TOWARDS SUSTAINABLE MANAGEMENT AND ECOTOURISM: UNDERSTANDING PERCEPTIONS OF BOULDERING IN ROCKLANDS

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Research report submitted in partial fulfilment of the requirements of the degree of BA (Honours) in Environmental and Geographical Sciences

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October 2018
Abstract

Outdoor-adventure niche-based activities are growing in popularity across the world and greater attention has been given to the associated impacts. This paper provides insights to enhance the effectiveness of boulder management in Rocklands in the Western Cape of South Africa, through identifying the key role players involved in bouldering at Rocklands and exploring their perceptions of the climbing-related impacts (i.e. environmental, social and cultural) and socio-economic benefits of bouldering. The results show that there has been a rapid growth in the number of visitors to the area. This has led to ecological impacts which are moderate in magnitude, site-specific and require enhanced management efforts in the short-medium term. The most significant ecological impacts are erosion at staging areas of boulders and of existing and proliferating numbers of access paths as well as uncontrolled human waste disposal. Social and cultural impacts are low. The growth in bouldering has improved the regional economy and ecotourism sector significantly. Enhanced conservation and sustainable management of bouldering at Rocklands requires improved and coordinated outreach and communication between landowners and climbers through various integrated media platforms that build on existing relationships. The current bouldering Environmental and Access Sport Climbing and Bouldering Management Plan Cederberg Wilderness Area needs to be reviewed and steps taken to ensure it is implemented effectively.
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Acknowledgements

I would like to sincerely thank Assoc. Prof. Rachel Wynberg for affording me the opportunity to undertake this research project and providing useful feedback as well as financial support to assist in completing it. My deep gratitude is expressed to Jaci van Niekerk for continuous supervision and guidance. Thanks, must also go to Fahdelah Hartley for assisting me with logistical organisation. Further thanks must be extended to the interviewees and respondents of this study who gave up their time to share their knowledge with me. I would like to thank Joshua Weiss and Jordan Barkai for assisting me with quantitative data analysis, and to Joshua for providing infinite wisdom and teaching me basic essential GIS skills. Finally, to my parents, Robert and Sara, thanks for their continued support and motivation, not only this year but throughout my studies.
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Conservation Manager, Algeria, 15 June 2018). Furthermore, the monitoring of the proliferation of sites became unmanageable.
Introduction

Outdoor recreational activities which contain an element of risk and adventure have gained in popularity across the world over the past three decades (Pomfret, 2006; Attarian and Keith, 2008; Ness, 2011). Rock-climbing is no exception. Bouldering, a type of rock climbing, as with any outdoor sport, has various impacts but also offers the potential to generate long term benefits (MCSA, 2005; Attarian and Keith, 2008). Outdoor adventure-based sports such as bouldering are often pursued in natural areas and it is critical that the natural heritage is sustainably managed to ensure the longevity of the sport and positive recreational and socio-economic yields (Kroeger and Manalo, 2007; van Der Merwe and Joubert, 2014).

The effectiveness of conservation measures is a global concern and it is reflected in the Aichi Target 11 of the Convention on Biological Diversity (CBD) that protected area networks need to be effectively and equitably managed to ensure the protection of biodiversity and ecosystem functions and services (Balmford et al., 2005; Hockings et al., 2006; Bennett, 2016). The implementation of conservation measures does not however, necessarily guarantee ecological success or benefits to humans (Bennett, 2016). Ineffective conservation initiatives have led to increased evaluation and monitoring of management, governance and socio-ecological considerations in a broader move towards adaptive management and evidence-informed conservation (Adams and Sandbrook, 2013).

Rocklands, in the Western Cape, South Africa, is a world-renowned bouldering site (Maddison, 2011; Noy, 2018). Since 2007 bouldering in the region has grown in extent and numbers and there is a rising concern that the implications of this growth are not being managed effectively (Attarian and Keith, 2008; Carpenter, 2013). This study reviews existing management of bouldering and associated conservation plans for Rocklands through a qualitative approach. The evidence gained is aimed at guiding and improving current management actions and socio-ecological outcomes for the site as recommended for effective conservation by Adams and Sandbrook (2013)

Literature Review

What is bouldering?

Bouldering is a type of rock climbing on boulders or overhangs which are small enough so that ropes and other gear are not required. A boulderer requires minimal equipment, usually only climbing shoes, a chalk bag (containing magnesium carbonate dust) and a crash pad (or bouldering mat) (The Access Fund, 2004).

A route up a boulder typically ranges between two to four metres and is called a ‘problem.’ The objective of bouldering is to mount a boulder via a problem. Falls are frequent in bouldering and the crash pad offers safety to the climber who is supported by ‘spotters’ (fellow climbers). Spotters help
to guide and redirect the climber towards the safest and least hazardous landing zone. Consequently, bouldering cannot be done alone and boulderers will often climb in a group (two to six people) for safety benefits, technical climbing advice and moral support (Attarian and Keith, 2008).¹

**The growing popularity of bouldering**

Originating in the 1970s, bouldering developed as a training activity for other climbing and mountaineering activities (Attarian and Keith, 2008). Since then it has become distinguished in its own terms. Some of the factors contributing to the popularity of bouldering include the low cost of entry, accessibility, potential for athletic progress, a sense of community and mainstream media exposure of the sport (Attarian and Keith, 2008; van Der Merwe and Joubert, 2014; Caber and Albayrak, 2016). Bouldering is growing across the world on every continent in urban, rural and pristine wilderness environments (Ness, 2011), including several sites in South Africa (Noy, 2018). The bouldering community is made up of individuals with a large age range and abilities but is dominated by a younger demographic (teens to mid-thirties). Despite this, the social culture of bouldering generated by the ‘spotter-climber’ relationship, has created a strong sub-culture among enthusiasts of all ages due to its inherent sense of community and camaraderie (Attarian and Keith, 2008; Caber and Albayrak, 2016).

**Climbing Impacts**

As with all forms of outdoor recreation, bouldering causes impacts to natural resources (Attarian and Keith, 2008; van Der Merwe and Joubert, 2014; Tessler et al., 2016). Internationally and locally, the impacts on wilderness areas from human activities are intensifying and are predicted to continue to do so in the future (Palmer, Shroyer and Wessels, 2003; Pomfret, 2006; Connell, Page and Meyer, 2015). Bouldering as a form of outdoor adventure tourism relies directly on abiotic natural features (particularly small rock formations and natural boulders) and has a variety of ecological impacts but also socio-economic benefits (Table 1) (Jenks et al., 2000; MCSA, 2005; Attarian and Keith, 2008).

¹ See Appendix E: Glossary of Terms.
Table 1:
The associated impacts and benefits of bouldering

<table>
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<tr>
<th>Impact</th>
<th>Description</th>
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<tr>
<td><strong>Loss of vegetation and erosion</strong></td>
<td>Trampling and removal of vegetation: to access a boulder and/or route, establish trail, for resting areas. Soil damage can limit aeration, and affects soil temperature, moisture content as well as soil nutrition and micro-organisms. Extent of impact is dependent on popularity of area and nature of the terrain.</td>
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<td><strong>Wildlife</strong></td>
<td>Most notably affecting (cliff nesting) bird habitats. Mere presence can disturb wildlife and recreational activity can also change behaviour, alter species distribution, reduce foraging behaviour, breeding success etc. Wildlife is also impacted cumulatively through the other impacts (i.e. pollution and loss of vegetation)</td>
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<td><strong>Heritage Resources</strong></td>
<td>Defacing of rock art and nearby areas due to chalk residue, usually due to a lack of knowledge; Archaeological deposits can be trampled.</td>
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<tr>
<td><strong>Visual impacts</strong></td>
<td>Gymnast chalk accumulation can be removed by rain unless suitably sheltered. Can result in a change in sense of place for visitors</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>Noise (i.e. shouting and grunting) is not considered a major issue but can affect concentration of other climbers, affect visitor experience or disturb wildlife.</td>
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<tr>
<td><strong>Pollution</strong></td>
<td>Disposal of human waste can contaminate water sources and/or generate an unpleasant experience for visitors (incorrect disposal of toilet paper included). Litter can have an indirect impact on water sources and wildlife. Small items of litter include: fragments of athletic tape, marker tape, food wrappers and cigarette butts.</td>
</tr>
<tr>
<td><strong>Pets</strong></td>
<td>Cumulative effects of dog urine and faeces; dogs may disturb wildlife and vegetation (e.g. through digging and chewing); social impacts of noise (barking) and unacceptable behaviour (fighting, obstruction, distraction).</td>
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<tr>
<td><strong>Recreational (Benefit)</strong></td>
<td>Users gain an increase in well-being, develop athletic potential, experience a sense of community, exposure to beautiful scenery etc.</td>
</tr>
<tr>
<td><strong>Economic (Benefit)</strong></td>
<td>Generation of revenue for local economy: income for landowners, accommodation providers and subsidiary economies (e.g. shops, car rental, fuel etc.). Long stays of climbers can ensure a steady income. Restrictions on climbing access may have repercussions for local business.</td>
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The Rocklands bouldering area

Rocklands bouldering area (Rocklands hereafter) is one of the top five ranked bouldering sites in the world (Maddison, 2011; van Der Merwe and Joubert, 2014; Noy, 2018). Rocklands is approximately 30 km north-east of Clanwilliam in the northern reaches of the Cederberg Mountains (which form the most northerly extent of the Cape Fold Mountains) in the Cederberg Local Municipality, Western Cape (32°07'S, 19°03'E) (Figure 1; Figure 2).

