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ROCK ART AND ROCK CLIMBING: AN ESCALATING CONFLICT

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Abstract. The recent escalation of bouldering and bolting in the sandstone ranges of western Victoria, Australia, has caused noticeable damage to Aboriginal rock art sites in the Grampians National Park and surrounding Crown Land Reserves (Greater Gariwerd). This has forced Parks Victoria, as an initial measure, to reassess their management of Special Protection Areas (SPAs) and extend the number of SPAs to cover all rock art sites within the Grampians National Park, resulting in the closure of eight well-known rock climbing faces. The closure, along with a Parks Victoria review of other climbing areas, caused an outcry by the Victorian climbing fraternity. Reviews of the reasons for the closure are presented while adding a caution to all cultural site managers to regularly and carefully monitor their cultural sites for an increase in damaging activities resulting from climbers.



Figure 1. Gariwerd and surrounding ranges showing traditional Aboriginal land affiliations.

Introduction

Recreational rock climbing has the potential to significantly damage rock art and other cultural sites worldwide (Long 1995; Watts 2019). To date, however, details of this threat have not been specifically elucidated. Largely in response to concern over actual and potential damage within the Grampians National Park in south-eastern Australia, Parks Victoria, the managing body, released the following statement on the 15 February 2019 asking that all rock-climbing activities cease indefinitely in eight 'key locations', all located in northern portions of the Victoria Range (Fig. 1):

In the coming months, Parks Victoria will be focussed on ensuring eight key locations in the western part of the Grampians National Park are protected and will be asking all climbing activity to cease in these areas indefinitely. Parks Victoria is committed to conserving Victoria's natural and cultural assets. In recent years, rock climbing in the Grampians has significantly increased and contemporary rock-climbing activities, such as bolting, have emerged creating significant risk to Aboriginal cultural heritage, rock faces and vegetation and visitor safety (Parks Victoria 2019).

This restriction received widespread comment and discussion in the press (e.g. Anon. 2019a; Day and Gillett 2019) and an extremely negative response on rock climbing internet forums: 'these bans are unprecedented, and as a user group we are going to need to respond in

