‘Seeing red’ in national parks: How visitors’ values affect perceptions and park experiences

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Abstract

People’s reasons for visiting national parks have been well researched. So too have their park activities and how diverse activities potentially affect visitors’ park experiences (e.g. perceptions of overcrowding). Far less research has examined how park users’ environmental values might affect their perceptions of other users and the appropriateness of different activities – a potential source of conflict. Relationships between personal environmental values and environmental and social perceptions are complex and interactive in the context of park visitation. Visitors’ encounters with other users can powerfully affect their experience and enjoyment of parks, in turn reflecting such factors as values-related expectations and judgments in the context of national parks. Personal and social values may also play an important role in influencing whether different activities are perceived as ‘out of place’ in the context of national park place meaning, yet the conceptualization of values within geographic literature on parks remains comparatively weak.

This paper utilizes a definition of values, derived from a concise review of the geography and social psychology literatures, to explain the results of survey research we undertook within national parks in Queensland, Australia. We use a ‘values-behavior hierarchy’ conceptual framework to consider how the personal environmental values of

a sample of park visitors (n=404) potentially affected patterns of park visitation, user activities, and user conflicts. Findings suggest that visitors' environmental values shaped how they perceived other park users and the appropriateness of their activities. This has international implications for geographic research and other disciplines and professions involved in national park visitation, park use, and human impacts, *on* and *of* these powerful places.

Keywords: parks; place; perception; environmental concern; environmental impacts; social impacts

Introduction

Rapid urbanization has been accompanied by a reduction in green space in many cities worldwide (Goddard, Dougill, & Benton, 2010; Wolch, Byrne, & Newell, 2014; Zhou & Wang, 2011). As accessible urban green space decreases, residents have begun to turn to alternative areas for their recreational needs (Rupprecht & Byrne, 2014). Accessible national parks are an example, and there is a growing literature reporting increased demand for recreational experiences in national parks (Arnberger & Brandenburg, 2007; Frick, Degenhardt, & Buchecker, 2007; Lundgren, 1974). This trend has also been accompanied by changing societal values about the appropriate use of national parks and other protected areas, such as the privatization of nature (Castree, 2010; Ernstson & Sorlin, 2009). Increased demand and changing values are generating a spectrum of social and environmental impacts in national parks globally, with

repercussions for park users and non-users alike (Frick, Degenhardt, & Buchecker, 2007). Peri-urban national parks are a good example.

Peri-urban national parks are located at the urban-rural fringe of cities (and/or the urban-wildland interface) (Ewert, Chavez, & Magill, 1993). The term peri-urban refers to the area between the outer edge of the continuous built-up residential parts of a city or town and the rural-production space (or wildland interface), irrespective of density of people per unit area (Lawton & Weaver, 2008; Nelson, 1992; Taylor, 2011). Research suggests that the activities of some visitors to peri-urban parks can potentially affect the psychological and social benefits derived by other visitors, with implications for health, wellbeing, environmental quality and social equity (Byrne, Wolch, & Zhang, 2009; Hartig, Mang, & Evans, 1991; Low Choy & Prineas, 2006; Maller et al., 2006).

Visitors' experiences in national parks can influence their level of support for nature conservation. Poor experiences may result in lower levels of support for protected areas (Coghlan, 2011; McCool, 2006). Researchers have found that a visitors' experiences are usually shaped by three interrelated cognitive processes: (i) their perceptions of adverse environmental impacts in parks (Dorwart, Moore, & Leung, 2010; Lynn & Brown, 2003; Noe, Hammitt, & Bixler, 1997); (ii) their perceptions of the appropriateness of the behavior and activities of other users; and (iii) their appraisals of the efficacy of park management (Floyd, Jang, & Noe, 1997). The experiences of visitors may also explain how and why some users express affinity for, or a sense of place towards, some parks but not others. In the longer term, this has potential repercussions for political commitment to establishing and maintaining protected areas such as national parks (Stedman, 2002). If people do not believe that a national park meets their needs, or if they feel unwelcome in – or excluded from these parks, they may be unlikely to support

such parks, with potential ramifications for biodiversity conservation and social equity (Byrne, 2012).

Contemporary geographic debates about park use have highlighted theoretical tensions with respect to the roles of distance, sense of place, landscape and the cultural politics of nature in shaping park access and use (Byrne, 2012; Byrne & Wolch, 2009). A growing body of research is illuminating how visitors' values, broader social and cultural values, as well as the values that inhere in landscapes can reflect and (re)produce social and environmental inequalities (Byrne, 2012; Byrne, Wolch, & Zhang, 2009). How a potential visitor perceives a park space and the people and activities that are deemed appropriate in those spaces affects their park-use choices, with flow on impacts upon quality of life, livelihood and even local ecologies (Wolch, Byrne, & Newell, 2014).

In this paper we present the results of research examining the personal values of visitors to peri-urban national parks in Queensland, Australia. We sought to further a geographic understanding of the role of values in park use and park management by answering two interrelated questions: (1) do the environmental values of park visitors vary according to their socio-demographic characteristics and the recreational activities they engage in?; and (2) do park visitors' environmental values affect their perception of the appropriateness of other users' behaviors and activities, and if so, how? The paper is structured into 6 sections. Following the introduction, we review the values literature and develop a conceptual model to explain the interaction of values, perceptions, park experiences and park user conflict. Here we note the tension between personal values and socially constructed value systems. Next we describe how we used an intercept survey (on-site, respondent completed survey) to examine park visitors'

personal values and recreational activities (Veal, 2011). We then report our findings, noting that visitors' environmental values appear to shape how they perceived other park users and their activities (e.g. motorized activities were perceived more negatively than other activities). In our discussion and conclusions we draw attention to the policy implication of these findings, and their implications for national parks in Australia and internationally. We suggest that park managers need to better understand the environmental values of visitors if they want to improve visitor's experiences and visitor's perceptions of the inclusiveness (or otherwise) of park spaces.[1] We conclude by highlighting some directions for future research.

Perceptions, attitudes and values: utility for geographic research on parks

It is important to examine collectively held and individual values in protected areas such as national parks because values can undergird support for such environmental planning policies and places. Moreover, different values may lead to inter-user and/or place-based conflict, presenting challenges for park managers (Clement & Cheng, 2011; Ford et al., 2009; Kouzakova et al., 2012; López-Mosquera & Sánchez, 2014; McIntyre, Moore, & Yuan, 2008) (Figure 2). Research suggests that values can predict visitors' levels of enjoyment and satisfaction with their park experience, as well as their affinity for parks in general. There is a well-established literature demonstrating relationships between the values that people hold and their pro-environmental behavior (Bolderdijk et al., 2013; Karp, 1996; Schultz & Zelezny, 1998; Stern et al., 1999). However, the role

[1] We recognize of course that park-users' differing motivations, understandings of national parks and park regulations, differing demographic and cultural factors, and the dynamics of the multifaceted interactions associated with differing recreational activities can all influence the efficacy of park management and visitors' levels of park enjoyment, but here we specifically focus on users' values.

of values is often poorly understood in geographic research addressing protected areas, such as national parks. This is partly because constructs such as values, attitudes, beliefs, and perception have been loosely defined, and partly because the constructs have often been used interchangeably. It is therefore important to clearly specify how these constructs are used in this paper and to briefly review their (inter)relationships for the purpose of conceptual and underlying construct clarity. More recent environmental research suggests that these constructs are nested in a hierarchical fashion, as shown in Figure 1 (Papagiannakis & Lioukas, 2012).