Rocklands falls within the Greater Cape Floristic Region (GCFR) and is found at an interface of the semi-arid Succulent Karoo Biome and Fynbos Biome. The vegetation type in which the bouldering sites are found is Cederberg Sandstone Fynbos. The GCFR is the smallest and richest of the six floral
kingdoms in the world and the irregular nature of the Succulent Karoo/Fynbos interface promotes floristic intermingling. Fynbos is the most biodiverse biome in South Africa and contains the highest number of endemic species (Rutherford, Mucina and Powrie, 2006; Saul et al., 2012). It is however highly susceptible and sensitive to trampling and disturbance (MCSA, 2005). The area experiences hot-dry summers from October to April and cold-wet winters from May to September (Saul et al., 2012). There is a high seasonal fluctuation in temperature, with daily mean maximum temperatures of 28.4°C and 4°C for February and July respectively and winter temperatures usually dropping below freezing. Maximum temperatures in summer hover between 30-40°C. The average rainfall in the region is 395mm (180–600 mm), peaking from May to August (Rebelo et al., 2006). There is a strong local spatial temperature and rainfall gradient with the higher-lying areas, around the Pakhuys Pass (~950 m above sea level) being cooler and wetter with rainfall range of up to 300 mm higher, between 500-600 mm, compared to the Agterpakhuys Valley (~600 m above sea level) (M. Engelbrecht 2018, pers. comm., 14 June). The main climbing season is in winter, primarily due to more moderate daily maximum temperatures being conducive to comfortable climbing.

Figure 1:
Map showing the location of Rocklands.
Human occupation of the area dates back to ±2000 BC, originally by the San and Khoi and later by European settlers in the 17th century (Deacon, 1993). The greater Cederberg area is home to many rock-art sites of Khoi-San descendants (Figure 3). By the end of the 18th century most of the area had become well settled, particularly around the town of Clanwilliam (Deacon, 1993). The current population is made up of a mix of private landowners, casual labourers and local communities (totalling approximately 150 people) (T. du Plessis 2018, pers. comm., 10 June).
Rocklands is made up of a mosaic of privately-owned plots (including agricultural land and ecotourism infrastructure) and provincially administered conservation areas. Farming practices range from micro-scale subsistence to livestock and commercial crop farming. Currently the landowners in the Rocklands area derive part of their material income by catering to the needs of visitors by providing accommodation and access to the boulders (Hall, 2011). The bouldering fields are located within private farmlands as well as the Cederberg Wilderness Area (CWA)\textsuperscript{2} managed by the Western Cape Nature Conservation Board (CapeNature) (Figure 4) (Hall, 2011; van Der Merwe and Joubert, 2014). Land ownership and access to Rocklands, as at other climbing sites, is complex and involves a “complex web of relationships and processes between actors that share overlapping interests” (Hall, 2011, p. 9).

\textsuperscript{2} The CWA is a Forest Wilderness Area proclaimed in terms of the National Forest Act, 1998 (Act No. 84 of 1998) and has a high conservation status in terms of existing South African legislation. The Cederberg, in accordance with the World Heritage Conservation Act 49 of 1999, is a declared world heritage site.
Boulder management in Rocklands

When rock climbing and bouldering in the Cederberg began to gain prominence, the Environmental and Access Sport Climbing and Bouldering Management Plan Cederberg Wilderness Area (EMP) was drawn up in 2005 by the Mountain Club of South Africa on behalf of CapeNature (MCSA, 2005). The MCSA and CapeNature are partners to the agreement, although CapeNature is the managing authority responsible for enforcing and implementing the EMP. The EMP was drawn up to address, minimise and properly manage the impacts of climbing whilst simultaneously maximising the benefits of the sport. The document was based largely on a desktop review of information and consultation with climbers. Subsequent expansion since 2005 of bouldering exclusively on CWA land onto private property and a growing number of visitors to the area, has led to growing and renewed concerns of the impacts of the sport beyond what is encompassed in the EMP (Carpenter, 2013).

Ecotourism

Ecotourism relies on the availability and quality of natural areas, therefore tourism in this context should be considered in tandem with strategies for maintaining and protecting nature (Ross and Wall, 1999; Deng, King and Bauer, 2002). Fundamentally, ecotourism is a strategy to support conservation and simultaneously promote sustainable local development (Deng, King and Bauer, 2002; Das and
This is achieved through interactions amongst multiple actors including tourists, local residents and managers who are united in a symbiotic relationship with the environment through the medium of tourism (Ross and Wall, 1999). There is no universally accepted definition of ecotourism, although it is seen as environment-centred and is geared towards sustainability as it protects the environment whilst also contributing to socio-economic development through the production of revenue, education (of visitors and local people), and local participation and capacity building (Figure 5) (Pederson, 1991; Ross and Wall, 1999; Deng, King and Bauer, 2002). Adventure-based tourism - tourism premised on a single recreational activity such as bouldering - falls within the realm of ecotourism and as a whole is gaining in popularity globally (Beedie and Hudson, 2003; Ness, 2011).

The agricultural, tourism and conservation land-use sectors at Rocklands are compatible as ecotourism is recognised as one of the key economic activities that can be pursued to complement recreational opportunities whilst ensuring biodiversity conservation and generating economic returns (Palmer, Shroyer and Wessels, 2003; Kroeger and Manalo, 2007).

**Value of perception-based studies in conservation**

Insights from studying perceptions of assessing and improving management and conservation indicate four distinct categories for evaluation of environmental as well as social impacts, namely; social impacts of conservation, ecological outcomes of conservation, legitimacy of conservation governance, and acceptability of conservation management (Bennet, 2016) (Table 2).

![Figure 5](image.png)

Figure 5: Ecotourism contributes to socio-economic development whilst protecting the environment and thus strives for sustainability (Source: Ross & Wall, 1999)
Conservation and management action are in a perpetual state of trial-and-error and requires constant reassessment and monitoring to adapt to changes to ensure that social, ecological and economic outcomes are sustainable (Bennett, 2016). Decisions should be informed by various forms of evidence. In this study perceptions are explored as they are deemed as being an indispensable source of evidence for all stages of conservation (i.e. planning, implementation and ongoing management)(Hockings et al., 2006). As Bennet (2016, p. 586) states:

“Perceptions can and should be monitored to understand when evaluations of conservation are positive or negative and to assess what facets of a conservation initiative—social impacts, ecological outcomes, governance, or management—are generating or undermining support and related actions”

There is room for more literature to provide greater insight and clarity about mountaineers in the adventure tourism context (Pomfret, 2006; van Der Merwe and Joubert, 2014). Tourist preferences and perspectives within broader policy and management frameworks and how they can be operationalised in local communities, have been underestimated (Deng, King and Bauer, 2002; Chaminuka et al., 2012). Research teams can be important in assisting in providing insights to better inform management approaches. It is important that further studies include the perceptions of tourists by incorporating them into studies (Ross and Wall, 1999; Deng, King and Bauer, 2002).

Perception studies are useful for single sites and research on perceptions can be readily incorporated into decision-making and adaptive management processes (Bennett, 2016) Furthermore, they are useful to understanding the effectiveness, legitimacy, and acceptability of a conservation initiative and can be used rapidly to determine social and ecological status for planning as well as monitoring purposes (Bennett, 2016).
**Aim and Objectives**

In the context of the existing EMP while noting the growing concerns of the impacts of bouldering at Rocklands, this study aims to conduct a perception-based study surrounding bouldering to understand these concerns and current management strategies in place.

The objectives of this study are to:

1. Determine key role-players;
2. Gauge perceptions of the climbing-related impacts (i.e. ecological, social and cultural) of bouldering and socio-economic benefits of the sport;
3. Assess management approaches to bouldering;
4. Provide insights that informs boulder management for enhanced effectiveness.

**Methods**

This study employed a combination of qualitative and quantitative methods including focus groups, semi-structured interviews and an online survey. Each method was used on a number of occasions at different stages of the research project; from establishing the research questions to data collection. Each interviewee was contacted telephonically to establish a rapport, explaining the aim of the study and their role within it. A combination of follow-up emails and/or WhatsApp conversations/groups were established to facilitate meeting arrangements. Each participant gave informed and prior consent for the research and ethics approval was obtained from the University of Cape Town (UCT) Faculty of Science Research Ethics Committee (Approval Code: FSREC 30 – 2018). Each interview and focus group was recorded and later transcribed. The online survey was hosted on the KoboToolbox website (https://kf.kobotoolbox.org).

**Preliminary research methods**

An initial focus group, held with a group of climbers from the UCT Mountain and Ski Club (UCT MSC) and interviews with three key informants\(^3\), was undertaken in order to establish the salient themes relating to impacts and visitor trends at Rocklands. The themes generated from these meetings assisted in the formulation of the online survey and subsequent interviews and focus groups.

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\(^3\) The key informants included a regular visitor to Rocklands, an academic scholar with research experience pertaining to Rocklands and a local landowner.
questions asked in these interviews are summarised in Appendix A: Preliminary focus group questions.

**Survey**

An online survey was conducted to get a broader understanding of climbers’ perceptions of the topic, particularly as it is a large group of individuals with diverse backgrounds. The survey was hosted on KoboToolbox (https://kf.kobotoolbox.org) and was distributed online via:

- Facebook pages (UCT MSC and The Mountain Club of South Africa - Cape Town Section);
- A popular climbing website – Climb ZA (www.climbing.co.za);
- Weekly online newsletter (UCT MSC Weekly Tales from the Mountains).

Various local climbing gyms were approached to share the survey as they have a high number of climbing members (i.e. CityRock and Bloc11)\(^4\). Additionally, a table tent (i.e. a small upright table coaster) was created with a scannable QR code link to the survey, which was distributed to two restaurants in Rocklands.

The survey questions were set out according to six different themes: personal information, experience of Rocklands, climbing impacts and awareness strategies, permits, accommodation and outreach (Appendix B: Survey). There were 84 respondents.

**Qualitative research methods: Focus groups and semi-structured interviews**

Semi-structured interviews were conducted with seven landowners\(^5\) and a senior field ranger of CapeNature from Rocklands and one climbing guidebook author in order to gauge their views around the themes established in the survey (Appendix B: Survey). Responses assisted additionally in fostering an understanding of the broader history of the area generally and management of bouldering.

