



Understanding the values and perceptions of base personnel to improve conservation management and policy in Antarctica

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ABSTRACT

The effectiveness of conservation in Antarctica is of critical global concern. Yet information on the impacts of increasing human activities in the region has been limited to date. Improved knowledge is critical for understanding the effectiveness of conservation, and evaluating how increasing human activity may influence the future of the continent. With no permanent human presence in Antarctica, personnel temporarily stationed at research bases provide a unique source of local and experiential knowledge on human activity and local changes in environment. In this paper, we report on the use of focus groups and participatory mapping activities with personnel at Scott Base, Ross Island, to explore perceptions of how Antarctica is used and valued. We found that all base personnel were concerned that increasing human activity would increase negative human impact at sites designated as Antarctic Specially Protected Areas. However, a quarter of participants also saw benefits to increasing human activity, including the potential to enhance advocacy for the future of the continent and increase support for environmental protection. Notably, base personnel perceived Antarctic Specially Protected Areas as being valued differently to the values identified in management documents, calling into question the clarity around ASPA designation and how well the protected area network in Antarctica is understood. Such information can be integrated with data from the natural sciences to develop a more complete picture of human impact on the continent, and can be used to evaluate the effectiveness of conservation management in Antarctica.

1. Introduction

Under the provisions of the 1991 Protocol on Environmental Protection to the Antarctica Treaty (the Protocol; Article 2) Antarctica is designated as a “natural reserve, devoted to peace and science” (Antarctic Treaty, 1991; International Legal Materials (ILM), 1991). Yet increasing human activity in the region, through both governmental and non-governmental activities, poses a potential risk to the future of the continent. Human activity has increased notably over the past few decades (COMNAP, 2016; IAATO, 2017), and is continuing to grow while expanding in variety, frequency, and intensity (Shaw et al., 2014; Tin et al., 2014). This growth in human activity risks increased impact in Antarctica, further compounded by the influence of a changing climate (Chown et al., 2012; Pointing et al., 2015). However, little dedicated monitoring is undertaken to adequately assess the direct and indirect impacts of increasing human activity “on the ground”. While

Kennicutt et al. (2010), as cited in Hughes (2010), is a notable exception, few studies have been undertaken to assess how increasing human activity is perceived, and what impact these activities are having on the values placed on Antarctica.

There are two main human activities in terrestrial Antarctica: science and tourism, with a variety of logistical and infrastructural investments required to support both (Shaw et al., 2014). There are currently over 100 government-funded research facilities across the continent hosting around 4000 people per year (COMNAP, 2016), and 2016–2017 saw nearly 38,000 tourist landings (IAATO, 2017). With both science- and tourism-based activities set to increase, there are concerns regarding disturbance to sites of scientific importance, historic sites, and to wildlife (Coetzee and Chown, 2016; Coetzee et al., 2017; Shaw et al., 2014; Tin et al., 2014). Additional concerns relate to the increased risk of introducing non-native species, and the redistribution of native Antarctic species across the continent (Hughes and Convey,

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2010).

Annex V to the Protocol provides for the designation of Antarctic Specially Protected Areas. There are currently 72 Antarctic Specially Protected Areas (ASPAs) to protect sites of special significance across Antarctica. Any area of Antarctica can be designated as an ASPA “to protect outstanding environmental, scientific, historic, aesthetic, or wilderness values” or any combination of these values (ATS, 2016). However, not all of these values are represented in ASPA designations. While ASPAs have been designated to represent historic, environmental, and scientific values, no ASPAs have been designated for aesthetic or wilderness values (Hughes et al., 2013; New Zealand, 2005a, 2005b; Summerson, 2012). Hughes et al. (2013) point out that the protected area network in Antarctica has evolved largely without any clear strategy and that many ASPA management plans do not state clearly the primary purpose or value for which the Area is being designated. Hughes et al (2013) also reported that an examination of visitor reports revealed that the proportion of visitors entering ASPAs did not reflect the primary reason of the ASPA designation *i.e.* for science and/or conservation.