What are values?

The construct of values has been used by a wide range of disciplines, including psychology, sociology, economics, leisure studies, landscape architecture, environmental science and geography (Reser & Bentrupperbäumer, 2005). Generally this construct refers to one of two distinct but interrelated ideas. First, values are seen as *guiding principles* that can filter information about the world, shape people's attitudes and indirectly influence their behavior (Bardi & Schwartz, 2003). Second, values have been conceptualized as a *measure of worth* of the utility of an object, of actions or goals (Papagiannakis & Lioukas, 2012). It is the first construct that we are interested in here, though we recognize that the two constructs are related.

For the purpose of this paper, values are defined as deep and enduring principles that inform and influence peoples' behavior (Dietz, Fitzgerald, & Shwom, 2005; Gregory et al., 2009; Knafo, Roccas, & Sagiv, 2011; Reser & Bentrupperbäumer, 2005; Rokeach, 1973; Schwartz, 1994; Stern & Dietz, 1994). Lee, Soutar, and Louviere (2007, 1043) note that values help us 'determine what is important' because they shape personal and

collective preferences about desired 'modes of conduct or end state[s] of existence'. They are a 'type of social cognition that function[s] to facilitate adaptation to one's environment…[for the] preservation of optimal [conditions]…[and] serve as prototypes from which attitudes and behaviors' are generated (Homer & Kahle, 1988, 638). In other words, values guide individuals and societies about what to do and how to act in particular situations, because they provide 'criteria for judgment, preferences and choice' (op. cit.).

Research by social and environmental psychologists strongly suggests that as guiding principles, values are relatively stable over time and have an appreciable and 'measurable influence on behavior' (Karp, 1996: 113; Kouzakova et al., 2012; Stern & Dietz, 1994) but do not directly regulate human behavior (Bardi & Schwartz, 2003; Schwartz, 1994) (see Figure 1). In the context of park visitation and use, it should be noted that other salient factors come into play when visitors perceive and judge other visitors, their behaviors, park management, the park environment itself, or their own levels of enjoyment (i.e. person perception and social perception). These include motivations, expectations, whether they are alone or with others, demographic differences, comfort levels and the like (Virden & Knopf, 1989). While important, a discussion of all these factors is beyond the scope of this paper.

Geographers' studies of people's values, as understood in the more social psychology discourse, are surprisingly scarce. There are notable exceptions including Tuan's (1974) research into what he called 'topophilia', Clement and Cheng's (2011) study of values in forest planning, Jackson's (2006) research into indigenous values of water resources and some higher-level examinations of geography and environmental values (e.g. Castree, 2014), and the interplay between values, recreation and the environment (e.g.

Franklin, 2004; Mels, 2002). More common however, are studies that have considered values as a *measure of worth* – for example Lee's (2006) investigation of economic value, or the notable work of Brown and colleagues, exploring how social values might inhere in landscape characteristics (Brown & Brabyn, 2012; Brown, Reed, & Harris, 2002; Brown & Weber, 2011; Harris & Brown, 1992; Van Riper et al.). While geographers have seemingly tended to eschew explicit studies of values as *guiding principle*s. Where they have conceptualized values this way it has tended to be framed in a similar fashion to that of social psychology. Specifically, geographers have used the values construct to refer to a set of guiding principles that regulate or inform behavior within place-related social settings (Gregory et al., 2009; Reser & Bentrupperbäumer, 2005; Schwartz, 1994).

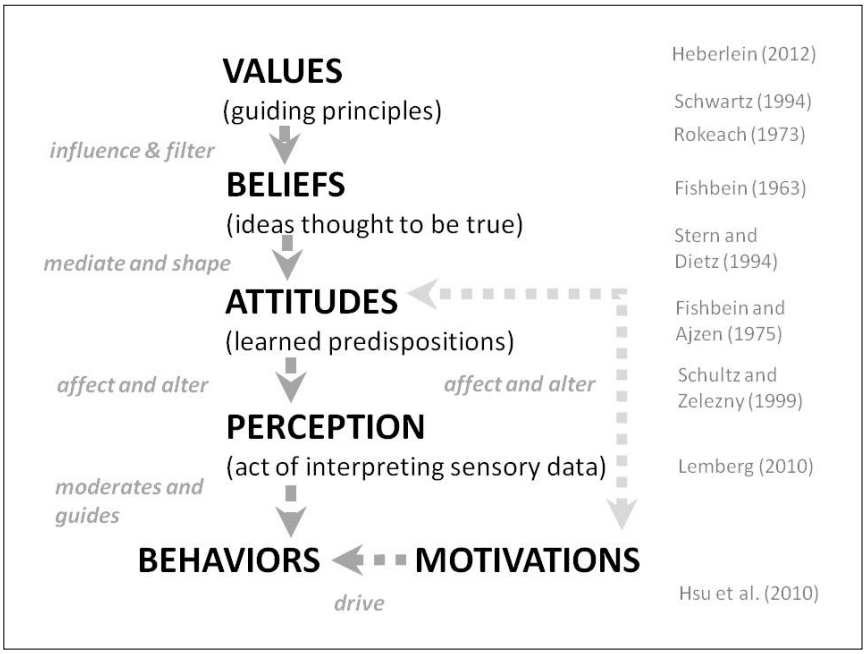

Figure 1. Conception of values (the guiding principles construct) in a conceptual hierarchal model of factors that mediate behavior – such as park use.

What are attitudes?

Psychology research provides strong evidence that values can influence people's attitudes. Indeed, many psychologists believe that 'values are determinants of attitudes'

(Axelrod, 1994) (see Figure 1). The attitude construct refers to 'a learned predisposition' towards an object or situation, or to paraphrase Fishbein and Ajzen (1975): how an individual respond[s] in a consistently [un]favorable manner with respect to a given object' (Fishbein, 1963; Fishbein & Ajzen, 1975). Attitudes can underpin motivations to act, but also can be sources of motivation (Hsu, Cai, & Li, 2010). Citing Hollander (1971), Hsu, Cai, and Li (2010) recognize that: 'attitudes [are] motivational-perceptual states that direct action.' People's attitudes form within a complex social milieu, and like values, are shaped by socio-demographic and cultural contexts (e.g. age, sex, education level, ethno-racial background, etc.) (Larson, De Freitas, & Hicks, 2013). Both values and attitudes mediate perceptions.