Three focus groups with climbers were conducted during field work at Rocklands. Interviewees were informally approached at a restaurant and asked questions in line with those in the survey. A total of three focus group interviews were held involving a total of seven individuals (in groups of two, three and two respectively) in order to provide a more nuanced and in-depth perspective of climbers. This also provided an opportunity to gain perspectives from foreign visitors who were under-represented in the survey results.

\(^4\) Neither organisation responded to communication in this regard and as a result did not assist in the dissemination of the survey.

\(^5\) One landowner was interviewed in their capacity as a representative of the landowner of the Cederberg Wilderness Area (CWA) and as conservation manager for the CWA responsible for managing Rocklands.
Data Analysis

Qualitative Data

All the interview transcriptions and descriptive survey data (i.e. comments) were captured using NVivo 12 qualitative data analysis software. In order to identify salient themes, each respondent was assigned a case and was then openly coded. Themes were identified through the coding process following which each code was analysed independently according to the assigned role of each case, i.e. climber or landowner. This approach was developed in order to synthesize the views of each identified role-player group.

Quantitative Data

The quantitative data derived from the survey was exported and cleaned, and each question was then analysed on its own merits and graphically represented to more easily assess the results. Questions where the respondent was required to rank his or her answer (e.g. in terms of severity or degree of influence) were averaged out. The salience was then determined for each occurrence relative to the overall average and ranking criteria.

Results

Expansion of tourism and bouldering

Since the inception of the EMP in 2005, there have been significant developments in Rocklands. There has been large growth in the number of visitors to the area, estimated at around 25% per year since 2006. The consensus across stakeholders is that growth was consistent until 2010 and progressively escalated from 2013 onwards:

“The whole thing in Rocklands is that the growth exceeded everyone’s expectations and we were caught a bit unprepared but not from our own doing. Just no one expected it and now you’re sitting with a situation where you have some tourism, where it triples, and it goes crazy.” (Accommodation owner, Agterpakhuys area, 12 June 2018)

The first climbing area on private land was established in 2005 by a handful of individuals and so began the expansion of bouldering beyond CapeNature land. New areas were opened subsequently in 2006, and bouldering areas continued to grow:

“2006/2007 that’s when it boomed. Climbing is a word-of-mouth sport like you go to an area, like Bishop in California and someone is like ‘Oh man, I was in Rocklands last year that
place is crazy, yeah I gotta go’ and then it just snowballs.” (Climber, Agterpakhuys area, 14 June 2018)

In 2005, there were four climbing crags exclusively within the CWA. Currently there are over 54 crags across the Rocklands region.

In general, the tourism industry has grown in the area although in Rocklands climbing has become the main industry and climbers now form the main clientele of accommodation providers in the region.

Outside of the main climbing season (May to September) ordinary tourists visit the area:

“...you know climbers are here every single day for four-months, you’re booked out solidly whereas summer it’s weekends, its long weekends and you’ve got the odd very, rarely you have bookings during the week which is as it goes. A lot of regulars, families that come every year.” (Accommodation owner, Agterpakhuys area, 11 June 2018)

Estimates suggest that in 2011 there were approximately 600 climbers throughout the climbing season (van der Merwe and Joubert, 2014). There has been continued growth in visitor numbers since, peaking in 2017 as indicated by the number of permits issued for the 2017 financial year which was 2 494:

“It’s escalated, very much. Basically, last year we had over almost 2000+ climbers throughout the year. On the pass [see Figure 6:
Parking lot at the Heuningvlei entrance of CapeNature at the top of the Pakhuys Pass] you have like 60 cars at the parking gate – a day. So, you have almost 200 people at the climbing areas a day. So, it’s not every day but you can get even more people. Some of the people get lifts and they drop them off there and then pick them up later. So, yes last year we had plenty of climbers.” (CapeNature Senior Field Ranger, Kliphuis, 12 June 2018)

The trend was expected to continue in 2018. However, according to landowners the drought has had a significant impact in this regard with visitor numbers recorded for April and May in 2018 being notably lower than the two preceding years. This despite numerous landowners reiterating that the Rocklands region has sufficient water supply to cater for tourism numbers.
Figure 6: Parking lot at the Hunningvlei entrance of CapeNature at the top of the Pakhuys Pass (12 June 2018).

Drivers of growing popularity of bouldering

Natural growth and good quality bouldering

Climbing has grown in popularity across the world and one climber from the Netherlands recognises this growth in the sport:

“Bouldering is growing faster than sport climbing. It seems like it does appeal to the younger generation because it’s much more accessible – you don’t need gear, you don’t need to learn how to belay, you just show up at the boulder gym and climb. And now especially because there’s so many bouldering-only gyms, like in the past you would have a sport climbing gym with a little bouldering area. Now we have just huge bouldering only facilities.” (Climber, Agterpakhuys area, 14 June 2018)

The natural growth of the sport is attributed as being the main reason for growth at Rocklands. Rocklands is, however, identified as one of the world’s top bouldering destinations and its reputation has grown:

“That’s basically the motivation - that Rocklands is really good. It’s got a good reputation. It might not be the best climbing in the world, but it’s got cool vibes, the weather’s generally
good, the rock is amazing, the food is good, it’s cheap to rent a car, it’s just like the whole package is really good…and there’s a lot of space for everyone. You’re not packed into this little thing, you can go all over the place and be by yourself.” (Climber, Agterpakhuyts area, 14 June 2018)

There is the perception that Rocklands has a lot of unexplored terrain, enticing more advanced climbers to open up new boulders and set new routes. There are many climbing routes, of various difficulties on offer with many climbers returning to complete projects which are bountiful at Rocklands. Climbing is considered a word-of-mouth sport and with growing popularity and its good reputation, bouldering in the region has snowballed; according to an American climber:

“I mean this is my first time here, so I can’t speak from prior experience, but I feel like just in the climbing communities outside, in people’s home countries people talk about ‘The Rocklands’, you hear people talk about it more and more and the knowledge of it and the exposure is increasing. So at least over the past few years people are becoming more aware of it than they were say five years ago.” (Climber, Agterpakhuyts area, 14 June 2018)

The snowball effect has been accentuated by the growth of publicity in the mainstream as well as social media. Initially (2000 to 2010) publicity was gained through international magazine publications and feature length films. Subsequently, the growth of online websites and social media has made a significant impact. Celebrity appearances on social media have also drawn more attention to the area. The development of better infrastructure (i.e. roads, shops etc.) is another contributing factor to the growing number of visitors. Furthermore, overwhelmingly for international climbers, it is suggested that South Africa is an extremely affordable climbing destination.

The growth in numbers is not considered an issue, relative to other countries, as one climber from the USA states:

6 Annual film festivals such as REEL ROCK Film Tour showcase a compilation of outdoor adventure and climbing related films. REEL ROCK is screened across the world at over 500 screenings (https://reelrocktour.com).

7 Popular websites and mobile sites include 8a.nu (https://www.8a.nu) and 27craggs (https://27craggs.com). The most prominent influencing social media platform is Instagram, followed by Facebooks and Vimeo.
“I think it’s a long way to being overcrowded, like compared to Fontainebleau\(^8\) on a good day. Also, because it’s not that accessible, you do have to come a long way and there is only limited places you can stay in the area and it’s such a huge area, there are so many boulders. I think you’d need a bunch of big hotels here or a lot of new little houses, a B ’n B or something, to get it as popular that there would actually be too many people. That is a long way away from now.” (Climber, Agterpakhuys area, 14 June 2018)

**Population demographic trends**

Whilst growing numbers of climbers are both local and international, landowners and climbers are noticing a rise in the number of international climbers. Overall there is 50/50 split in visitors who are local and foreign, although one climber suggested that at the height of the climbing season, 80% of the climbers are international (Figure 7; Table 3) (Climber, Agterpakhuys area, 14 June 2018). This is attributable to the favourable climbing conditions coinciding with the European/Northern Hemisphere summer (which is traditionally a vacation period):

“I think there is endless potential here. There aren’t any areas during our summer that are good – not everywhere but most places. And we just really love coming here because it’s really beautiful and like I said, there is endless amount of rock.” (Swiss climber, Agterpakhuys area, 14 June 2018)

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\(^8\) Fontainebleau, situated 70 km south-east of Paris in France, is often considered the most popular bouldering destination in the world.
Figure 7:
Survey respondents who acknowledged that there was a growth in visitors to the area, from both South Africa as well as overseas were asked to account for the nationality of the visitors that they had become aware of and/or most notably interacted with at Rocklands. The graph shows the number of times each nationality was cited.

Table 3:
Survey respondents were asked if they were a member of any climbing related organisation or gym. This was asked to identify which organisations to potentially target for future communication strategies as climbing organisations can be useful for outreach to climbers (Attarian and Keith, 2008) and further gauge where climbers come from.

<table>
<thead>
<tr>
<th>Climbing Organisation/Gym membership</th>
<th>Country</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain Club of South Africa (MCSA)</td>
<td>South Africa</td>
<td>24</td>
</tr>
<tr>
<td>Bloc11 Climbing Gym</td>
<td>South Africa, WC</td>
<td>24</td>
</tr>
<tr>
<td>No affiliation</td>
<td>N/A</td>
<td>16</td>
</tr>
<tr>
<td>City Rock Climbing Gym</td>
<td>South Africa</td>
<td>15</td>
</tr>
<tr>
<td>UCT Mountain and Ski Club (UCT MSC)</td>
<td>South Africa, WC</td>
<td>13</td>
</tr>
<tr>
<td>Berg- en Toer Klub (BTK)</td>
<td>South Africa, WC</td>
<td>5</td>
</tr>
<tr>
<td>Exploratio</td>
<td>South Africa, KZN</td>
<td>3</td>
</tr>
<tr>
<td>Southern Rock Climbing Gym</td>
<td>South Africa, KZN</td>
<td>3</td>
</tr>
<tr>
<td>Rocklands Association for Development</td>
<td>South Africa</td>
<td>2</td>
</tr>
<tr>
<td>German Alpine Club</td>
<td>Germany</td>
<td>1</td>
</tr>
<tr>
<td>Italian Alpine Club</td>
<td>Italy</td>
<td>1</td>
</tr>
<tr>
<td>Royal Dutch Mountaineering and Rock Climbing Assoc.</td>
<td>Netherlands</td>
<td>1</td>
</tr>
</tbody>
</table>
Impacts and management strategies

Part II of the 2005 EMP includes the proposed measures for implementation of the management plan. Since it was published there have been developments that were not accounted for due to the growth and expansion of the sport. A summary of Part II of the EMP and the developments in relation to each section (specifically to bouldering) is provided in Table 4.