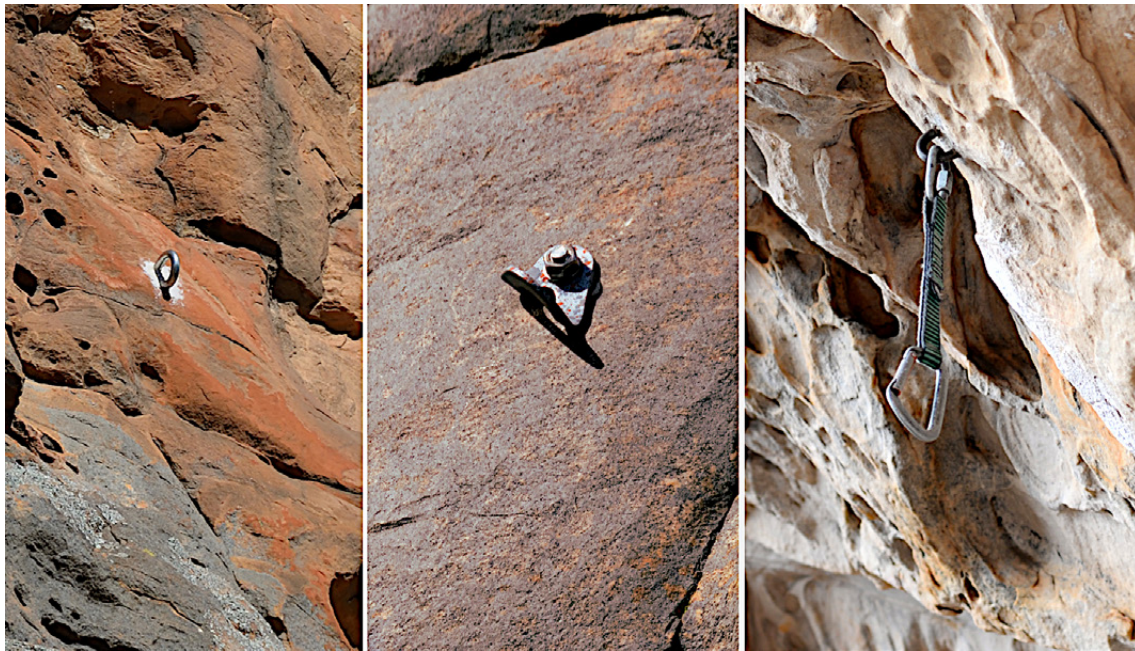


Figure 2. Climbing bolt in the rock face (left); bolt with hanger (centre) and bolt with carabiner (right), all too high to scale (photographs LCD and RG).

an organised and forceful fashion' (AdventureTypes 2019a) and 'Grampians climbers currently hang in limbo, while restlessly working to regain *their right to climb*' (Slavsky 2019; our emphasis). The concerns expressed by the rock-climbing community reflect the fact that:

1. The Grampians generally, and the Victoria Range, in particular, has been an important locality for recreational rock climbing for which it has a national and international reputation. Large-scale rock climbing began in the Grampians in the 1960s and since then the level of activity, both in terms of participant numbers, recorded routes, and guide books (now also web-based route descriptions), has increased more or less continuously. There are now more than 9000 climbs described in the Grampians and large numbers of climbers visit the area regularly (estimated at 20 000/annum).
2. Land managers have not previously enforced climbing restrictions.

In contrast to opinions expressed by some individual climbers, representative groups such as Cliffcare Victoria (<https://cliffcare.org.au/>) acknowledge there is a problem that needs to be addressed. Traditional climbers, those who take care to minimise their impact on the environment as opposed to Sports climbers (see below), take the view that as well as damaging and altering the rock, the excessive insertion of permanent steel bolt anchors (e.g. Fig. 2) to assist with their climb is 'depriving future generations of climbers of challenges' (Berry 2002). Both nationally and internationally most rock climbing representative groups have self-imposed codes of conduct to minimise negative environmental and cultural impacts (e.g. Hanemann 2000; QORF 2014; Anon 2016; NZAC 2017; Cliffcare n.d.). In Sax-on Switzerland National Park, on the German border

with the Czech Republic, codes of practice have been in place since the early 1900s that specify that artificial aids, such as bolts and chalk, are forbidden (Däweritz 1986; Heinicke 2003).

Most of these climbing codes make mention of the need to protect cultural heritage places. For example, the publication *Rock and Ice* based in Colorado, U.S.A., includes as one of their ethics notes:

Show Respect. Never boulder on, or near, cultural resources such as pictographs, petroglyphs, milling surfaces and historical structures. Regulations for government lands usually prohibit climbing within 50 to 150 feet of cultural resources. It is your responsibility to know the rules (Anon. 2016).

Focusing on recent problems in the Greater Gariwerd region, this paper will illustrate the forms of damage inadvertently inflicted on Aboriginal rockshelter sites and present an argument favouring the exclusion of potentially damaging rock climbing in areas of cultural sensitivity (including recorded and potential cultural heritage sites and those places as yet unassessed but likely to have cultural heritage potential). In Australia and many other countries, culturally sensitive areas are defined in State or Federal legislation either as places of intangible cultural heritage or those with archaeological manifestations.

The protection of Aboriginal cultural heritage in Victoria

All Aboriginal places in Victoria are protected under the *Aboriginal Heritage Act 2006* (incorporating amendments as at 28 May 2007 and 5 April 2016). For the Act, an Aboriginal place is an area in Victoria or the coastal waters of Victoria that is of cultural heritage significance to the Aboriginal people of Victoria, including any archaeological site, feature or deposit.



Figure 3. *The Fortress: a popular climbing area in the Victoria Range (photograph RG).*

It is an offence under the Act to harm or undertake activity that is likely to harm any Aboriginal cultural heritage whether or not its significance is known to the perpetrator (exceptional circumstances may apply).