What is perception?

According to Lemberg (2010), perception refers to: 'how people sense, mentally process and act on' information derived from the environment around them. Perception is a cognitive process that has both biological and socio-cultural dimensions. The biological component relates to how our receptors – eyes, ears, skin, etc. – receive incoming stimuli and respond to them. The socio-cultural dimension relates to how we make sense of the information that we receive from our senses. Lemberg (2010) further clarifies that construct of perception entails: 'the cognitive process…directly involved with the detection and interpretation of sensory information.' He continues, perception is both: 'the act of sensing the environment' and the act of interpreting that which is sensed, based on experience, mood, beliefs etc. which in turn act as a 'filter' through which the physical world is apprehended and comprehended. People's values play a key role in the process of perception (Ravlin & Meglino, 1987).

How are values different to ethics?

Like values, ethics inform actions (Gregory et al., 2009). Ethics are thought to direct how people ought to act, because they are a form of moral code that is used to determine what is accepted as right or wrong, good or bad by individuals and the community as a whole (Gregory et al., 2009). Ethics can be thought of as criteria for evaluating the moral correctness or appropriateness of an action, or as Blackburn (1998, p. 1) put it: "of knowing how to act" in a moral way (cited in Barnett, 2011). In contrast to values, ethics have a strongly normative dimension. Ethics are oftentimes codified within religious systems (Upton, 2002). For the purpose of this paper, we clarify that what we are discussing here are values, not ethical considerations.

Three broad value domains

Earlier values research in psychology identified ten core values that appeared to be stable across human societies (e.g. power, hedonism, benevolence, conformity) (Schultz & Zelezny, 1999; Schwartz, 1994). But many scholars now regard these individual values as nested within broader socially constructed value 'orientations' or clusters. They distinguish between egocentric (self-oriented), *anthropocentric* (society-oriented) and *ecocentric* (ecosystem oriented) values (Axelrod, 1994; Reser & Bentrupperbäumer, 2005; Winter, 2007; Winter & Lockwood, 2004; Wolch & Zhang, 2004). These value clusters have also sometimes been referred to as egoistic, altruistic and biospheric values (Schmuck & Schultz, 2002; Schultz, 2001; Stern & Dietz, 1994).

Egocentric orientations are said to be characteristic of people who are primarily concerned about themselves and their own interests – they include individual values of social power and personal wealth, self-achievement, recognition and self-direction (e.g.

freedom to choose own goals) (Schultz & Zelezny, 1999; Schwartz, 1994). *Anthropocentric* orientations on the other hand, are shared by individuals more concerned about the collective welfare of human communities, encompassing values such as benevolence, tradition, loyalty and social justice (Gagnon Thompson & Barton, 1994). *Ecocentric* value orientations are thought to have emerged more recently, and are held by people who are primarily concerned about the environment and/or nature's intrinsic qualities. They encompass values such as unity with nature, environmental aesthetics, ecosystem protection and universalism (De Groot & Steg, 2010; Dunlap, 2008; Schultz, 2001; Schultz & Zelezny, 1999; Stern & Dietz, 1994; Winter & Lockwood, 2004).

It is important to recognize that these are not discrete classes of values; there can be overlap between them. Consequently, people and groups can simultaneously hold incommensurable values (Stern & Dietz, 1994), and the interplay between value differences can be a source of conflict (Karp, 1996; Seligman, Syme, & Gilchrist, 1994). According to Mackay (1993), such value conflict can act as a vehicle for social change, if it reflects a positive process of critical appraisal, leading to good decision-making. Just as readily though, value-conflict can become a driver of over-regulation, limiting options and placing constraints on personal freedoms – such as has occurred in recent conflicts over the neoliberalization of nature (Castree, 2010). For these reasons, people's values are important when considering questions around who has access to public spaces such as parks and protected areas, which activities deemed to belong in these spaces, and which people and activities are perceived as 'out of place'. Researchers have understood the various inter-relationships between values, attitudes,

perceptions, and behavior in different ways. Here we turn our attention to how different values can lead to conflict and poor visitor experiences in protected areas (Figure 2).

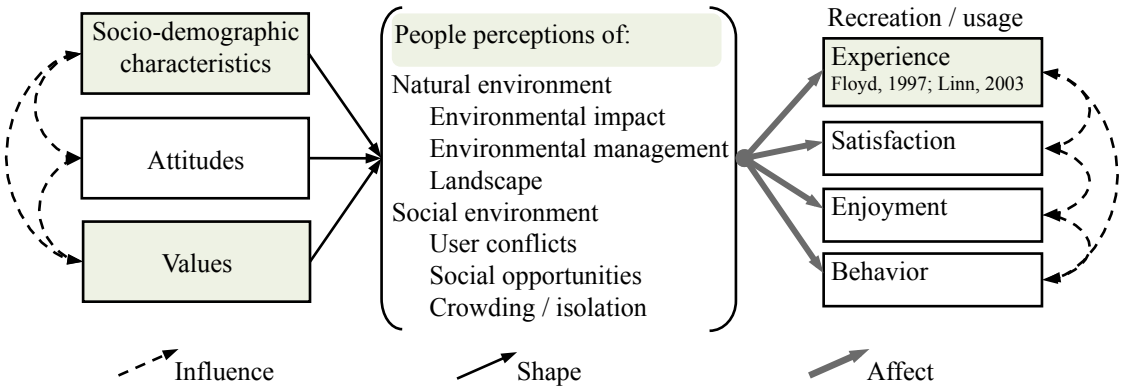

Figure 2. Relationships between values, socio-demographic characteristics, and perceptions mediating and moderating people's experiences in protected areas.

Visitors' values and protected areas

A number of studies have assessed how park visitors' socio-demographic characteristics influence their environmental values (Lynn & Brown, 2003; Stern & Dietz, 1994). Studies have also examined how visitors' values influence their perceptions of social and environmental impacts in protected areas (Byrne, Wolch, & Zhang, 2009; Cessford, 2003; Jacob & Schreyer, 1980; Priskin, 2003; Vaske et al., 1995) and how perceptions of impacts affect visitor's experiences (Dorwart, Moore, & Leung, 2010; Kaplan, Kaplan, & Ryan, 1998; Lynn & Brown, 2003; Moore et al., 2012). Most of these studies rely on two theories found in the natural resource management literature: (i) interpersonal conflict theory, developed by Jacob and Schreyer (1980) and (ii) social value conflict theory, developed by Vaske and colleagues (Vaske et al., 1995; Vittersø et al., 2004).