Actions and behaviour: Impacts

As with any outdoor sport, there is bound to be an impact on the biophysical environment. The impacts of the sport investigated here pertain to biophysical impacts (i.e. impacts on fauna and flora), social impacts (i.e. instances that detract from the climbing experience) and cultural impacts (i.e. damage to rock art) (Figure 8). It is important to note that CapeNature has a constitutional mandate to conserve the environment and not manage bouldering per se:

“We are not going to preserve the sport. We are going to protect the area.” (Conservation manager, Algeria, 15 June 2018)
Increasing erosion at the staging area of boulders is the highest observed impact (Figure 9). This occurs as a result of climbers ‘stashing’ boulder pads on vegetation on the fringe of staging areas. This impact is contained at a boulder-scale, though at some sites the erosion is intense (due to high use) which is not only damaging the environment but the integrity of the bouldering too:

“High impact zones like Roadside there’s a Question of Balance boulder and this one called the Turret, and there the base is just getting lower and lower because people throw their crash-pads down and the rock gets exposed and then they’ll take that rock out and the level of the sand just gets lower.” (Climber, Agterpakuys area, 14 June 2018)

A proliferation of new paths in the web of trails due to people not sticking to paths has also occurred (Figure 10). The severity of the impacts (of path-webs and erosion) was intensified by a fire which swept through the area in 2013 (Figure 10). The affected area was not closed off and thus not given a chance to recover sufficiently. This was exacerbated by the declining annual rainfall since, culminating in the drought of 2017/2018. Over time these areas have recovered naturally although appropriate management and monitoring could have lessened the severity of impacts from bouldering.
Table 4:  
Summary of Part II - Management Plan of the EMP (MCSA, 2005). The sections and descriptions have been adapted from the original text. The developments column highlights the changes that have taken place since the EMP was drawn up, based on personal communication and field observations of this study unless otherwise stated. It is important to note that the implementation of the EMP failed due to the growth in the number of visitors and internationals thereof who are not affiliated with the MCSA and thus no responsibility was claimed for the impacts (CapeNature Conservation Manager, Algeria, 15 June 2018). Furthermore, the monitoring of the proliferation of sites became unmanageable.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Minimise impacts and maximise benefits of bouldering activities;</td>
<td>Analysis of these objectives forms the crux of the discussion of this paper.</td>
</tr>
<tr>
<td></td>
<td>Ensure a high quality of experience for boulder climbers in the Cederberg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nature Reserve.</td>
<td></td>
</tr>
<tr>
<td>Roles and Responsibilities</td>
<td>CapeNature and the MCSA are the two organisations included in the document,</td>
<td>The effectiveness of this arrangement and discussion thereof appears</td>
</tr>
<tr>
<td></td>
<td>and their respective roles and responsibilities are indicated.</td>
<td>in the findings of this paper. However, importantly it must be</td>
</tr>
<tr>
<td>Actions and Behaviour</td>
<td>Standards of behaviour and rules proposed in order to limit the impact</td>
<td>acknowledged that the stakeholders involved in boulder management</td>
</tr>
<tr>
<td></td>
<td>on the environment and enhance the positive aspects of the climbing</td>
<td>has expanded to incorporate local landowners as per the revised</td>
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<tr>
<td></td>
<td>experience, which minimise the impact on: vegetation and erosion,</td>
<td>permit highlighted below in Access Management.</td>
</tr>
<tr>
<td></td>
<td>fauna, cultural sites and litter and waste. Access path infrastructure is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>also recognised under Section 4.2 as an important element of environmental</td>
<td></td>
</tr>
<tr>
<td></td>
<td>management.</td>
<td></td>
</tr>
<tr>
<td>Information Dissemination</td>
<td>A key aspect of the 2005 EMP is education via effective and ongoing</td>
<td>There is limited signage in Rocklands, although signage has expanded</td>
</tr>
<tr>
<td></td>
<td>communication with the climbing community. Education was highlighted as</td>
<td>in tandem with the growth of climbing areas. A series of signs have</td>
</tr>
<tr>
<td></td>
<td>the most significant management strategy. Highlighted strategies included</td>
<td>been put up along the roadside adjacent to CapeNature land and there are</td>
</tr>
<tr>
<td></td>
<td>signage at two areas (The Kliphuys campsite and at the Roadside boulder</td>
<td>a variety of signs that have been put up by private landowners (Figure 16).</td>
</tr>
<tr>
<td></td>
<td>parking lot). Other strategies include providing information through</td>
<td>There are a series of indemnity boards at the entrance to Heuningvlei (The</td>
</tr>
<tr>
<td></td>
<td>newsletters, notification to other climbing clubs (UCT MSC and BTK), public</td>
<td>entrance to ‘The Pass’, the most popular climbing</td>
</tr>
<tr>
<td></td>
<td>notices at public gyms (e.g. City Rock), notices in publications, pamphlets</td>
<td>area) but these are fading and generally disintegrating, while others</td>
</tr>
<tr>
<td></td>
<td>attached to</td>
<td>have been damaged by fire. Welcome signs (designed and funded by</td>
</tr>
</tbody>
</table>
permits, information on relevant online website and notices in ablution blocks. Signage is also recognised under Section 4.1 as an important means of information dissemination.

CapeNature) on roadsides to individual boulder sites are starting to be rolled out, together with a template document for an indemnity signboard which can be printed at each landowner’s own personal expense. Trail maintenance has been done differently at each site, varying from directional sign-posting, painted footprints and cairns, mostly done on a volunteer basis (including climbers and private landowners). Information is available on online platforms (such as the Climb ZA website).

Each landowner is responsible for monitoring climbing on their own property. This typically entails demarcating parking lots, managing paths, putting up appropriate signage, ensuring the area is clean, waste control, reducing erosion and policing of permits. Traditionally, most management and monitoring is carried out by climbers themselves, although on CapeNature land it is also the responsibility of field rangers. Scouting of new areas has explicitly only been done by climbers as it is the nature of the sport.

Monitoring

Determining whether additional management controls are required, which could include resting certain areas or limitation on numbers of climbers at certain sites, pathways and number and integrity of bouldering sites. Accurate and reliable data can help ensure that management strategies are correctly directed, and appropriate resources provided. Scouting and establishment of new routes is recognised in Section 3.1 as being very difficult to control and recommends that management should be in line with principles of activity management. No formal record keeping of new boulder sites is provided. A representative site sample analysis of impacts is recommended.
Access management refers to permits (see Appendix D: Permits). All climbers are required to purchase a permit. The reason provided is for access control as per CapeNature regulations and to monitor climbing numbers, as a database did not exist. This database can thus inform monitoring strategies.

Permits have been used at Rocklands since 2007. Until 2014, each landowner had their own permit for climbing on their land. In 2015, an all-in-one permit system was established which included all the landowners with climbing on their land. The formulation of the all-in-one permit system was the result of a collaborative effort between the landowners and the MCSA bouldering sub-committee. This new system was designed to streamline and consolidate differential access as well as making the permit easier to obtain. The shift to the all-in-one system has been well received by landowners and climbers.

The funds are split proportionately among each landowner relative to the number boulder sites on each property, according to data available in ‘Rocklands Bouldering’ (Noy, 2018).

The permit serves to manage the climbing areas, in terms of access control, infrastructure development but also a diversification of income. There are no regulations or obligations imposed by the permit and it is completely at the discretion of each individual landowner as to how the funds are spent. CapeNature, however, has an official mandate to protect the environment. Each landowner is responsible for their own public liability insurance. The permit outlines procedures for minimizing disturbance on the environment. A permit is required to access any area in Rocklands. Permits vary in price according to time period of activity and nationality and/or region (i.e. SADC member countries and other). A permit can be bought at various accommodation outlets in Rocklands or online (Appendix D: Permits).

This is fourth year that the system is in place and is continuously being monitored. The permit indemnifies CapeNature and landowners against any damage, loss or death and also holds admission rights. At some stage the cost of a permit was covered by a Wild Card. This was however revoked at the introduction of the all-in-one system, due to complications with the involvement of the private landowners.
Figure 9: The ‘Minki’ boulder on The Plateau field (12 June 2018). Chalk stains (a) are evident, vegetation has been trampled on (b) and the staging area (shaded in turquoise) has expanded (the area shaded in red) (c).

Figure 10: Image of The Plateau field depicting the nature of the terrain (12 June 2018). Path-making and following a path can be difficult in such conditions.
Figure 11: Satellite imagery (a,b,c) showing the changing state of the landscape at the top of the Pakhuys Pass as a result of a fire which was caused by a lightning strike in January of 2013. The fire enhanced the severity of the environmental impacts of bouldering in this region, which is also one of the more popular areas. Source: Google Earth, 2018.
Human waste disposal

The survey indicates that uncontrolled human waste disposal is also perceived to be a significant issue and among landowners it was deemed the most significant. This has been attributed to visitors not being aware of the correct etiquette regarding defecating in the wilderness:

“People need to be educated that if you go to the toilet in the wild, walk away from the area, dig a hole, and just cover it with rocks that a baboon can’t move…people need to be educated that you don’t do that [merely defecate in the wilderness].” (Climber, Agterpakhuys area, 14 June 2018)

There is a tendency for ‘bush toilets’ to become established at specific sites with one specifically established beneath a boulder with rock art panels present.