Under their 2003 Grampians National Park Management Plan, Parks Victoria permits rock climbing within the Grampians National Park, but ‘excluding Reference Areas or other specified areas, in accordance with Parks Victoria’s operational policies’ (Parks Victoria 2003: 43). The requirements of the Management Plan, however, were contradicted by Parks Victoria themselves in a ‘Rock climbing and bouldering update’ by advertising open access to climbing sites within their Special Protection Areas: select areas of the Park where, according to the Management Plan, climbing is not permitted (Cliffcare 2019). When appropriate, however, the Management Plan recommends the closure of climbs that conflict with Aboriginal cultural sites, significant flora and fauna or other park values, and signpost accordingly (Parks Victoria 2003: 43). The Management Plan also encourages the use of minimal impact and clean-climbing techniques. The act of bolting is classified as an inappropriate activity within the Park as it can have a significant adverse impact on the Park’s natural, cultural and recreational values (Parks Victoria 2003: 6).

Aimed specifically at rock climbers, the authors of *Grampians selected climbs* make climbers aware of the presence of quarry and rock art sites in the Grampians National Park and call on them to ‘keep an eye out for [rock art] and avoid damaging it’ (Mentz and Tempest 2001: 15). Other rock climbing web sites also acknowledge the potentially detrimental effect on rockshelter sites, suggesting that any well-informed climber should be aware of the possibility of coming across rock art sites in Gariwerd. Indeed, several noteworthy rock art sites in the region have been first reported to Parks Victoria by rock climbers (e.g. Gunn 2017).

It is also necessary to mention that discussions

between rock climbers and Parks Victoria regarding climbing issues have been ongoing for many years (Adventuretypes 2019a, 2019b). Indeed, one of the present authors (RG) was involved in discussions with Parks Victoria and representatives from the climbing fraternity about concerns over potential damage to Aboriginal sites in the region in the early 1980s.

The regulations from the Grampians National Parks 2003 management plan have been in operation for over 15 years, including the exclusion of rock climbing from the Special Protected Areas (SPA) of the northern Victoria Range (Fig. 1). This SPA was extended further in February 2019 to embrace a further cluster of rock art sites. However, as the significance of SPA’s was poorly communicated by Parks Victoria and policing never enforced, rock climbers and the broader public had little awareness of these restrictions or the reasons for why they were in place (although, all groups had had the opportunity to comment on the original draft of the management plan).

Gariwerd

Gariwerd, the Aboriginal name for the Grampians Ranges, is a dramatic set of prominent sandstone ranges between the flat, northern dry plains of the Wimmera and the better-watered, southern undulating volcanic plains of the Western District of Victoria (Fig. 1). Rising from 200 m to 1160 m above sea level, the ranges have many cliffs and rock outcrops (Fig. 3). It has long been recognised for its high concentration of rock art sites (e.g. Mathew 1896; Barrett 1929; Gunn 1981, 1983, 1987a; Massola 1973; Gunn and Goodes 2018), with over 140 sites recorded to date, which is almost 90% of all rock art sites in the State. Since the 1960s, it has also become well-known for its wide variety of rock climbs.

Archaeological excavation has been conducted at six rock art shelters, indicating Aboriginal use of the ranges was intermittent and most probably seasonal (winter-spring). The earliest dated Aboriginal occu-

pation from floor deposits within rockshelters is around 22 000 years ago; however, the range of dates recovered suggest a more intense use of the ranges over the past 4000 years (Coutts and Lorblanchet 1982; Gunn 2003; Bird and Frankel 2005).

The Victoria Range, with 77 rock art shelters to date, has the highest concentration of rock art sites in Gariwerd (and also the State; VAHR files) and also has over 2500 registered climbing routes (The Crag 2019a) despite being a Remote Natural Area where all such climbing activities are prohibited.

Originally, the Aboriginal Cultural Heritage of Gariwerd was managed by Parks Victoria in conjunction with Brambuk Inc., Halls Gap. Today, this is collaboratively managed by Parks Victoria, Aboriginal Victoria, and the individual Traditional Owner parties (Barengi Gadjin Land Council Aboriginal Corporation, Eastern Maar Aboriginal Corporation, Martang Pty Ltd and Gunditj Mirring Traditional Owners Aboriginal Corporation). For these Traditional Owner groups, the rock art sites, along with other archaeological and mythological sites, represent a tangible and irreplaceable connection to a particular facet of their ongoing culture.