Interpersonal conflict theory states that conflict occurs when there is goal interference due to other recreationist's behavior (Jacob & Schreyer, 1980). Social value conflict theory states that conflict can be attributed to the existence of perceived problems from other users or their activities, even when they are not directly observed or encountered (Carothers, Vaske, & Donnelly, 2001; Tynon & Gómez, 2012; Vaske et al., 1995; Vaske, Needham, & Cline, 2007). In these studies, social value conflicts are not formally measured with a psychometric scale, rather they are inferred on the basis of responses to two set of questions: (a) have visitors observed an event during their visit? and (b) how did they perceive the event? (Carothers, Vaske, & Donnelly, 2001; Tynon & Gómez, 2012; Vaske et al., 1995; Vaske, Needham, & Cline, 2007). The model presented by Vaske et al. (1995) suggests the need for further investigation into recreationists' value orientations to explore when social value conflicts may occur (Carothers, Vaske, & Donnelly, 2001; Vaske, Needham, & Cline, 2007).

However, there are few studies that have examined the relationship between peoples' environmental values and their perceptions of other visitors' recreational activities and more general behaviors in national parks (Floyd, Jang, & Noe, 1997; Manfredo et al., 2004; Noe, Hammitt, & Bixler, 1997). A finding of existing research has been that people holding ecocentric orientations are more likely to engage in non-motorized activities and are less tolerant of environmental impacts (Floyd, Jang, & Noe, 1997; Jackson, 1986; Noe, Hammitt, & Bixler, 1997). Assessing these relationships is important because they can directly affect visitors' experiences in national parks, and their views about the importance of protected areas (Dorwart, Moore, & Leung, 2010; Lynn & Brown, 2003; Noe, Hammitt, & Bixler, 1997; Priskin & McCool, 2006). We take up that task in this paper.

Methods

Study area

This study was conducted in peri-urban parks in south-east Queensland in Australia. Queensland is the third most populous state in Australia, containing 20% of the country's total population. Within the State, 65% of people live in the south-east area, nearly all in Brisbane, the Gold Coast and the Sunshine Coast cities (Figure 3). Protected areas in close proximity to these population centers offer a range of recreational opportunities for urban dwellers. Activities include walking, cycling, horse riding, bird watching, relaxation or socializing. In the protected areas we examined, different activities occur along the same park trails. The conservation status of these protected areas has recently changed from State Forest to National Park. This change in status has affected dog-walking, which is banned in most national parks, but other activities are still permitted in some places. The Queensland Government established a long term monitoring program to assess the change in status, along with the environmental impacts of activities that have historically occurred in these areas. The current study was undertaken in the context of that broader visitor-monitoring program, which provided us with the opportunity to assess visitors' environmental values and perceptions.

Study sites

The study was conducted in five national parks, which are currently used for a range of different recreational activities, coexisting on multiple-use trails. These were Nerang National Park, Tewantin National Park, Mapleton National Park, Glass House Mountains National Park and North D'Aguilar National Park (Figure 3). The sizes of

these parks varied from 1700 ha to 40,000 ha, and all have histories of extractive land uses (e.g. logging), as well as being used for a diverse range of recreational activities (including four-wheel driving and trail bike riding) prior to their change of status. In two of these national parks (i.e. Mapleton National Park and D'Aguilar National Park), motorized activities are still permitted on designated multiple use forest trails (Table 1) (Rossi, Pickering, & Byrne, 2013). The five parks are used almost exclusively by local residents, and hence have relatively low and stable levels of visitation (Rossi, Pickering, & Byrne, 2013).

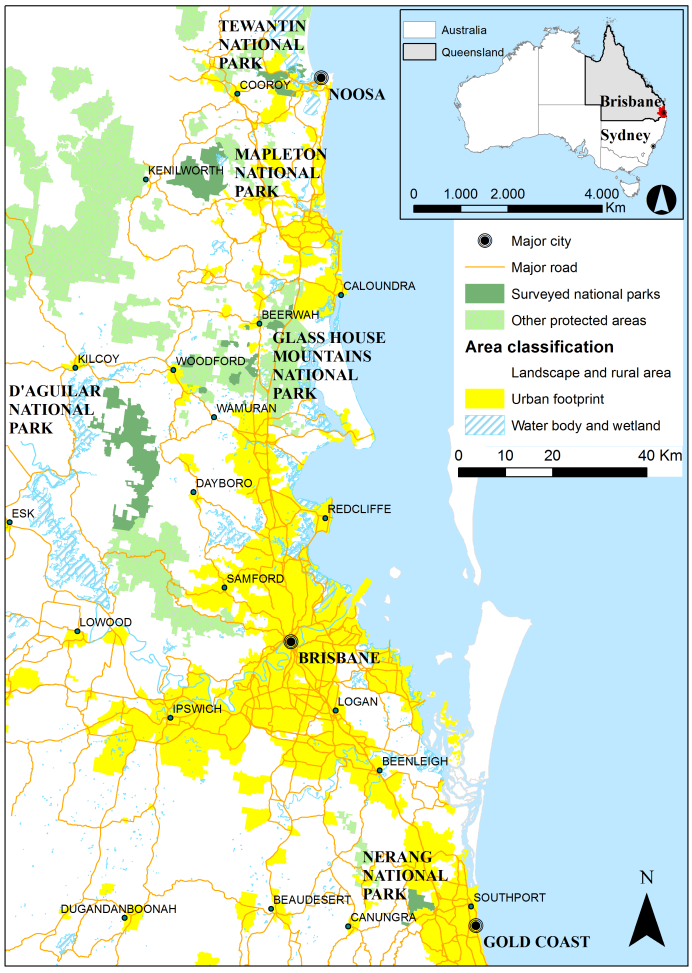

Figure 3. Five National Parks surveyed in South East Queensland, Australia. These are Nerang National Park, Tewantin National Park, Mapleton National Park, Glass House Mountains National Park and North D'Aguilar National Park.

Table 1. Surveyed national parks' characteristics including the year of declaration, the size in hectares and the permitted activities after the transition to national park.

National Park	Declared	Size (Ha)	Activities permitted on trails
Tewantin	2011	3,098	Hiking, bird watching, rock climbing, horse riding*, mountain bike riding*, sightseeing.
Mapleton	2011	10,381	Hiking, bird watching, camping, four wheel driving*, trail bike riding*.
Glass House	2010	2,883	Hiking, bird watching, picnicking, rock climbing, sightseeing.
D'Aguilar	2009	40,000	Hiking, bird watching, picnicking, horse riding*, swimming, camping, sightseeing, four wheel driving*, trail bike riding*.
Nerang	2009	1,700	Hiking, bird watching, horse riding*, mountain bike riding*.

* Permitted only on designated forest trails.