Impacts: Boulder scouting and establishment

New areas, boulders and routes are constantly being scouted. Traditionally at Rocklands this has been done by an experienced climber who will open the route and thereafter establish the trail leading to it. More recently however, a growing number of climbers are establishing routes and sharing them on social media, meaning that other climbers are attempting those routes prior to paths being properly established, contributing to greater number of paths forming. In some instances, new routes and boulders have been opened, with trees being cut down in the process:

“There have been those who have been entrusted with custodianship with the saw, who have been responsible for a lot of the development and know what they’re doing and have done it properly and correctly. Last year, evidence would suggest that lots of other people decided ,with or without saws just by means of breaking, to go and clear for themselves.”

(Accommodation provider, Agterpakhuys area, 10 June 2018)

One instance in 2017 involved the cutting of a protected Yellowwood Podocarpus latifolius. This was however an isolated incident and the tree is still living (Figure 12).
Cultural impacts: Impacts on rock art

Impacts on rock art sites are site-specific and fairly limited in extent and have been attributed to a lack of cultural awareness and knowledge of the nature of rock art in South Africa, particularly as most visitors are not local. The following quote from a survey respondent highlights the nuance of human behavioural effects on rock art:

“There are other examples of well-established boulder areas in uncomfortable proximity to rock art, however my concern is the impact of modern activity on the ‘visibility’ of potential open air Late Stone Age sites in the interstitial spaces between rock art sites. The issue is that rock art sites in the Cederberg area (especially Pakhuys and Agterpakhuyys) are viewed as multiple isolated instances (predominately, but not exclusively, found in rock shelters), whereas the sites probably represent a small aspect of a network of settlement and activity which covers and links a far greater area.” (Anonymous survey respondent, 29 May 2018)
Chalk stains on boulders

Chalk stains on boulders were deemed not to be a significant issue, with more than two-thirds (70%) of climbers indicating that it had no impact on their climbing experience (Figure 13). Additionally, when asked about the impacts on the area, none of the landowners cited chalk stains as an issue in any respect. Gauging the views of from the public on this matter was beyond the scope of this study.

As derived from Figure 8, the overall average ranking for climbing-related social impacts (i.e. crowding at boulders, noise at boulders and pets) are low (2.11/5). This attests to the high-quality experience of bouldering at Rocklands. Despite these being low, they remain important metrics to monitor as they may become more significant in the future.

Monitoring

Scouting for new sites continues to be the responsibility of climbers. Originally it was pursued by experienced climbers with an intimate knowledge of the area, who had an understanding with landowners that they would do it. In this way the landowner trusted that the climber would act responsibly. This is still the case, however, with the advent of social media and apps, a greater number of climbers are sharing information about new boulders which then have to be verified and logged by experienced climbers and maintenance on paths done accordingly. It is in this way that climbers monitor their own impact. It is, however, a challenge to maintain new areas although developments and integration of technology are already being implemented:

“Instagram is big. Most of the new things have been shared over Instagram and then they’ll meet at Traveller’s Rest and share the beta. That makes my life pretty tricky because then I
have to go there and find all this stuff. We are in the process on 27crags.com of making an online topo and part of the app is a navigation tool. That hopefully will also help a lot.”

(Climber, Agterpakhuys area, 14 June 2018)

Landowners suggest that scouting should be a more standardized process, facilitated by better communication, where climbers should seek permission and report back to the respective landowner accordingly.

Access Management: Permits

Attitude towards permits

Previous studies suggest that only one-third of climbers who visit Rocklands purchase permits (van Der Merwe and Joubert, 2014). While that may have been the case during that period (observation made in 2011), results show that currently, almost two-thirds (57%) of climbers always buy a permit, 39.3% sometimes purchase one whilst 3.7% never purchase one. The reasons given for respondents only sometimes or never purchasing a permit is overwhelmingly because they do not see the benefit of them and/or are too expensive (Figure 14). Qualitative accounts reveal that another reason attributed for permits not always being purchased is that climbers are occasionally lackadaisical in this regard and will only buy it if it is convenient to do so:

“If it is convenient and not ridiculously costly I always get a permit. The current online permit and permit for all areas at the campsites is fantastic. In other areas, where permits must be obtained by lengthy correspondence in advance, I sometimes don’t get one.”

(Anonymous survey respondent, 19 May 2018)
Not seeing the benefit of a permit is a major issue. There is a feeling that the amount that the permit is cumulatively yielding is not reflected in managerial action on the ground and is not being used for conservation action. One landowner sums this up:

“...I'm not even pointing fingers, to say that anybody is in the wrong here but not making the connection between the fact that if you levy a fee, there should be some sort of conservation output, coupled to the fact that the need for conservation efforts is starting to creep up on us.” (Accommodation provider, Agterpakhuyts area, 10 June 2018)

The sentiment of climbers is that they do not see the benefit and feel that there is a misallocation of funds for other unrelated infrastructure. Much of the disdain surrounding permits is aimed at CapeNature, as they are perceived to be the primary agent in decision making surrounding permits. This is summed up in the following two survey responses:

“I always buy a permit due to implications for everyone if caught without one. However, the permit system is my biggest gripe with going to Rocklands. It is a complete and utter scam. A
permit system should be in place to protect the environment...” (Anonymous survey respondent, 29 May 2018)

“Permits are extremely annoying. I don’t see the money been spent on Rocklands. The money goes to CapeNature and then [Rocklands users] never see it again. I have a huge issue with this. I would really like to see CapeNature spending money on trying to rehabilitate the area. CapeNature sees mountain users as an endless stream of cash.” (Anonymous survey respondent, 12 June 2018)

Climbers feel that more transparency and better information would improve their attitude to account for the perceived lack of visible management in the area, particularly as most management is done by the climbing community itself:

“Permits should not be required unless SANParks (sic) [CapeNature] disclose what the money is allocated for. Most rehabilitation, trail building, clean-ups etc. in Rocklands happens on a volunteer basis and is not funded by SANParks.” (Anonymous Survey Respondent, 30 May 2018)

An emergent issue surrounding attitudes to permits is it not being covered by the Wild Card. Such a view was expressed during an interview with a climber when discussing permits:

“What I do have a problem with is the fact that I bought a Wild Card that gives me access to all the areas, except bouldering. Why? I still have to get a permit anyway. I don’t even get a discount when I buy a permit.” (Climber, Agterpakhuys area, 14 June 2018)

The manager for Rocklands at CapeNature explains the reason for this situation:

“So, the Wild Card is a way for a day access conservation fee. In any of the parks or reserves, if you do a special activity you pay for the activity permit and bouldering is an activity. That’s why they are paying for their bouldering permit.” (Conservation manager, Algeria, 15 June 2018)

One landowner commented that it is also a factor in discouraging locals to visit Rocklands:

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9 A Wild Card is a chip card used for the Wild Card loyalty program designed to incentivise an annual membership for the public to cover conservation fees at a number of protected areas throughout the country (https://www.wildcard.co.za).
“...and I think it’s got to do with the permit prices as well – for locals. They’re no longer covered by the Wild Card so that has definitely scared Capetonians away” (Accommodation provider, Agterpakhuys area, 11 June 2018)

As highlighted in Table 4, the Wild Card was removed as a cover for permit fees due to complications with the involvement of the private landowners in the permit agreement of 2014.

**Policing Permits**

Policing of permits is the responsibility of the individual landowner. However, CapeNature is the only landowner which has formal dedicated personnel to actively monitor permits. This has proved to be difficult and largely ineffective. CapeNature has used a variety of methods for checking permits at the entrance to their property, often spontaneously, or for two days every fortnight and during expected busy periods (in climbing season and long weekends). The act of enforcing permits through these methods is costly as often over-time wages need to be paid. An additional impediment is that there are three separate access points to their property. CapeNature has not prioritised access control measures (e.g. stationing a field ranger at access points), largely because it is very costly. The perception among climbers is that very little policing is done or is evident. A senior field ranger at Kliphuis campsite suggests that policing is not an appropriate strategy:

“We don’t want to go and check on people, we don’t want to play police. That is not the right thing to do, you can’t go and sit there every day and ask at the gate and control the people – the relationship between climbers and us won’t be good.” (CapeNature Senior Field Ranger, 12 June 2018)

Local landowners don’t want to check permits due to a lack of human resources:

“The area is under resourced when it comes to checking permits and to actually be following up on this stuff. And again, I don’t have time every day to go and check who’s climbing there” (Accommodation provider, Agterpakhuys area, 11 June 2018)

**Limitations of permits to monitor visitor numbers**

Whilst the permit is efficient in helping to develop a database for the number of climbers visiting the area, it does not assist in providing insights into the distribution of climbers, nor newly developed climbing sites. As landowners are generally not climbers, they are not necessarily aware of the location of sites nor impacts that occur. The private landowners have other priorities and responsibilities (i.e. running accommodation businesses and farming activities) so impact management is often not a high priority.
The CapeNature conservation manager suggests that the rapid growth of climbing sites and the lack of knowledge of the location thereof presents a major obstacle to management:

“Last year we tried, with the CapeNature rangers to go and look for all the climbing sites and collect all the GPS points of [them] and we were probably only able to record about 70% of the apparent climbing sites on our property.” (CapeNature conservation manager, Algeria, 15 June 2018)

Climbers believe that the landowners do care about the land, though suggest that CapeNature specifically has been slack in attending to its management responsibilities:

“The land is public land, it is there for the use of the public and it is protected by CapeNature, they are the guardians or the custodians...But at the end of the day it is land that we as a public should be able to utilize responsibly and it is their responsibility to inform us and to guide us in a way that is sustainable and I don’t think they are doing that. Their job is to collect money and that’s it.” (Climber, Agterpakhuys area, 14 June 2018)

The climbing community is perceived to be very responsive to management outreach. Effective management is possible where a landowner puts his trust in climbers that they will be responsible and in turn report back to the landowner on impacts and management issues:

“I like it when the landowner goes ‘Okay climbers you are responsible for it’, that basically says that they don’t care too much and that we are allowed to go climbing. But at the same time, it then gives us responsibility to actually maintain what they expect us to maintain.”