In addition to Gariwerd, the six outlying ranges of the Grampians sandstone that encompass Greater Gariwerd (Black Range - Burrunj, Dundas Range, Mt Arapiles, Mt Bepcha, Mt Talbot, Red Rock - Lil Lil) also contain rock art and other Aboriginal cultural sites (Massola 1963; Gunn 1985, 1987b, 1987c, 1999, 2000; Edmonds 1992; Long 1992, 1995). Of these outliers, only the Dundas Range has not been noticeably impacted by climbers.

Sandstone damage

The ranges that are exposed in Gariwerd are built up from sandy sediments laid down in the Silurian Period (Cayley and Taylor 1997). These consist of very quartz-rich sandstones formed under massive pressure that in many places are quartzitic. The many outcrops and cliffs now present were exposed by massive folding, faulting and slipping, along with the subsequent erosion of surrounding sediments and softer rocks over millions of years. The rock itself, however, is not as stable as many volcanic rocks (the so-called hard rocks), but most exposed sandstone rockshelters have



Figure 4. Rock art site LL-05 showing the location of the rock art panel, bolt (arrowed) and climbing route (white line) (photograph LD 2015).

an outer skin that reduces the effects of aggressive erosion. This skin is a coating of silica developed by water passing through the rock and mobilising silica in solution, derived from the quartz grains of the sandstone. When the solution reaches the outer face of protected (overhanging) surfaces the water evaporates and deposits a glass-like covering of silica.

In deeper shelters, the surface has been stabilised with gypsum through the combination of calcium in the rock combining with sulphur from the atmosphere. This forms a very tenuous stabilising crust that can easily be disrupted by further salt erosion, giving rise to the typical scalloped nature of many deep shelters.

In addition to silica, the water also transports salts and other minerals, such as iron, from within the rock. Salts are normally transported past the silica skin via



Figure 5. Digital enhancement of the LL-05 rock art panel (DStretch_yrd10) (photograph LD 2015).



Figure 6. Aboriginal rock art site BR-04 with the location of the climbing route within the shelter (photograph RG 2017).

cracks and fissures, and are then deposited on the outer side of the rock as the water evaporates or forms a water-run down the face. Alternatively, the saline moisture may build up behind the impervious silica and gypsum crusts causing more widespread failure of the surface.

This process can either break down the surrounding sandstone through the expansion and contraction of the salts with fluctuating temperature and humidity (Thorn 2008) (granular disintegration) or cause horizontal fissures to widen, generating rock collapse. In the case of granular disintegration, if the regrowth of the silica skin is not rapid, the fissure expands, eventually creating a small niche (cavernous weathering). Over time this process can expand and create a new pocket or cavern within the rockshelter (Turkington

and Phillips 2004).

When this skin is broken through the act of placing a bolt into the rock face or other activities, an artificial conduit for internal moisture is created that can accelerate the natural process of the rock's breakdown. The plugging of bolting holes with a grout of similar water permeability to that of the parent rock and repair of broken ledges is a complex procedure and requires specialist attention (Finn and Hall 1996; Thorn 2010, 2011, 2013).

The damage: bolting

The insertion of bolts requires a hole to be drilled into the rock to accommodate the bolt (expanding or glued). This process necessarily and permanently damages the rock and may cause premature rock decay.

In 2015 two bolts were noticed on a climbing route up the cliff face of a rock art site (site LL-05; VAHR 7323/195; Figs 4–5). Although the lowest bolt is 3.5 m above the rock art, the climb to get to that bolt is just one metre to the right of the panel of faint handprints, and the use of suitable handholds may have required some climbers to pass over the art. This art panel is particularly significant, being the first rock art site in the State on a barely overhanging cliff face rather than within a rockshelter. (A second such open rock art panel, unrelated to any climbing route, was located in 2018). The bolts at LL-05 were removed illegally by an anonymous person.