Visitor survey

Over 67% of visitation to these parks occurs on weekends (Fairfax, Dowling, & Neldner, 2012). For this reason, data was collected using an intercept survey (on-site, respondent completed survey). Intercept surveys are one of the most appropriate and commonly used methods for surveying park visitors (Veal, 2011). The survey was conducted over ten high visitation days on weekends from 17 September until 29 October, 2011. All visitors arriving or leaving the five parks at the main entrances to multiple-use trails were counted. A total of 703 adults and 45 children under 15 years old visited the five parks during the survey period. Two interviewers approached all visitors older than 15 years of age, and after introducing the project and obtaining respondents' consent, participants were provided with a self-completion questionnaire. A total of 436 people completed the survey resulting in a 62% response rate.

The survey included questions adopted from previous survey instruments used to examine park visitors' environmental values and perceptions (Byrne, Wolch, & Zhang, 2009; Healy, 2009). The questionnaire was approved by the home institution's human subjects ethics committee, following the Australian National Statement in Ethical Conduct in Human Research (ENV/19/10/HREC). To gather visitors' socio demographic information (gender, level of education, age and travel distance) and the

activity they were engaged in, closed questions were used. For information about user perceptions towards other activities or users' behaviors in parks, respondents were asked to identify how positively, neutrally or negatively different user activities (mountain biking, hiking, running, horse riding, picnicking, dog walking, trail bike riding and four-wheel driving) impacted upon them. To gather visitor' perceptions of the environmental and social impacts of different activities conducted in the parks, respondents were asked to answer a multiple response question. This question requested them to indicate for each activity that they selected as negatively affecting them, what adverse impacts they perceived or had personally experienced (i.e. potential collisions or injury, make too much noise, uncooperative behavior, startle people, scare horses, damage plants or animals, frighten wildlife, dog off leash, live animal waste, and create litter).

To address visitors' environmental values (i.e. ecocentric or anthropocentric values), a survey measure assessing 29 value statements was used, measured on a five point Likert-scale. For each value statement, respondents were asked to rank each statement from strongly positive to strongly negative. Three different scales were assessed to examine their utility for exploring value-oriented relationships among and between visitors to each peri-urban national park. Value statements were adapted from three sources: (a) the "Natural Area Value Scale" developed by Winter (Winter, 2007; Winter & Lockwood, 2004, 2005), (b) the value statements reworded from Wolch and Zhang (2004) and (c) a set of statements from Healy (2009).

A number of Winter and Lockwood's (2004) held values (measures of worth) were operationalized to examine values as principles guiding behavior, because these measures enabled testing for beliefs in instrumental (use) and intrinsic value of

protected areas. Both Wolch and Zhang (2004) and Healy (2009) derived some of their values measures from Dunlap's NEP (new environmental paradigm). Although some scholars contend that the NEP can be used to measure attitudes (Papagiannakis & Lioukas, 2012), Dunlap and colleagues have consistently used the scale they devised to assess what they call 'worldview' or 'primitive belief' systems. They define this worldview as a 'paradigm…that influences attitudes' not attitudes themselves (Dunlap et al., 2000), and their scale aligns with other values scales.

A series of tests were run to identify whether a gap existed in these scales and then psychometric measures that were reliable, valid and had good internal consistency were selected because they were best suited to capturing the value constructs we sought to assess. These value constructs, although closely related to those of Schwartz (1994), are operationalized as systems of values, similar to the nomenclature used by Stern and Dietz (1994), among others. The selected measures address some of the issues associated with specifying and operationalizing the construct of values, as illustrated in Figure 1, recognizing however, that these terms remain debated and contested in the field of social psychology (Clement & Cheng, 2011; Schwartz, 2011).

Data entry and analysis

All information from the completed surveys was entered into a database and then analyzed in the Statistical Package for Social Science (SPSS version 22). To determine respondents' environmental values (ecocentric or anthropocentric), the reliability test of the 29 statements was conducted in SPSS. The 29 items were reduced to 16 items representing respondent's environmental values with a Cronbach's alpha >0.8 (Table 2).

Table 2. Items of the value scale used to measure visitor's environmental values, showing mean of the five point Likert scale question ranging from 1= strongly positive to 5= strongly negative, and factor analysis matrix of items loading in the two components.

Value statements	Mean	Component (value orientations)	
		Anthropocentric	Ecocentric
The value of an ecosystem only depends on what it does for humans	4.05	0.688	
Our children will be better off if we focus on the economy instead of worrying about the environment	4.05	0.654	
It's better to test new drugs on animals than on humans because animals don't suffer like we do	4.00	0.648	
Ugly areas like swamps have no value and should be cleaned up	4.12	0.620	
Only humans have value for their own sake	3.73	0.608	
I don't like native plants because they look messy	4.53	0.562	
The welfare of people comes before that of animals and plants	3.29	0.533	
If humans do not manage nature, it becomes a threat	3.40	0.530	
I find flies and ants in parks to be a real nuisance	3.54	0.465	
Picking wildflowers causes no harm	3.64	0.379	0.378
Riding trail-bikes in parks is fun – a few damaged plants won't matter	3.97		0.483
The most important reason for parks is to protect plants and animals *	4.30		0.758
It's never OK to interfere with wild animals; they should be free to lead lives without disturbance *	3.90		0.462
Native plants and animals in parks are beautiful *	4.53		0.702
Seeing wild birds and animals in parks gives me a magical feeling *	4.10		0.702
I would pay more taxes to protect my local parks *	3.69		-0.564

* Reversed items.

One-way Analysis of Variance (ANOVA) tests were conducted to determine if respondent's values differed based on socio-demographic variables (age, gender, education and travel distance), and visitor activity type (e.g. hiking). Socio demographic variables and respondents' main activity were used as independent variables and the psychometric measuring respondent's environmental values was used as the dependent variable. To satisfy the assumptions of the analysis, homogeneity of variance was tested. Gender and main activity were analyzed using the Kruskal-Wallis non-parametric test, as the data for these parameters did not satisfy the assumptions of parametric analysis.

To identify how environmental values affected respondents' perceptions of other visitors, the Kruskal-Wallis test was again used. Respondents' perceptions (classified as positive, neutral or negative) were computed as constituting an independent variable, while respondents' environmental values was treated as the dependent variable. Values were computed as the mean of a 5-point Likert scale, which ranged from 1 representing the anthropocentric to 5 representing the ecocentric values of respondents. A Chi-square test was used to determine if respondents' perceptions of the impacts caused by recreational activities varied based on their value orientations.

Results

A total of 436 out of 703 approached users completed the survey, with 32 questionnaires excluded for further analysis due to substantive missing information, resulting in a 57% response rate. This is a robust response rate. Analysis of non-response data suggested there were no confounding effects due to selection bias in the sample (Veal, 2011). The most common reasons given by visitors for not participating in the survey were lack of time and unwillingness to stop.

