in the practice of visitor management only by working closely with researchers, creating solid, mutually beneficial partnerships. Better alignment between the research being produced and what managers require for informed decision-making will increase the uptake of visitor research into policy. Close interaction between managers and researchers also promotes the development of wisdom that more successfully addresses the intricacies involved in visitor management (McCool, 2012). Managers should clearly articulate their key intelligence needs to external researchers to prioritise management-relevant research (Manning, 2011). Practitioners can motivate for the acquisition of certain types of knowledge that inform visitor use- and impact management (Marion, 2016) and visitor experience management strategies (McCool, 2006). Research evaluating the efficacy of management strategies and practices should be prioritised. When scoping projects, practitioners should work closely with academic researchers (Manning, 2011), giving careful consideration to the number and combination of research types collected in each study. The inclusion of different types of knowledge could give rise to more applications (Xiao & Smith, 2007) and increase the value of the research outputs. This will require practitioners to be aware of other research gaps in the organisation or work with an intermediary who hold a broader view of management goals. Embedded researchers often act as facilitators (Roux et al., 2019) across various projects and can provide guidance in this respect while also synthesising research outputs to practitioners, further stimulating research uptake. Managers should also consider other ways of optimising research outputs, including demanding from researchers a demonstration of how visitor research can be optimally applied to enhance decision-making. To make their research more relevant, researchers should spend time in the practitioner environment to gain a rich understanding of the user's context, the research problem and the challenges experienced. Lastly, managers need to recognise the value of academic research in transforming and inspiring institutional frameworks and long-term research goals (Newman & Head, 2015).

Irrespective of instrumental and, to a lesser degree, symbolic use found in existing visitor research, it is not yet known to what extent academic research addresses protected areas' requirements at a collective or organisational scale. There remain considerable opportunities for researchers to empirically investigate the current and potential contribution of visitor research in visitor management decision-making, a shortcoming highlighted decades ago (Wardell & Moore, 2004). There are also significant gaps in understanding the current level of utilisation' whether the available visitor research can be applied more effectively by practitioners; which factors influence utilisation and how to

address them to remove the barriers to utilisation. Future research can also investigate whether studies involving embedded researchers bring about higher levels of actual uptake in management decision-making.

This review has several limitations. The most significant one is the exclusive use of visitor research studies published in peer-reviewed academic journals, which has several implications. Like other reviews (GodtmanKling et al., 2017), the overall number of research studies is undercounted as studies in other types of publications such as books, book chapters and conference papers, research management reports, and other unpublished research, were excluded. Certain types of research could be underrepresented in academic reviews. An example is visitor use statistics, gathered primarily to satisfy legal and policy mandates (Ziesler & Pettebone, 2018). In itself, it may not be considered suitable for publishing in academic journals.

The authors acknowledge that the search strategy excluded many other protected areas with similar characteristics to national parks, such as wilderness areas and state parks in the US. It is further possible that the requirement for either phrases “national park” or “protected area” to be present in the abstract of an article, might have been too restrictive. The authors found it to be the most efficient way of sifting through the 5491 abstracts which appeared in the initial search results.

As with most systematic reviews, the sample only included articles published in the English language, limiting its representativeness (Pickering & Byrne, 2014). Although English is considered the dominant language for scientific publications (Albarillo, 2014; Stockemer & Wigginton, 2019), perspectives and paradigms embedded in other cultural and linguistic traditions may not be captured (Albarillo, 2014). The final 407 studies included in this review should be viewed as a sample of the visitor research produced in the English language rather than the absolute number of studies.

The limitations in the design of this study provide opportunities for further research. More in-depth research could include performing a country-specific or agency-specific evaluation of the knowledge utilisation pathways to develop appropriate strategies to combat visitor research underutilisation. Future studies could also investigate visitor research utilisation from the demand side, such as practitioner pull into policy documents, strategies, and other planning activities such as park management plans, visitor management plans, and marketing plans. Lastly, the definition and categorisation of both the visitor research types and management application areas could benefit from further refinement towards more formal, academically formulated constructs.

Declaration of competing interest

This paper forms part of a series of papers from an unpublished PhD thesis (available from the University). It should further be noted that the lead author is employed by a protected area agency which could have influenced the design, analysis and interpretation of the results. The iterative and systematic approach followed in this review, however, countered this limitation.

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