In October 2017, rock climbers were observed by RG and a party from the Wimmera Bushwalkers making a new bolted route immediately south of the BR-04 rock art site (VAHR No. 7323/024) in Burrunj (the Black Range State Park; Fig. 1). Besides, at least nine bolt holes were noticed on the rear wall of the shelter itself. The holes extended up the rear wall of the shelter and out across the ceiling some 10 m above the floor (Figs 6–8). The beginning of this route was less than one metre to the right of a prominent hand stencil. Parks Victoria and the local Tradition Owner, Barengi Gadjin Land Council were informed immediately and Parks Victoria then notified Aboriginal Affairs Victoria (the state body responsible for the protection of Aboriginal cultural heritage; now *Aboriginal Victoria*).

On a subsequent visit to the site in November 2017 with site managers and local rock climbing representatives, the bolts on the outside climb were found to have been removed leaving the drill-hole scars (Fig. 9). While the rock climbing representatives were perturbed by the damage, they felt it was most likely the work of 'sport climbers'. Sports climbing is a relatively new and increasingly popular form of rock climbing

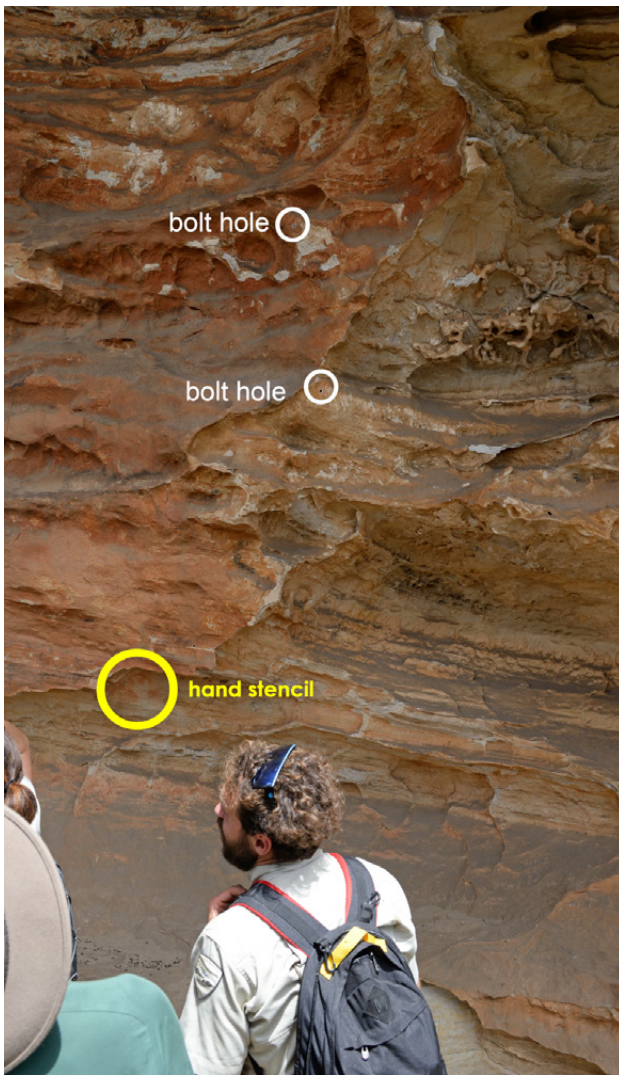


Figure 7. Detail of the BR-04 climb route showing the location of two of the nine bolt holes and adjacent rock damage (white) to the hand stencil (photograph LD 2017).

that relies on permanent anchors fixed to the rock for protection and contrasts with 'traditional climbing' where climbers must use removable protection as they climb. According to FrictionLabs:

Sport climbing is the act of climbing single- or multi-pitch routes, protected by permanently-fixed bolts and anchors drilled into the rock, using a rope and the aid of a belayer.

The main difference between sport climbing and bouldering is the height of the routes being climbed and the form of protection (bouldering = no ropes, with crash pads). Likewise, traditional climbing calls for the use of temporary gear and anchors (ex. nuts, camalots etc.) to protect the climber, as opposed to permanent ones used in sport climbing (Mirsky 2016).