More males (69%) than females (31%) aged between 25 and 44 years old (52%) visited these parks. Respondents' level of education was high, with 60% of respondents reporting a university education (Table 3). The most popular activities conducted in the surveyed parks were mountain bike riding (39%) and hiking (37%) followed by trail bike riding (7%), running (5%) and picnicking (5%). Other less common activities conducted in these parks included horse riding (2%), dog walking (1%) and four wheel driving (1%). Overall, respondents' environmental values were ecocentric ($M = 3.9$, $SD = 0.5$), with few respondents (<4%) holding anthropocentric value

orientations (Figure 4 and Table 2). Respondents were predominantly local residents, who lived an average of 28 km from the parks. Participants younger than 34 years old tended to live further away than older people, and hence travelled longer distances to visit these parks ($F = 3.541$, $p < 0.05$).

Table 3. Respondents' characteristics based on the five parks surveyed in South East Queensland, including the mean of their environmental values. P values for the statistical tests (ANOVAs and Kruskal-Wallis) comparing environmental values based on socio-demographic characteristics and activity undertaken are included. Environmental values scale ranges from 1 = anthropocentric to 5 = ecocentric.

Socio-demographic variables	*n*	%	Environmental Values (mean)	*P*
Gender				**0.001**
Male	280	69	3.86	
Female	124	31	4.08	
Age				**0.002**
<24	54	13	3.70	
25-34	105	26	3.89	
35-44	107	26	3.96	
45-54	84	21	4.01	
>55	54	13	4.04	
Education				**0.004**
<Technical	160	40	3.84	
University	238	60	3.99	
Activity type				**<0.001**
Motorized	33	8	3.63	
Non-motorized	371	92	3.96	
Users' non-motorized activity				0.143
Mountain bike	158	39	3.93	
Hiking	149	37	4.00	
Running	22	5	3.83	
Picnicking	20	5	3.97	
Other	28	7	3.97	

Values in bold are significant at $\alpha < 0.05$ (95% confidence level).

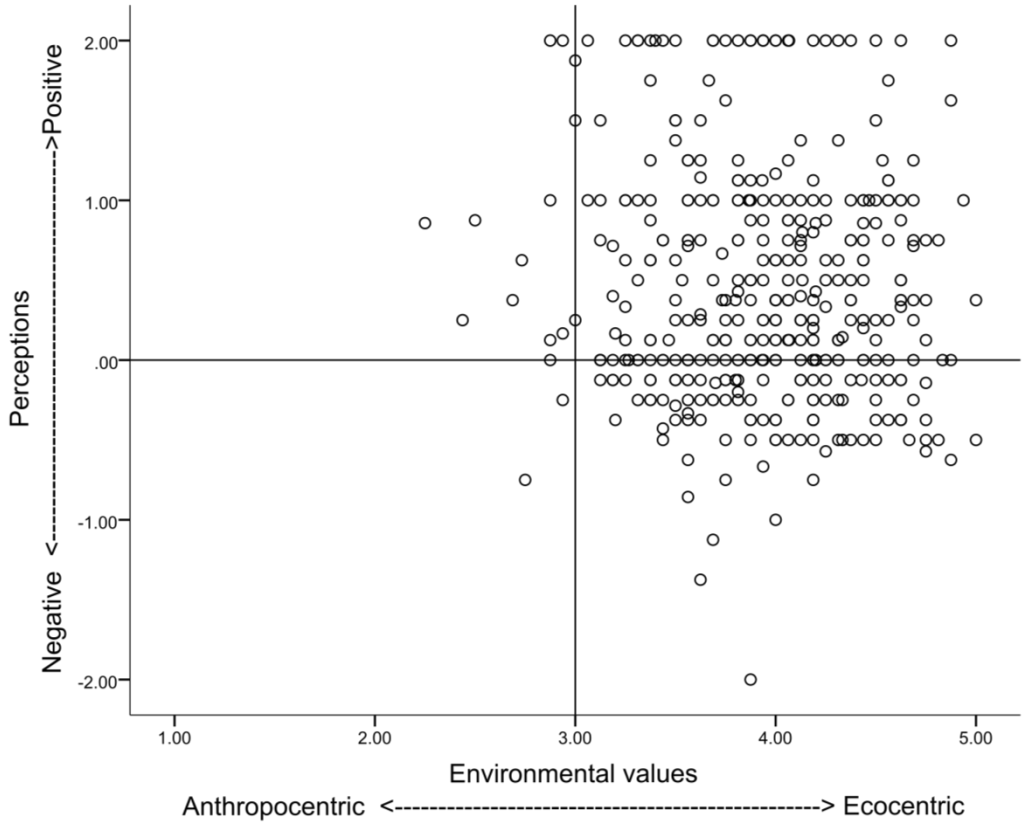

Figure 4. Respondents' environmental values and their perceptions of other users' activities or behaviors in national parks in South East Queensland. Respondents' environmental values and perceptions are represented by the mean of a five point Likert scale. Respondents' environmental values range from 1 = anthropocentric to 5 = ecocentric. Respondents' perceptions range from -2 = strongly negative to 2 = strongly positive.

Do visitors' environmental values vary according to socio-demographic characteristics and recreational activities?

Environmental values differed by respondents' socio-demographic characteristics, including age, level of education and gender. Respondents older than 45 years old tended to be more ecocentric than younger visitors ($F = 4.384$, $p < 0.05$) (Table 3). Similarly, university-educated people displayed more ecocentric values than respondents with technical or lower levels of education ($F = 8.165$, $p < 0.05$) (Table 3).

Furthermore, females had stronger environmental values than males ($H = 15.368$, $p < 0.001$) (Table 3).

Respondents' value profiles appeared to affect the type of activity, motorized or non-motorized, that they were engaged in ($H = 14.491$, $p < 0.001$). Although respondents conducting motorized activities were few in number (33), they tended to be less ecocentric than respondents conducting non-motorized activities such as mountain biking and hiking (Table 3). Non-motorized visitors (e.g. mountain bikers, runners or hikers) showed no significant differences in their environmental value orientation ($H = 14.720$, $p > 0.05$) (Table 3).

Does value orientation influence visitors' perceptions towards other users in parks?

Respondents perceived other users' behaviors or activities as mostly positive (61%). For the remainder, 14% of respondents reported being unaffected (neutral) and 25% of respondents reported being negatively affected by other visitors' activities or by specific users' behaviors (Figure 4). Environmental values appeared to play a role in the extent to which the behaviors or activities of some visitors impacted others (Table 4). For instance, respondents who reported being negatively affected by trail bike riding, four-wheel driving, and dog walking held more ecocentric values than those neutrally or positively affected by these activities (Table 4). In contrast, respondents who were affected positively by hiking and picnicking were more ecocentric than respondents reporting neutral perceptions with these activities (Table 4). Finally, no significant differences were found in the values held by visitors affected either positively, neutrally or negatively by mountain bike riding, horse riding and running (Table 4).