(Climber, Agterpakhuys area, 14 June 2018)

Information dissemination

Climbing community environmental awareness

In order to develop recommendations for enhancing management strategies, this study sought to first determine what level of environmental awareness climbers have as this would help to tailor educational strategies appropriately and determine relevant strategies for information dissemination. Overall, self-reflection on the climbers’ behalf indicates that environmental consciousness of the climbing community is reasonable (63%). Opinion varied across the board, though generally it is perceived that most climbers are environmentally aware. Younger or newer climbers are perceived as being less aware due to a lack of outdoor climbing experience.
There have been instances in the past of experienced climbers cutting down indigenous protected trees in order to establish new routes, which one landowner attributes to the ‘free-for-all’ attitude of climbers. On the other hand, one respondent suggests that it is indicative of the pressure for celebrity climbers to continuously open up and showcase new routes as part of publicity contracts. Generally, amongst climbers however, is the perception that the global community and inherent different social contexts and associated cultural norms account for differing attitudes towards the environment. One climbing interviewee states:

“It’s more that the climbing community isn’t educated in the same way across the board about what’s acceptable and what’s not acceptable.” (Climber, Agterpakhuys area, 14 June 2018)

**Appropriate information dissemination strategies**

Climbers were asked what they deemed the most effective methods for enhancing awareness of the impacts of climbing. Results from the survey suggest that the two most effective strategies were information boards in central locations (e.g. rest areas, sculleries and in ablution blocks) as well as signage at trailheads (Figure 15). Figure 16 shows a few examples of the current trailhead signboards. A variety of methods for disseminating information were suggested although considering the growth in numbers, the young climber demographic and growth in social media, one climber (interviewee) suggests using social media as an educational tool:
Figure 15: Survey results showing the mean ranking of information dissemination strategies. Ranking of each strategy was defined according to its level of effectiveness as follows: 0 = None; 1 = Very low; 2 = Low; 3 = Moderate; 4 = High; 5 = Very high.
“It doesn’t necessarily have to do with younger climbers or inexperienced climbers, I think it’s the way you grow up and your attitude towards nature. But I think the most effective way to reach people nowadays is [via] social media.” (Climber, Agterpakhuyys area, 14 June 2018)

There is a wide consensus that education and awareness are the most important aspects in mitigating the impacts of climbing. This view is shared by landowners, with one landowner suggesting that the focus be on awareness rather than formal regulations.

![Figure 16: Images (a) and (b) are images of signage that was put up in early at The Coop boulder area (13 June 2018). Images (c) and (d) is the current signage at the Heuningvlei entrance to CWA land (12 June 2018). Notice the recent interventions in path maintenance using rocks for demarcation in the background of image (a).](image)

In terms of human waste disposal, the most effective method is simple in nature, and that is to make communication of etiquette basic and obvious:

“On the point of the toilet paper as well, maybe have a sign that says ‘go far away from the crags’ or just make the communication thereof obvious, because people coming from New York City don’t know what the etiquette is for the bush. Somehow communicating it in a basic way that you can’t not know. I feel a lot of time that’s the problem – that people don’t know.” (Climber, Agterpakhuyys area, 14 June 2018)
Whilst toilets have been built at two sites on CapeNature land (Figure 17), climbers suggest that they are misplaced for the practicalities of climbing:

“The new toilet at the Roadside Parking Lot makes absolutely no sense to me, even though it is nice. There is (sic) no signs from the parking lot or maps indicating that there will be a toilet - you don’t need it right after you parked and when you do need it you are a 30min walk away at the boulders and you will definitely not walk back an hour to defecate.” (Anonymous survey respondent, 29 May 2018)

Enhanced communication with the climbing community and information dissemination are needed. Consensus is needed among managers for the most appropriate method and the guidelines, standards and etiquette that is desired or required by climbers. This sentiment is shared by climbers too:

“They are not communicating with us... They are doing all this stuff, but why don’t you ask the people what actually needs to be done? It’s beyond me. If you do something, it’s like aliens landing on the planet and going ‘we are going to do something now’ but they have no idea what these guys need but we gonna do something. But we’re spending a whole lot of money. It’s just a waste of time.” (Climber, Agterpakhuys area, 14 June 2018)

Figure 17
Eco-Toilet at the Leipoldt Grave parking lot – at the entrance to the Roadside boulder field along the Pakuys Pass (11 June 2018).
Socio-economic benefits

As highlighted in Table 1:
The associated impacts and benefits of bouldering, there are various potential socio-economic benefits for the region. The expansion of the sport has meant that bouldering has become the main economic industry of the Rocklands region:

“Specifically in this area rooibos has always been around and tourism was non-existent before 2003. There was no tourism activity going on at all in this valley. Although they were producing rooibos tea. Rooibos tea-tourism was more centred around Clanwilliam and in the town, the guesthouses, people visiting and going to the factory but this economy here is driven by the climbers – 100%. I wouldn’t even attribute any tourism in our area to rooibos. I mean rooibos is there and it’s a thing in the Cederberg of course, but I don’t think it has had a big influence on us.” (Accommodation provider, Agterpakhuys area, 12 June 2018)

Estimates from the mainstream media in 2011 indicate that climbing generated between R4m – R5m to the economy of Rocklands/Clanwilliam (Lawson, 2011). A current threefold growth in the number of climbers suggests that this figure is now significantly higher. Local resident communities experience a small benefit from catering to climbers in adhoc laundry work and catering to their food needs during climbing season. There are also small-scale entrepreneurs who sell locally harvested wood to the tourism market. There has been a concerted outreach effort on behalf of the climbers involving the local Elizabethfontein School which has been running for over nine years. Projects involving the school have included the construction of a boulder wall, initiating a climbing club with mentorship by climbers as well as the development of a vegetable garden to name a few. The seasonality of climbing and very hot summer weather conditions presents a major hinderance to the sustainability of these programs. These and other related issues are being addressed particularly with the establishment in 2017 of the Rocklands Association for Development (RAD) non-profit organisation which aims to assist in ecological conservation, youth outreach, and to develop and foster greater socio-economic inclusion of local communities in the Rocklands region (RAD, 2018).

Discussion

Growth, trends and ecotourism

This research affirms that Rocklands is part of a global trend of the growing popularity of bouldering (Attarian and Keith, 2008; Ness, 2011; Tessler et al., 2016). This has been due to the nature of the sport, the psyche of climbers and the push and pull factors that drive niche-based adventure tourism
(Pomfret, 2006; Ness, 2011; Caber and Albayrak, 2016). These have been accentuated by the growth of social media.

There is a disconnect between CapeNature and the dynamics of the sport and its intrinsic environmental reliance. This highlights the need for enhanced communication between landowners and climbers to foster cross-stakeholder understanding which can enhance the sustainable management of the sport and environment simultaneously, whilst also generating long-term economic gains (Palmer, Shroyer and Wessels, 2003; Kroeger and Manalo, 2007). Tourism is a major contributor to the economy of the Western Cape (Palmer, Shroyer and Wessels, 2003) and adventure-based tourism in Rocklands is an extension of this. The socio-economic benefits of bouldering at Rocklands emphasises the growth of adventure-niche based tourism and the ability of ecotourism to generate income and infrastructure development (Ross and Wall, 1999; Deng, King and Bauer, 2002; Beedie and Hudson, 2003). Thus, the sustainable management of the sport should be seriously considered by CapeNature and prioritised by the Western Cape government as the benefit yield is vast and has the potential to further stimulate regional socio-economic development. Sustainable climbing management could be used as a vehicle for growing environmental awareness, particularly with the growth of the sport and publicity that it receives (Pederson, 1991; Ross and Wall, 1999; Deng, King and Bauer, 2002; Adams and Sandbrook, 2013). Ecotourism can be thought of as a sustainable development program and the ability of local stakeholders to influence its direction and outcome is integral to its success, as they are affected by it and can gain tangible economic, social and infrastructural benefits by participating in it (Ross and Wall, 1999; Palmer, Shroyer and Wessels, 2003; Kroeger and Manalo, 2007). Without the buy-in of locals, or should locals feel disgruntled by the tourism activity, negative attitudes towards it which can stymie progress are fostered (Ross and Wall, 1999; Das and Chatterjee, 2015).

Impacts

Attarian and Keith (2008) state that the impacts associated with climbing depend not so much on the total number of climbers, but rather on the spatial and temporal concentration of climbers in particular areas. In this vein, whilst most climbers have not noticed a big impact on the area, the scale of these issues is not vast as Rocklands contains multiple areas, and climbers are indeed spread out. Nevertheless, individual boulders were identified as being particularly affected in popular areas. Landowners and climbers generally are concerned about the ecological impacts.

Overwhelmingly it was deemed important to recognise the scale of impacts relative to other industries (e.g. rooibos farming) and the amount of people venturing through the area, which in 2017 was approximately 2 500 primarily over a four-month window. Other conservation threats in the Cederberg include the conversion of natural habitat to permanent agriculture, rapid and intensive development, over-exploitation of water resources, infestation by alien species and inappropriate fire management (Saul et al., 2012). The severity of the impacts of path-webs and erosion was intensified
by a fire which swept through the area in 2013. Had the affected area been closed off for rehabilitation, the severity of the impacts could well have been diminished. Overall erosion levels on a vegetation unit scale is however considered very low (Rebelo et al., 2006). The mean severity of ecological impacts was 3.2/5, suggesting that the impacts are moderate in magnitude on a local (i.e. site-specific) to regional scale, in the short-medium term (i.e. ≥ 10 years) (Jenks et al., 2000). Cederberg Sandstone Fynbos is well protected in private and statutory conservation areas (46%) and 15% of it has been transformed mainly for the cultivation of rooibos and vineyards (Rebelo et al., 2006).