The imbalance in protecting identified values throughout the ASPA network, coupled with a lack of clarity in ASPA management plans regarding the values being protected, has potential to devalue the ASPA management tool, and risks confusion among those undertaking activities in Antarctica, and to whom the ASPA management controls are intended to apply. In this paper we explore how ASPA values are perceived and understood by personnel occupying an Antarctic research station and operating in the vicinity of several ASPAs. With no permanent settlements in Antarctica, research base personnel provide a unique source of local knowledge on human activity and local changes in the environment. Base personnel also have experiential knowledge related to how different sites are used and valued. They often work the entire summer research season (October to February) supporting science research events in the field and maintaining operations on base. They are often the only people present in Antarctica across the entire summer season where science and tourism activity is concentrated due to the greater availability of sunlight extending potential operations. While it is important to note that some staff are only in Antarctica for a few months, a number of personnel return to work multiple summer seasons and/or over-winter, observing more temporal trends and effects. As a result, base personnel can provide unique insights that can help us better understand human impact in Antarctica, and identify future management priorities to improve conservation effectiveness.

In this paper, we discuss the outcomes of three focus groups held with personnel at New Zealand’s Scott Base research station during the 2015–2016 summer season. The aim of this study was to explore how the values associated with designated ASPAs are perceived and understood by base personnel, as well as their positive and negative perceptions of increasing human activity on the continent.

2. Methods

2.1. Study area

This research was conducted within the Ross Sea region of Antarctica. This region is of significant scientific importance, and is characterised by unique ecosystems and biodiversity found no-where else on earth (Seabrook-Davison et al., 2010). As such, the future of the region is of strategic importance to New Zealand and the broader international community (Antarctica New Zealand, 2016; New Zealand Antarctic Research Institute (NZARI), 2016). The area is also of great historical significance, with a number of huts and artefacts from the “Heroic Era” of Antarctic exploration, including Robert Falcon Scott’s hut from the 1910–1913 Terra Nova expedition and Ernest Shackleton’s hut from the 1907–1909 Nimrod expedition. The study area includes 15 sites designated as Antarctic Specially Protected Areas (ASPAs) within the proximity of Scott Base to protect a range of environmental,

scientific, historic, and wilderness values (Article 3 of Annex V to the Protocol).

2.2. Participants

Three focus groups were held with personnel at New Zealand’s Scott Base in Antarctica on the 21st January 2016. Each focus group has between six and nine participants with 23 personnel participating in total. With 32 personnel present on base in late January 2016, participation was 72%. Participants represented all roles at Scott Base and a broad range of knowledge, experience, and perceptions. Participants’ time spent in Antarctica ranged from one summer season (October 2015–February 2016) to over 10 summer seasons. Several participants also had experience over-wintering, spending a full year in Antarctica to support research and base operations. Prior to each focus group, the purpose of the research was explained and formal written consent was obtained from each participant (as per Auckland University of Technology Ethics Committee (AUTEK) procedures: reference 15/434).

2.3. Focus groups

Each focus group took around 40 min, with an additional value mapping exercise held at the end. Each focus group was led by the lead author with the senior author as co-facilitator. We chose to conduct the focus groups towards the end of the summer season to provide opportunities for reflective insights into human activity over the 2015/16 summer season. Each focus group was recorded on audio tape and transcribed verbatim. In addition, a co-facilitator made notes during each focus group to cross-reference with the transcription. The transcripts were analysed using NVivo 11. Broad thematic coding was applied to understand positive and negative perceptions of increasing human activity and any associated impacts. Emerging themes were continually checked against the data (as per Cvitanovic et al. (2016a, 2016b), Strauss and Corbin (1998)).

2.4. Values mapping

Spatial value mapping is a commonly used research technique to understand how places are understood and valued (Alessa et al., 2008; Jarvis et al., 2016). Such methods were adapted for the focus groups at Scott Base. Each participant was given a total of 50 markers, *i.e.* ten markers in five different colours. The five colours each represented environmental, scientific, historic, aesthetic, and wilderness values, respectively. Participants were asked to place their different coloured markers to the map to identify areas they considered important for each of these five values. They did not have to use all the markers if they did not wish to. The map of the Ross Sea region contained key topographic information and labels of key features to aid participants in visualising the region (United States Geological Survey (USGS), 2016). ASPAs were clearly marked and labelled on the map to assist participants in accurately identifying sites. All markers were digitised in QGIS using the Quantarctica package (Norwegian Polar Institute, 2016; QGIS Development Team, 2016). Heatmaps of each value type were created to show where markers had been concentrated on the map using the heatmap tool in QGIS using a radius of 15 km. The analysis was separated into three bands, with the first and second most concentrated bands visualised to highlight hotspots where markers of each particular value had been most concentrated on the map. Value hotspots identified by participants were compared to the values identified in ASPA management plans.

3. Results

3.1. Negative perceptions of increasing human activity

All participants agreed that increasing human activity would result

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