Table 4. Non-parametric Kruskal-Wallis test examining how values affected respondents' perceptions of different activities conducted in national parks in South East Queensland. Environmental values scale ranges from 1 = Anthropocentric to 5 = Ecocentric.

Activities	People perceptions						Values affect perceptions	
	Positive		Neutral		Negative			
	n	Value mean	*n*	Value mean	*n*	Value mean	*H*	*P*
Mountain biking	227	3.92	144	3.96	20	3.94	0.470	0.791
Horse riding	116	4.03	193	3.90	37	3.91	5.033	0.081
Running	224	3.97	137	3.87	7	3.81	4.736	0.094
Hiking	256	3.99	114	3.85	5	3.83	7.835	**0.020**
Picnicking	187	4.02	150	3.85	4	3.45	14.706	**0.001**
Dog walking	124	3.96	160	3.88	72	4.05	6.318	**0.042**
Trail bike riding	48	3.66	92	3.85	224	4.03	27.620	**<0.001**
Four wheel driving	41	3.74	115	3.82	198	4.03	20.203	**<0.001**

Values in bold are significant at $\alpha < 0.05$ (95% confidence level).

Respondents identified and perceived both social and environmental impacts caused by recreational activities. However, respondents' perceptions about the impacts of the activities did not differ on the basis of their environmental value orientations ($\chi^2 = 3.42$, $p = 0.943$). Overall, respondents reported four wheel driving and trail bike riding as the activities having the greatest impacts on other visitors within the parks as well as on the environmental quality of the parks. Commonly reported environmental impacts arising from motorized activities included harming plants or animals and frightening wildlife. Commonly reported social impacts were noise, potential collisions, uncooperative behavior and startling people. Dog walking was also reported as a problem due to animal waste and the disturbance of wildlife (Figure 5).

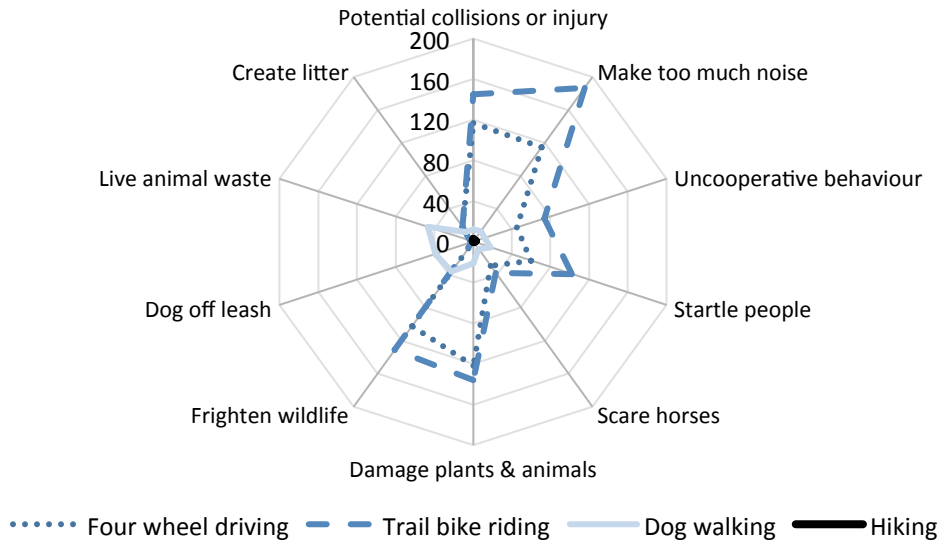

Figure 5. Number of respondents who perceived social and environmental impacts caused by four-wheel driving, trail bike riding, dog walking and hiking in national parks in South East Queensland, Australia.

Discussion

This study contributes to geographic knowledge about the relationships between park visitors' environmental values and visitors' perceptions of other users' recreational activities and behaviors. Many of our findings corroborate research from the fields of human geography, leisure studies, natural resource management and environmental psychology, indicating that visitors' values affect their perceptions and experiences of natural settings. Such research suggests that park visitors' values are important mediators of their perceptions of multiple aspects of national parks. These aspects include leisure experiences, recreational enjoyment and satisfaction with park experiences (De Groot & Steg, 2010; Dietz, Fitzgerald, & Shwom, 2005; Gregory et al., 2009; Knafo, Roccas, & Sagiv, 2011; Reser & Bentrupperbäumer, 2005). To the best of our knowledge, there exist few, if any, studies examining the relationship between the environmental values of park visitors and their perceptions of other visitors' behaviors

and activities in national parks. It is important to note that previous studies assessing value-based recreational conflict in protected areas have mainly relied on Vaske's 'social value theory', with 'social values' not typically measured using psychometric scales (Carothers, Vaske, & Donnelly, 2001; Vaske et al., 1995). Our study has found that differences in visitors' perceptions appear to be closely related to their environmental values. For example, we found that visitors with stronger ecocentric values were more likely to perceive motorized activities negatively than were those holding more anthropocentric values.

The type of activity that visitors undertook also differed based on their environmental values. In this study, respondents participating in non-motorized activities such as mountain biking and hiking held more ecocentric values than those engaged in motorized activities, including trail bike riding and four-wheel driving. This is consistent with research that has found that non-motorized activities such as cross-country skiing reflected the more ecocentric values of skiers than snowmobilers (Floyd, Jang, & Noe, 1997; Jackson, 1986; Wolf-Watz, Sandell, & Fredman, 2011). For example, a national survey in Sweden has shown that pro-environmental groups prefer non-motorized activities (Wolf-Watz, Sandell, & Fredman, 2011) and two studies, one in North Carolina, USA (Floyd, Jang, & Noe, 1997) and another in Alberta, Canada (Jackson, 1986) have shown that people holding pro-environmental or ecocentric orientations preferred non-motorized activities.

Evidence was not found for heightened perceptions of, or sensitivity to, social or environmental impacts, on the basis of differing environmental values. This is in contrast with other studies such as those conducted by Floyd, Jang, and Noe (1997) in North Carolina, USA and Noe, Hammitt, and Bixler (1997) in Virginia, Georgia and

Tennessee, USA, where they found that respondents who held more ecocentric values identified more environmental impacts. This may be because most of the respondents in our study were not negatively affected by non-motorized activities, including mountain bikers, horse riders and hikers. Respondents who were affected by motorized activities tended to hold more ecocentric values.

We found a relative absence of negative perceptions of environmental impacts attributable to different recreational activities. This could be explained by how the change in status was managed by responsible land management agencies, especially their awareness raising campaigns. Other studies have demonstrated that how a park is represented (e.g. through brochures and other media) can influence visitors' perceptions (Pritchard & Morgan, 2001; Weightman, 1987). It is important to acknowledge here that the change in status from State Forest to National Park, for the five national parks we assessed in this study, appears to have had limited impact on the range of recreational activities permitted in the area (with the exception of dog-walking) (DERM, 2011). Therefore, it is likely that visitors' perceptions about what they would experience and encounter in these national parks would have minimally changed, if at all, due to their change in status.

