



Current knowledge and future research directions for the monitoring and management of visitors in recreational and protected areas

Catherine Pickering^{a,*}, Sebastian Dario Rossi^a, Ana Hernando^b, Agustina Barros^b

^a Environment Futures Research Institute, Griffith University, Australia

^b Instituto Argentino de Nivología y Glaciología y Ciencias Ambientales (IANIGLA), Centro Científico Tecnológico (CCT) CONICET, Mendoza, Argentina

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ABSTRACT

Visitation to recreation and protected areas is increasing globally and in many regions, including Europe, so is research on visitation. But who, where, what and how is the research done and what are the trends and key research gaps? The systematic quantitative review of 758 oral abstracts from the first seven conferences on Monitoring and Management of Visitors in Recreation and Protected Areas answers research questions on methods, goals and locations presented in the last decade as well as discussing trends and recommendations for the future. These major multi-disciplinary conferences are held every two years in different countries in Europe. Most (72%) of the research was from Europe, predominantly from countries where English is not the dominant language. Nearly every abstract was from terrestrial natural areas, often terrestrial protected areas (56%), with only three marine studies. Most abstracts (85%) were in the social sciences, either assessing visitor profile data along with motivations, satisfaction and experiences or focused on psychological aspects such as the attitudes, perceptions and behavior of visitors. Environmental research (32% abstracts) was mostly on vegetation, wildlife and landscape features with limited research on aquatic systems. Technology is driving research, with the analysis of big data from social media transforming where and how visitors can be monitored. Important gaps remain including research from countries and regions with large protected area systems and high levels of visitation including in Asia, South America and Africa, as well as some countries in Europe such as France.

Management implications: The article describes the previous trends in this conference series on outdoor recreation. The findings suggest that future conferences could:

- enhance the attendance and representation of researchers from parts of Europe so far under represented and different parts of the world such as Asia, the Russian Federation and Africa to make the conference truly international,
- strengthen the relevance of the conference for practitioners and managers, and
- communicate the value of research, including how new methods and technologies can enhance sustainable decision making.

1. Introduction

Nature-based tourism and recreation is increasing and diversifying worldwide, with protected areas and other natural sites key destinations for a range of activities (Ankre, Fredman, & Lindhagen, 2016; Balmford et al., 2015; Eagles, 2014; Newsome, Moore, & Dowling, 2012). This is in part driven by the well-recognized social benefits of visitor use of natural areas including improving human health and wellbeing (Berman, Jonides, & Kaplan, 2008; Bowler, Buyung-Ali, Knight, & Pullin, 2010; Byrne, Wolch, & Zhang, 2009; Li et al., 2011;

Maller, Townsend, Pryor, Brown, & St Leger, 2006; Morita et al., 2007; Pretty, Peacock, Sellens, & Griffin, 2005; Rossi, Byrne, & Pickering, 2015; Wells & Lekies, 2006). Nature-based activities can also generate economic revenues for protected areas and local communities through visitor expenditures and commercial concessions (Balmford et al., 2015). Unfortunately, these activities can also have detrimental impacts on the natural environment (Liddle, 1997; Monz, Cole, Leung, & Marion, 2010; Monz, Pickering, & Hadwen, 2013; Pickering & Hill, 2007), as well as resulting in social conflict among different users and with other stakeholders, when not properly managed (Arnberger &

* Corresponding author.

E-mail addresses: c.pickering@griffith.edu.au (C. Pickering), sebastian.rossi@griffithuni.edu.au (S.D. Rossi), ana.hernando.j@gmail.com (A. Hernando), abarros@conicet-mendoza.gov.ar, anaagustinabarros@gmail.com (A. Barros).

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Brandenburg, 2007; Carothers, Vaske, & Donnelly, 2001; Jacob & Schreyer, 1980; Rossi, Pickering, & Byrne, 2016; Vaske, Needham, & Cline, 2007).

To respond to the challenges and opportunities from nature-based tourism and recreation, there is an increasing focus on research into visitor management and monitoring (Buckley, Robinson, Carmody, & King, 2008; Lockwood, Worboys, & Kothari, 2012; Newsome et al., 2012; Worboys, Lockwood, Kothari, Feary, & Pulsford, 2015). This includes collecting information about visitors such as when, where and how many people use protected areas and for what purposes. This type of data is critical for protected area managers and other land use agencies (Andersen, Gundersen, Wold, & Stange, 2014; Buckley et al., 2008; Cessford & Muhar, 2003; Eagles, 2014; Worboys et al., 2015). Such data can help improve recreation opportunities while reducing the risk of social conflict as well as mitigate some environmental impacts (Ankre et al., 2016; Hadwen, Hill, & Pickering, 2007; Santos, Nogueira Mendes, & Vasco, 2016). The implementation of monitoring programs can also provide information about the state of conservation resources, the severity of threats, and the success of management responses (Buckley et al., 2008; Lockwood et al., 2012; Newsome et al., 2012; Worboys et al., 2015).