A broader and more enlightening description is:

Sport climbing offers an easier, more convenient experience which requires less equipment, less in the way of technical skills required to be safe during the climb, and lower levels of mental stress than traditional climbing.



Figure 8. BR-04 - the clearly visible hand stencil adjacent to the base of the climbing route (photograph RG 2017).



Figure 9. BR-04 - detail of the lower bolt hole (photograph RG 2017).

With increased accessibility to climbing walls, and gyms, more climbers now enter the sport through indoor climbing than outdoor climbing. The transition from indoor climbing to sport climbing is not difficult because the techniques and equipment used for indoor climbing are nearly sufficient for sport climbing. Whereas the transition from indoor climbing to traditional climbing is hard because traditional climbing requires significantly more in terms of techniques, experience, and equipment.

While sport climbing is common in many areas worldwide, it is heavily restricted in some places where it is considered ethically unacceptable to bolt climbs. This is largely due to the local climbing traditions, and to the type of rock; for instance, it is often considered reasonable to bolt limestone or slate quarries in the UK, especially if these are otherwise unprotectable, but it is considered completely unacceptable to bolt gritstone [hard, coarse-grained, siliceous sandstone as in the Gariwerd] regardless as to how dangerous a climbing path might be. Debates over bolting in the climbing communities are often fierce. Bolting without a consensus in favour of bolting generally leads to the destruction, or removal, of the bolts by activists against bolting.

Since sport climbing paths do not need to follow



Figure 10. Sign at the entrance to the Red Rock Reserve (Lil Lil) requesting avoidance of disrespectful activities (photograph LD 2019).



Figure 11. Detail of quarried cornice in the Gallery rockshelter. Note the surface coating of white chalk (photograph RG 2019).

climbing paths where protection can be placed they tend to follow more direct, and straight forward, paths up crags than traditional climbing paths which can be winding and devious by comparison. This, in addition to the need to place gear, tends to result in different styles of climbing between sport and traditional (Anon 2019b).

The careful removal of bolts and the plugging of the holes to prevent rock erosion are complex and time-consuming practices (e.g. Finn and Hall 1996; Thorn 2010, 2011).

Following the incident at BR-04, further site assessments showed that the incidence of bolting was rapidly escalating across Greater Gariwerd and that other Aboriginal sites were being affected. In a review of the state of the cliff around five rock art sites at Lil Lil (in the Red Rock Reserve north of the Black Range; known to climbers as 'Black Ian's Rocks'; The Crag 2019b) in March 2019 eleven bolted climbs, with a total of 69 bolts, were noted adjacent to the rock art shelters.

Two climbs commenced within rockshelters with rock art (sites LL-02 and LL-04).

The escalation of bolting has occurred despite (i) signage informing the public of the presence of Aboriginal cultural sites and requesting climbers refrain from graffiti and bolting (Fig. 10), and (ii) a widely-used online climbers' platform 'The Crag' that highlights the Aboriginal cultural values of the Reserve and requests that climbers refrain from all bolting, and also from camping and bouldering in the 'camping cave'. The 'camping cave' referred to is the Aboriginal rock art and rockshelter quarry site LL-01 (VAHR 7323/003).

The problem is exemplified at the popular climbing wall 'The Gallery' in the Victoria Range (Mentz and Tempest 2001: 216–219). The Gallery is a rockshelter with a high overhanging rock wall as its ceiling, with 15 registered climb routes (The Crag 2019c). The wall was described as 'Short steep and pocket wall that's been conveniently machine-gunned with bolts' (Mentz and Tempest 2001: 202; our emphasis). The rockshelter is also within the Special Protection Zone of the National Park (Parks Victoria 2003) and was registered as an Aboriginal site in August 2000 (VAHR 7323/234), with evidence of Aboriginal quarrying on a number of its protruding quartzitic sandstone cornices (Fig. 11).