Corroborating recent studies, we found that respondents' socio demographic characteristics were related to their environmental values (Luo & Deng, 2008; Wolf-Watz, Sandell, & Fredman, 2011). Older people, well-educated participants, and females held more ecocentric values than other respondents, although we note that some earlier studies have found that older, well-educated people tend to be less ecocentric (Cottrell, 2003; Diamantopoulos et al., 2003; Jurowski et al., 1995). This could be partly explained by the peri-urban location of the national parks we studied. A recent study

(Rossi, Byrne, & Pickering, 2015) has found that older people may live closer to these national parks. Older neighbors may have developed a stronger identification with – or attachment to these parks, based on their sense of place. Research in the United States and the Canary Islands has found that a sense of place can develop over time, and appears to be related to environmental values (Hernández et al., 2010; Jorgensen & Stedman, 2006; see also Tuan, 1977). Older people have been found to develop strong connections to, and identification with, local places, particularly their immediate home space (Jorgensen & Stedman, 2006). They may thus be more aware of potentially adverse environmental impacts affecting these parks (Jorgensen & Stedman, 2006; Vorkinn & Riese, 2001).

These findings have important implications for the management of protected areas generally and policy making for the use of national parks specifically. Although peoples' values are difficult to change (De Groot & Steg, 2010; Heberlein, 2012), being able to identify and recognize the spectrum of value orientations that different user groups hold can inform and potentially improve management and long term planning and decision-making (Driver et al., 1987; Virden & Knopf, 1989). For example, by better understanding visitors' values, managers can plan which facilities should be provided within specific protected areas, including infrastructure, environmental education, or adventure-tourism facilities, as well as having a better understanding of the type of activities that may be permitted – or in some cases may require closer monitoring and management. In turn, this can have implications for visitors' sense of place, satisfaction with park experiences, perceptions of effective park management, and level of political and economic support for national parks and other protected areas.

Conclusions and management implications

The purpose of national parks in the developed world is increasingly contested. Competing objectives around multiple-use, and new ideas about the reasons for protection versus utilization, can create conflict. As urban expansion continues to place additional pressure on peri-urban national park spaces, it creates challenges for sensitive and strategic planning and for effective natural resource management. A focus on national park visitors' values and on potential value conflicts must directly address the distinctive cultural and environmental values that are intrinsic to the establishment and longer-term functioning of these protected areas. The diverse personal values and motivations of people visiting and 'using' these public places, many of which are also World Heritage Areas, requires closer scrutiny from geographers and other human-environment researchers (e.g. Dietz, Fitzgerald, & Shwom, 2005; Reser & Bentrupperbäumer, 2008; Worboys, Lockwood, & de Lacy, 2005).

Serious empirical work addressing values as a core focus of park research must also contend with some longstanding issues with construct specification and measurement. There are also practical realities and challenges associated with researching the ongoing visitation and use of national park settings in situ. Additional challenges are associated with better understanding the views of adjacent residential communities, for whom these protected areas are particularly salient public amenities (the majority of whom may be vicarious users of national park landscapes) (e.g. Marie, 1994; Reser & Bentrupperbäumer, 2005).

The findings of our research have important implications for park management. Growing numbers of national parks in Australia, which once functioned primarily for

conservation purposes, are now being opened up for a range of recreational activities, such as horse-riding, mountain biking and hunting (as well as some commercial activities), which may be incompatible with both the value systems responsible for originally creating these parks and with those of many contemporary park visitors (Booth, 2013). The protected area objectives and function of some Australian national parks have been found to be eroded by activities such as adventure tourism (Newsome, Moore, & Dowling, 2012). Similar patterns have been reported internationally (Pickering et al., 2010). These trends increase the likelihood of conflict within national parks worldwide – especially those closer to urban areas. The issues may also be causing problems in the context of taken-for-granted nature-society interactions assumed to underpin the creation of national parks, reopening what many thought to be a closed chapter on the use of such protected areas in developed countries (Byrne, 2012). It also appears that national parks in Australia and elsewhere in the developed world may be 'open for business', as neoliberal ideologies force managers to seek alternative funding sources (Adams, Hodge, & Sandbrook, 2013; Castree, 2010).[2] This has implications for environmental values, nature conservation and environmental justice. As national parks become increasingly commercialized, there could be a displacement effect upon lower-income park visitors, but also potentially upon surrounding communities, due to eco-gentrification (Wolch, Byrne, & Newell, 2014).

Environmental values are known to affect people's perceptions and therefore their experiences in national parks, potentially engendering support towards pro-conservation park management policies (Floyd, Jang, & Noe, 1997; McCool, 2006). Knowing what

[2] Neoliberal economic policies are generally characterized by privatization of the public agencies and reductions in government expenditures. Therefore, nature conservation under this regimen is recognized as an 'ecosystem services' provider which is a source of current and future economic resources (Adams, Hodge, & Sandbrook, 2013).

types of visitors are likely to use a protected area, and the values that those visitors hold, is crucial for successful management and for engendering public support for conservation. By understanding visitors' values, protected areas managers can anticipate not only which activities their users will be willing to engage in, but also the need to potentially designate or zone some areas for more intensive activities, only when appropriate, while protecting others. We have found that the relationships between personal environmental values and environmental perception are complex. In the case of park visitation, a visitor's experience of other users may impact their park experience and enjoyment, and could create conflict between visitors (Dietz, Fitzgerald, & Shwom, 2005; Manfredo et al., 2004).

Even though the protected areas we have examined have undergone a recent change in status, our findings still have implications for national park management in the developed world. In our introduction we noted a trend towards the increasing privatization of nature associated with the growing influence of neoliberal ideology (Castree, 2010). Limited space has meant we have mostly confined our examination to individual values, addressing a notable gap in the literature. But there is a growing body of research in geography that has highlighted the importance of collectively held social and cultural values, and how those values configure socio-ecological outcomes (i.e. access to nature) (e.g. Byrne, 2012). Future research should explore the interplay between individual and collective values in nature-society interrelations, and the role of scale, agency, and institutions, for example, in environmental contestations. It could examine for instance, the role of values in biodiversity conservation and protection of livelihoods (Adams, Hodge, & Sandbrook, 2013; McCool, 2006). Here we have specifically considered the role of people's values when considering questions about

who has access to parks and protected areas, which activities deemed to belong in these spaces (or not), and who is perceived as 'out of place'. A failure to understand the nature and likelihood of value conflicts across park visitors could leave them 'seeing red' in protected areas (Kalof & Satterfield, 2005).

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