Recognizing the increasing interest in these issues, multidisciplinary conferences on Monitoring and Management of Visitors in Recreational and Protected Areas have been run every two years from 2002 to 2016 in Europe (Arnberger, Brandenburg, & Muhar, 2002; Đorđije, Miroslav, Lazar, & Vladimir, 2016; Fredman, Stenseke, Mossing, Liljendahl, & Laven, 2012; Goossen, Birgit, & van Marwijk, 2010; Raschi & Trampetti, 2008; Reimann, Sepp, Pärna, & Tuula, 2014; Siegrist, Clivaz, Hunziker, & Iten, 2006; Sievänen et al., 2004). These conferences bring together academics and practitioners to exchange information about the latest research, to identify emerging issues and foster better practices. The first conference was held in Vienna, Austria in 2002, with subsequent conferences in Rovaniemi, Finland in 2004, Rapperswil, Switzerland in 2006, Montecatini Terme, Italy in 2008, Wageningen, the Netherlands in 2010, Stockholm, Sweden in 2012, Tallinn, Estonia in 2014, and in Novi Sad, Serbia in 2016 (Fig. 1). The proceedings of the first seven conferences are published online, providing snapshots over time, allowing major themes, research outcomes, trends and gaps to be elucidated.

In this paper we review the proceedings of the first seven Monitoring and Management of Visitors Conferences (2002–2014) to assess: (1) who does research on this topic, and where, (2) what type of visitor data was collected and for which activities, (3) what are the main research themes/approaches, (4) what are the main methods used, (5) what was the role of technology in shaping research, and (6) where are key research gaps that should be addressed in future research on managing and monitoring visitors.

2. Methods

2.1. Quantifying the literature

We used a Systematic Quantitative Literature Review methodology (Pickering & Byrne, 2014; Pickering, Grignon, Steven, Guitart, & Byrne, 2015) to review the topic using the proceedings of the first seven conferences. To maintain consistency in the level of detail provided, while ensuring a wide diversity of topics were analyzed, we assessed the 758 abstracts for oral presentations, but excluded posters and keynote speaker abstracts. For each oral abstract, information was coded into a customized database for the review including: (1) *who did the research* such as the names of authors and their country of affiliation, (2) *where was the research conducted* including the region, country and location of the study, including if it was conducted in a protected area or other type of land use, and (3) on the type of *visitor data* collected (i.e. number of visitors, spatial and temporal use patterns). To determine (4) *what was the main approach/themes of the research* we recorded if it was original

research, a case study, new methodology, a concept or a review abstract. We also coded if the research was primarily in the social sciences, environmental sciences, or both, or if it focused on technological developments, and what the major themes of the research were. We recorded data on (5) the *general methods* used for data collection, and (6) the *type(s) of technology* used (if any) for data collection such as GIS, traffic counters, GPS trackers or GPS tracking via smartphones. For abstracts in the social sciences, additional information was recorded including if the methods used were only quantitative (i.e. structured questionnaires, mailed questionnaires and/or desktop analysis), only qualitative (some individual or focus group interviews, document analysis, and/or participant observation) or 'mixed' studies using both quantitative and qualitative methods (Veal, 2011). In addition, the types of methods used were recorded including if they were formal structure questionnaires (e.g. used structured-designed question forms), visitor interviews (from semi-structured to unstructured interviews recording words, images and sounds), document analysis, direct observations (where the researcher watches the subject without interacting or altering the environment), participant observations (where the researcher was part of the social environment being studied) and intervention experiments (Veal, 2011). We also recorded who was assessed (e.g. visitors, communities, other stakeholders). For environmental studies, additional data about the type of impacts were recorded including if there were impacts on wildlife, vegetation, soils and/or aquatic systems. The coding procedures were cross-checked within the team, including the criteria used prior to assigning any abstracts, and then the coding of a sample of abstracts was compared between two of the authors to check for consistency.

2.2. Data analyses

The data for each abstract were initially entered into Survey Monkey using standardized categories/options to minimize entry errors and then transferred into SPSS (version 22.0). The geographic location (region, country and location) of each study was included in a GIS database to visually represent where research was conducted, with some abstracts including research from more than one location.

To identify research gaps (seventh aim) along with patterns and trends, the numbers of abstracts per category were examined through descriptive analysis and Chi-square tests. This included if there were differences in the field of research, components assessed and methods used among the seven conferences, including variation in quantitative and qualitative research in the social sciences abstracts. To identify more general patterns in the social science abstracts a Categorical Principal Component Analysis (CATPCA) was also used. The CATPCA is analogous to Linear Principal Component Analysis (PCA), except that it is suitable for the analysis of categorical variables (i.e. nominal or ordinal) and non-linear relationships (Linting, Meulman, Groenen, & van der Kooij, 2007).

3. Results

3.1. Who does the research and where?

Across the seven proceedings there were 758 oral abstracts by 1124 authors from 57 countries (Table 1). Some authors have multiple abstracts, but most (731) only appeared once as the author of an abstract at the conferences. Most of the research at the conferences was from authors affiliated with institutions located in non-English speaking countries (834, 74%), mainly Germany (86), Austria (81), Switzerland (72), the Netherlands (64), Finland (62), Italy (50), Sweden (45) and Japan (44). For authors affiliated with institutions in English speaking countries, the major contributions were by authors from the USA (125), followed by Australia (62), Canada (50), the United Kingdom (41) and New Zealand (12).

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