As with any outdoor sport, there is bound to be an impact on the biophysical environment. This study revealed that the highest perceived environmental impacts are defecating in the wilderness, growing erosion at staging areas and erosion generally. Whilst erosion measures are already in place (such as padding staging areas and using cairns and signage to demarcate paths for example), these measures need to be scaled-up and coordinated. Integration of technology (i.e. mobile-application based navigational maps) can also assist in this regard.

There are a variety of solutions to combatting the issue of human waste. Whilst toilets have been built and may assist to some degree, this is likely to be minimal as they are not positioned in a viable area relative to climbing (i.e. at trailheads/parking lots). For toilets to be effective they would need to be within 5 – 10 minutes walking distance from main bouldering areas and be clean. With the continuous expansion in climbing areas it is not a viable option. Basic information on the desired etiquette (‘The dig and drop’ method is seen as most effective) on defecating in the wilderness needs to be communicated. This can be done in innovative ways incorporating various media (e.g. videos, on trailhead signs and on pamphlets).

The overall average for climbing-related social impacts are low, ranking ±2.1 out of 5. This attests to the high-quality experience and good reputation of bouldering at Rocklands. Despite these being low they remain important as metrics so that they do not become issues in the future. Impacts on rock art sites are also site-specific and fairly limited in extent and has been attributed to a lack of cultural awareness. However, the nature of the impact on rock art networks may require further investigation.

**EMP**

The EMP is structurally sound and the impact criteria appropriate as it aligns with other management plans and guidelines (Jenks et al., 2000; Attarian and Keith, 2008). It is a standard requirement of conservation measures and management to be reflective and adaptive to changes (Bennett, 2016) and findings from this study suggest there is a need for a review to enhance its effectiveness. Furthermore, findings from this paper could be used to enhance and streamline the process to ensure that the appropriate management strategies and impacts are used. Notwithstanding an apparent failure of the implementation of many aspects of the EMP, the lack of adaptiveness in a systematic manner has
meant that the legitimacy of conservation governance and acceptability of conservation management has been undermined. This in part has led to the severity of the impacts that have occurred in the area.

**Shift in permit system**

Overlapping interests in a web of relationships and processes of land ownership and access has heightened the complexity to the management of this socio-ecological system. The development of the all-in-one permit system and management structure thereof (including CapeNature and landowners) has however, signalled an adaptive shift in management approach and that should be acknowledged. The structure of this agreement has been initiated in the absence of a proper, revised EMP. Findings suggest that landowners perceived that the scale of the impacts at the time of the initiation of this agreement did not warrant an EMP. However, the rapid and sheer increase in visitor numbers has spurred a need for the review of a formal plan beyond the stipulations currently stated within the landowner permit arrangement.

**Stakeholder relationship and management**

Attarian & Keith (2008) suggest that climbers will support programs that protect natural resources as well as those with historic and cultural values. Furthermore, they suggest that any climbing intervention should be backed up by outreach to the climbing community. This study emphasises that a strong relationship between local climbers, climbing organisations and land managers is integral for successful sustainable management of bouldering in the adventure-niche based tourism context, so that it is ecologically, economically and ethically responsible (Ross and Wall, 1999; Deng, King and Bauer, 2002; van Der Merwe and Joubert, 2014; Das and Chatterjee, 2015).

Climbers are integral to the relationship between the different land-owners as they, through participating in the sport, monitor the environment. The division of dividends from the permits amongst landowners is split proportionately to the number of boulders on their land and the inventory of boulder sites is based on climber-generated data (i.e. Rocklands Bouldering first edition, 2010). More outreach and communication that is based on mutual trust and responsibility can assist in updating the inventory database. The latest edition of Rocklands Bouldering (Noy, 2018) is a valuable source of GPS locations of boulders and accurate maps, which can assist in monitoring. Integration of community contributed information on mobile-based application platforms that is readily available offline and could assist in the future of monitoring.

A salient perspective on environmental awareness is that context matters. Most South African climbers suggest that foreign climbers have a lower environmental awareness. This is attributable to the different social contexts in which people grow up and their inherent cultural norms. However, climbers generally are considered avid outdoor people who have environmental awareness ingrained into their psyches and are considered to have a higher level of awareness than the general population. However, a lack of education about norms and practices in different areas means that people are not
necessarily aware of the sensitivity of the vegetation, the importance of rock art nor the correct etiquette of disposing of human waste in the wilderness. Potential strategies for communicating with visitors are diverse and should make use of a variety of multi-media platforms. Communication is vital among both stakeholder groups, landowners and climbers. Conscientious engagement has been shown to work in other cases, such as in Cape Peninsula in the City of Cape Town (Lawson, 2011). Currently substantive co-ordination exists between climbing organisations, individuals and between stakeholders, but this needs to be enhanced to cater for the global demographic of climbers and climbing clubs. Survey results indicated that there are a variety of climbing related organisations to which people belong. This needs to be considered in formulating an inclusive strategy that engages with a diverse, global climbing community.

Private landowners have a very good relationship with the climbers and recognise the value that they bring to the region. Climbers are considered very easy to deal with and there appears to be a high level of mutual respect between climbers and landowners. The biggest barrier to a good relationship is the lack of communication between climbers and the conservation management in CapeNature. The private landowners engage with the climbers on a daily basis and have personal connections with the climbers. Senior CapeNature management personnel at Cederberg on the other hand, are not based in the Rocklands area (rather at Algeria 30 km south), seemingly rarely interact with climbers and are thus out of touch with the climbers and the dynamic of the sport and its influence in the region. CapeNature, however, does have the additional task of fulfilling a constitutional mandate to preserve the area.

There is currently a good working relationship between landowners and in the absence of a formal management plan, this relationship needs to be built upon and enhanced with greater co-ordination with climbers. The most cited proposal to achieve this is through the establishment of a new forum dedicated to conservation and management of bouldering. Such a forum could build on what is already established in the EMP.

**Issues related to permits**

Overall, climbers assume that the funds are reserved for conservation measures but also recognise that it is for access control. The different agendas of the landowners within the permit agreement has however fostered confusion among climbers as to the purpose of the permit. In terms of access control, it is perceived by climbers that the funds generated from permit sales would be used for monitoring and administrative costs, whilst infrastructure development would entail path maintenance and information dissemination. As mentioned in Table 4, whilst CapeNature has a mandate to conserve the area, there are no conservation obligations for private landowners and the use of funds is entirely discretionary. Findings indicate that there are a lack of conservation measures in place and that greater action is needed in this regard.
Whilst the permit system successfully assists in building a database of visitors, it fails to reduce numbers of visitors to high impact zones, does not necessarily restrict access nor does it foster environmental consciousness. Policing of permits does not seem to be an appropriate strategy to ensuring climbers purchase them as most climbers do purchase them (only 3.7% of climbers never purchase a permit). Most of the rehabilitation and environmental management measures as well as information dissemination is done voluntarily by the climbers themselves. The lack of disclosure and transparency on the *bona fide* benefit and use of funds generated from the permit system has fostered ambivalence towards CapeNature and as a result undermined its legitimacy and the acceptability of its management. An emblematic example of this is the installation of two eco-toilets by CapeNature at the parking lots of two sites in early 2017. These toilets are perceived to not be the correct measure to alleviating the issue of human waste disposal. This example is indicative of conservation measures that are out of touch with the nature of bouldering and the views of the climbing community.

The issue of permits no longer being covered by the Wild Card has been raised by local climbers. Insufficient communication on why this is the case, coupled with a lack of visible management and outreach, fosters apathy and disgruntlement towards permits and the view that the permit is merely a money-making scheme. This is accentuated by the perception that permits are expensive. The absence of visible awareness strategies and management (or enhancement of the climbing experience) whilst non-bouldering related infrastructure development occurs, leaves the impression that bouldering-related conservation management has not been suitably prioritised by landowners.

Disclosure and transparency on permit fund allocation that is communicated effectively and is publicly available (such as is the case in Table Mountain National Park’s activity cards (SANParks, 2018)) could assist in clearing up misperceptions around the need to purchase permits. However, due to the different obligations of the landowners, more visible conservation and outreach to the climbing community could be a viable alternative.

**Conclusion**

Perception studies are useful to understand the effectiveness, legitimacy and acceptability of a conservation initiative, and can be used rapidly to determine social and ecological status for planning as well as monitoring purposes (Bennett, 2016). This study has shown the value of perception studies in assessing the impacts of and conservation plans for bouldering in Rocklands. The results from this study can be used to guide and improve current management actions and socio-ecological outcomes. The ability of this, however, cannot be overstated and to go beyond understanding perceptions and execute a shift towards realising adaptive management, these findings will be best served in furthering stakeholder deliberations “that explore rationales for positive or negative evaluations and implications for conservation policy and practice.” (Bennet, 2016).

This research provides insight and clarity into understanding an aspect of mountaineers in the adventure tourism context, thereby enhancing the integration of tourist preferences and perspectives
into conservation management which have been underestimated within broader policy and management frameworks. Improved and coordinated outreach and communication between landowners and climbers, building on strong existing relationships and with the use and integration of various media, can enhance the monitoring and reduction of impacts of the sport. The current bouldering EMP for bouldering needs to be reviewed and steps taken to ensure it is formalised and implemented effectively. Further revision of the permit system needs to be undertaken so as to not undermine the relationships between stakeholders. The nature of the impact on rock art networks was beyond the scope of this study and should be the subject of further investigation. Future research is needed to assess the operational requirements and cost-benefit analysis of permits and organisational structures that can best ensure substantive implementation of conservation and management plans.
REFERENCES


Deacon, J. (1993) *Management guidelines for rock art sites in two wilderness areas in the Western Cape.*


Western Cape Province, South Africa: Where We Are Going’, *Wilderness*, (May), pp. 13–19.