The damage: chalking and bouldering

Paralleling the rise of bolting there has also been an increase in the amount of chalk-stained walls in rockshelters from climbing, particularly bouldering. Chalk is used by climbers to reduce the amount of hand perspiration. The chalk used in climbing is 'gymnastic chalk': magnesium carbonate. This chalk is a drying and abrasive material that, while it adheres to the rock, does not retain its drying properties and requires each climber to chalk their hands before attempting the same climb. Thus the chalk deposit on the rock continues to



Figure 12. Chalk marks leading up from shelter LL04 (photograph RG 2019).

build up as long as the route is re-used.

While the use of chalk in climbing and bouldering on one or two occasions is rarely offensive, when multiple people use the same route over time, the build-up of chalk develops into a more or less permanent trail of white patches delineating the route at regular intervals of 1–2 m. The chalk then becomes ingrained into the rock and is very difficult and costly to remove. Most codes of ethic request climbers to remove excess chalk from the rock face after their climb. When it occurs within an Aboriginal cultural site chalking is classed as damage comparable to graffiti.

Removal of chalking requires dry brushing to get rid of the mass without forcing it further into the rock. Any remaining visible impression requires, in some cases, the application of acids to dissolve the magnesium carbonate. Such acids can also dissolve the carbonate matrix within the sandstone, requiring follow-up consolidation treatments. These processes all take considerable time and careful impact assessment.

Again at Lil Lil, a well-chalked climb begins at the art and occupation site LL-04 (VAHR 7323/194). The five visible chalk-stained patches lead from within the shelter to a climb with a bolt nearer the top of the cliff (Fig. 12).

The Gallery rockshelter in the Victoria Range mentioned above concerning bolting has also been heavily

encrusted with chalking such that the wall is now peppered with white stains (Figs 11 and 13).

Bouldering has also caused damage to the rock surface through the breaking of protuberances and brushing of the rock surface, removing micro-ecosystems (and possibly rock art).

As with bolting, the use of chalk is considered unacceptable by many members of the climbing community because (a) it is seen as an artificial aid, (b) can degrade



Figure 13. Chalk marking on the face of the Gallery rockshelter: a registered Aboriginal quarry site (photograph RG 2019).



Figure 14. Additional problems associated with the use of the BR-04 rockshelter.
A: disturbed floor deposits; B: dust accumulation on wall ledges; C: campfire (photograph RG 2014).

the climb by progressively filling in surface features and thereby reducing friction, and (c) it removes the need to route find/work out the climb as all the key holds are highlighted in chalk. Chalk is banned in some jurisdictions, while rock-coloured or organic chalk is required in others (e.g. Garden of the Gods 2015).

The damage: graffiti

'Graffiti are markings done on private or government property without formal or tacit consent and, hence, not endorsed by the broader society' (cf. Keegan 2014: 4–5).

Graffiti in rockshelter sites are an ongoing international problem (Jacobs and Gale 1994). The first reported instance of graffiti in Gariwerd was at Billimina (VAHR site 7323/001) in 1896 (Mathews 1896: 31), and it continues to be a problem throughout the region.

In one instance this has led to prosecution when in 1981 two youths (non-rock climbers) were charged for putting graffiti in an Aboriginal rock art site in the Victoria Range. This was the first prosecution under, and a test case for, the *Victorian Archaeological and Aboriginal Relics Preservation Act 1972*, relating to the defacement and desecration of Aboriginal rock art in Victoria (Clark 2002).

Much of the graffiti in the Greater Gariwerd have not been produced by rock climbers (such as those youths mentioned above); in other instances, particularly at Lil-Lil, it is all too apparent that rock climbers are at fault. At Lil-Lil some graffiti have been deliberately placed over rock art, and the damage is permanent. Others elsewhere have been racially offensive or, through the production of pseudo-rock art, deprecating to Aboriginal people and the majority

of non-Aboriginal Australians. As mentioned above, chalking is classed as damage comparable to graffiti.

In 2016 a conservator was engaged by Parks Victoria to undertake a graffiti removal project at LL-01 with the assistance of traditional owner groups. At the cost of around \$A20 000 and a week's work for a team of eleven, conservation works are a costly expense for any public authority. Fortunately, despite the recent influx of bolting and general climbing around the Lil-Lil shelters, no graffiti have been added to the LL-01 shelter since the cleaning project.