Appendices

Appendix A: Preliminary focus group questions

The series of open-ended questions posed during the preliminary focus group were:

1. What is the history of management at Rocklands?
2. What are the impacts?
3. Have you noticed an increase in visitors over the past few years?
4. Is there enough accommodation?
5. Permits: Do they work; What are the different attitudes towards them?
6. What is the relationship between landowners and climbers? Who are the key role players?
Appendix B: Survey

Impacts and Management: Climber’s perspectives on Rocklands

What is your age?
- under 18
- 18 - 25
- 26 - 35
- 36 - 45
- 46 - 60
- 60+

What is your gender?
- Male
- Female
- Other

What is your current place of residence (City/Town)?

How long have you been climbing outdoors?
- I do not climb outdoors
- < 1 year
- 1 - 5 years
- 6 - 10 years
- 10+ years

Are you a member of any of these climbing-related organisations?
- Mountain Club of South Africa
- BAC2
- University of Cape Town Mountain and Ski Club
- City Rock
- Other (If applicable select this option and state below)
- I’m not a member of a climbing organisation

Other:

How many years have you been climbing at Rocklands?
- < 1 year
- 1 - 4 years
- 5 - 8 years
- 9 - 12 years
- 13 - 16 years
- 16+ years

What time of year do you tend to visit Rocklands?
- Mid-September - March
- April - Mid-May
- Mid-May - Mid-September

Has there been a rise in visitors to Rocklands since you started going there?
- Yes
- No, not noticed.
Additional comments

If Yes, where are the majority of visitors from?
- South Africa
- International
- Both

If you selected 'Both' or 'International', what are the most common nationalities?

If you answered 'Yes', what do you perceive this to be attributed to?

- The sport is growing and naturally more people are going to Rocklands
- Growing visibility on Social and Mainstream Media
- Publication of Rockclimbing Rocklands' guidebook by Scott Noy

Other:

Impacts of Climbing

Rank the severity of each of the following negative environmental impacts around bouldering sites in Rocklands that you have experienced

- No apparent
- Slight
- Moderate
- Major/Massive
- Severe
- Very severe

Many paths forming (approaching boulder sites)

Erosion and widening staging area

Erosion (of paths and surrounding landscape)

Damage to trees and bushes

Uncontrolled human waste disposal (including toilet paper litter)

Wildlife (birds and animals - e.g. nesting, shelter etc.)

Other:

Rank the severity of each of the following negative social impacts on your experiences at Rocklands.

- No apparent
- Slight
- Moderate
- Major/Massive
- Severe
- Very severe

Chalk stains
Are toilets at trailheads effective in alleviating a problem of human waste disposal?
If you select 'No - there are better solutions', please state them below.

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<td>No - there are better solutions</td>
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Additional Comments

Other solutions:

In your opinion, what is the general level of climber’s awareness of the impacts (environmental, cultural, social) of bouldering in Redlands?

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<td>Very Low</td>
<td>Vague</td>
<td>Good</td>
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Additional Comments

What are the most effective methods for raising awareness about climbing impacts?
Please rank each according to how effective it would be: 0 = Not effective at all, 5 = Very effective.

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<td>Trail Signage (eg. Trail rehabilitation signs)</td>
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<td>Information boards at trailheads</td>
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Graffiti

Pets

Crowding at boulders

Noise at boulders

Noise at campsites

Insufficient camping facilities

Other

Has climbing impacted any cultural sites (e.g. rock art)?

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Site impacted and nature of damage:

Does a prevalence of chalk stains detract from your experience of climbing at Redlands?

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<td>Yes, aesthetically.</td>
<td>Yes, climbing ability.</td>
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Page 6 of 10
### Educational brochures available at trailheads and accommodation receptions
- [ ] Yes
- [ ] No
- [ ] Don't know

### Educational information in guidebooks
- [ ] Yes
- [ ] No
- [ ] Don't know

### Educational information on a dedicated Focklands website
- [ ] Yes
- [ ] No
- [ ] Don't know

### Information boards in central resting areas and wash-up areas.
- [ ] Yes
- [ ] No
- [ ] Don't know

### At Climbing Gyms: Information signs and sessions/presentations
- [ ] Yes
- [ ] No
- [ ] Don't know

### Additional Comments

### Permits

Where required, do you acquire permits?
- [ ] Always
- [ ] Sometimes
- [ ] Never

### Additional Comments

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If you answered 'Sometimes' or 'Never', what do you perceive this to be attributed to?

Please rank each option on a scale of influence: 0 = no influence, 1 = minor influence, 2 = moderate influence, 3 = major influence.

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### Other:

- [ ] Yes
- [ ] No

### Additional Comments

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Do you believe that permits should be required for all bouldering areas (on private land and conservancy land)?
- [ ] Yes
- [ ] No

### Additional Comments

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Do you think permits should be cheaper for local residents than foreign visitors?
- [ ] Yes
- [ ] No

### Additional Comments

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Do you think permit price should vary according to off-peak and peak climbing seasons? (i.e. permits from Mid-May - Mid-September be more expensive than the rest of the year)
- [ ] Yes
- [ ] No

### Additional Comments

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Accommodation
What influences where you choose to stay?
Please select the appropriate response(s). If other, please indicate below.

☐ Cost (The cheaper, the better)
☐ Close proximity to people
☐ Close proximity to bouldering areas
☐ Accommodation type - Camping
☐ Accommodation type - Unilet/Self-catering Units

Other:

Which accommodation provider do you use most often when visiting Rocklands?
If other, please indicate below.

☐ De Pakhuys
☐ Alpine Getaway
☐ Kleinebos
☐ Traveller's Rest
☐ The Storytellers
☐ Osa Point
☐ Bushmen's Cave
☐ Kloofies Campsite

Other:

Concerns have been raised over the quality of the facilities at De Pakhuys Campsite during climbing season (i.e. the number and quality of ablutions, fridges and washing up areas). Please state briefly what changes to facilities would improve your overall experience.

Outreach

The Rocklands Association for Development (RAD) runs various community-based programs which aim to incorporate climbers. Please select the options below that would be applicable to you.

☐ I would be interested in volunteering in climbing outreach programs with children from local schools.
☐ I would do some casual volunteering with children from the local area beyond climbing (e.g. helping with homework, hosting page classes etc.)
☐ I am not interested in participating in outreach programs whilst in Rocklands.

Additional Comments

Would a dedicated centre (comprising of a restaurant, a shop, crash pad repair services etc.) be a valuable asset to Rocklands?

☐ Yes
☐ No

Additional Comments

Please add any other comments regarding the survey you may have here or should you wish to receive feedback of the results fill in your email address:
Appendix C: Accommodation providers interviewed

The accommodation providers who were interviewed were representatives of the following:

- Alpha Excelsior
- Bushman’s Cave
- De Pakhuys
- Die Poort
- Kliphuis Campsite (CWA)
- The Storytellers
- Traveller’s Rest
Appendix D: Permits

The physical permit

The image below is of the back of the permit which climbers must purchase at Rocklands.
The online permit

Ticketing information:

**Ticket Type** | **Sales End** | **Price** | **Fee** | **Quantity**  
---|---|---|---|---  
Day Permit (1 day) | 01 Mar 2024 | R80 | R7.86 | 0  
Weekend Permit (2 days) | 01 Mar 2024 | R132 | R10.33 | 0  
Weekend Permit (3 days) | 01 Mar 2024 | R156 | R16.76 | 0  
Month Permit (30 Days) | 01 Mar 2024 | R390 | R35.00 | 0  
3 Month Permit (90 Days) | 01 Mar 2024 | R2,390 | R155.18 | 0

**Need help?**
- How to buy a ticket with a credit card
- How to buy a ticket using an instant EFT
- How to apply a discount or access code
- What to do if tickets sold out?
- Our support center

**When and where?**
- Rocklands Bouldering Permit

**Organiser details**

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10 Permit available online at https://www.quicket.co.za/events/4582-rocklands-bouldering-permit/.
The Event

This permit guarantees entry to all bouldering areas in Rocklands for the validity duration, including CapeNature, de Pakhuys and Travellers Rest.

All climbers visiting Rocklands must be in possession of this permit to climb on any land and must carry this permit with them at all times.

Booking Terms and Conditions:
The following Terms and Conditions apply to all bookings (walk-in or pre-paid):

Damage / loss / death

It is a distinct condition of admission to any protected area, that the Western Cape Nature Conservation Board and the property owners accept no responsibility or liability arising from a visit(s) however caused:
- For any death, injury or illness sustained or suffered by any person.
- For theft/loss damage to any property, whether allegedly due to the negligence of the board/
  - officers/employees/agents or arising from the use of any facilities supplied/made available.
- CapeNature and the landowners accepts NO responsibility for clothing or any items left behind at our facilities.
- From any alleged defect in any utensil/equipment/services/vessel/vehicle.
- From any other conveyance supplied made available, or from any liquid/food supplied.
- From any other matter arising, in any other manner and from any other cause whatsoever.

**Breaking of the rules**

CapaNature and the landowners reserves the right to deny access or to eject guests who do not adhere to the rules and regulations of the CapaNature and landowners and or its reserves. Money paid for these bookings will be forfeited.

**These rules include, but are not limited to the following:**

- Visitors are to have their bouldering permit with them upon entrance to the reserve.
- No pets allowed on reserves, the only exception will be guide dogs for the blind.
- No collection of bait, removing, damaging or disturbing of fauna or flora.
- Rowdy or unwanted behavior.
- All tariffs are subject to change without notification.
- Stick to the marked walking trails.
- No puff or resin allowed.
- Carry out what you carry in.
Appendix E: Glossary of Terms

**Climbing Area:** A region comprising of many boulder fields (e.g. Rocklands).

**Crag:** A climbing area comprised of a number of boulders or cliff-lines (e.g. Roadside).

**Boulder:** A small rock formation that is typically between 3-6 m high on which a climber attempts to surmount (e.g. Question of Balance)

**Route:** The path or sequence of moves used to complete a specific clime. There may be multiple routes on a specific boulder varying in difficulty.

**Project:** A specific route that a climber is attempting to or has ambitions to complete without falling or resting.

**Topo:** Information or advice provided by climbers that may help others complete a route.