The removal of graffiti over painted rock surfaces requires extreme care to avoid further damage to the painting. In one instance, the removal of overpaints required two conservators for a week (Thorn 1991) and in all cases graffiti removal requires consideration of all losses, including cultural and archaeological values (Thorn 1993).

Damage through floor disturbance

The enticement to rock climbers and bushwalkers to use or camp in rockshelters with flat sandy floors was doubtless the same reason Aboriginal people in the past used them. However, the contemporary use of these rockshelters by climbers and bushwalkers (and also feral goats) can disturb evidence of previous Aboriginal use, and in the worst cases destroy an otherwise valuable archaeological record (cf. Frankel 1991; Jacobs and Gale 1994; Theunissen et al. 1998). This is most evident in the disturbing of the floor deposits and destruction of its stratigraphy; mixing contemporary charcoal from their fires with that of earlier Aboriginal campfires and making any radiocarbon dating of Aboriginal occupation difficult if not meaningless; the

moving (or removal) of surface artefacts; in addition to raising dust that settles over rock surfaces (Fig. 14) and which, over time, can become permanently bonded to the rock surfaces and forever obliterate any underlying rock art (cf. Morwood 1994; Watchman 1998). Such use of shelters, as was the use of the shelter by Aboriginal people in the past, can also accelerate the rate of erosion of poorly cemented rock surfaces, simply through the accidental brushing of the surface or other inadvertent impacts by numerous people (Sullivan and Hughes 1983; Hughes 1978). This gentle erosion is one of the mechanisms that contribute to the forming of the floor deposits.

Discussion

While Aboriginal sites are generally recorded as isolated dots across the countryside, this presents a distorted, museum-like view of Aboriginal culture. All Aboriginal sites are part of a broad cultured landscape, developed over thousands of years through maintenance, alteration and cultural associations (e.g. Coutts et al. 1978; Lourandos 1997; Bradley 2008; Gammage 2011; Delannoy et al. 2017). To understand a single site, its physical, metaphysical, and cultural setting has to be assessed (Spencer and Gillen 1899; Vinnicombe 1984; Witter 1984; Mowaljarlai and Malnic 1993; Gunn 1997; Ross 2001; McNiven and Brady 2012). Hence, while grilles and legislation may protect individual sites, the inappropriate use of the surrounding landscape, such as the cliff face between two sites, can be just as degrading to the sites themselves. For example, while avoiding the stained-glass windows, climbing on the cathedral walls that house the windows is unlikely to be tolerated as appropriate behaviour. One or two climbers might be prosecuted as larrikins, a steady stream of such thrill-seekers would likely cause national outrage. It is impossible to consider the rock art of Greater Gariwerd without appreciating the physical and spiritual context of the place: the cliff-line in which it occurs (cf. David and Thomas 2008; Haberle and David 2012). Whereas unobtrusive climbing may well be acceptable on faces of adjoining outcrops, even these must be seen and respected as part of the greater Aboriginal landscape of Greater Gariwerd.

In addition to the potential to damage rock art, other potential environmental impacts are of concern for Parks management. Bouldering has been responsible for damaging rock vegetation communities; such as fungi, mosses and lichens (micro-ecosystems) (Tessler and Clark 2016). This destruction has occurred as a result of the climbers intentionally cleaning the boulder for safer foot/handhold, or unintentionally from repeated use of these protruding holds. Vegetation on the ground surrounding the boulder is damaged from a place's overuse, particularly by climbers laying down crash-pads. Also, soil erosion can result from trampling vegetation while hiking to new outcrops, creating informal tracks, or as a result of land clearing (such as removing smaller rocks) to make a safer landing zone

in the event of a fall. Although at the smaller scale, these micro-lifeforms are an important biophysical component that contributes to biodiversity within the National Parks Reserves.

At the larger scale, natural pockets in the rock are often used as part of a climb. Peregrine falcons also use these pockets for roosting: in one of these a falcon was observed on our visit returning with prey and leaving soon after (feeding chicks?). The climbing bodies suggest temporary climbing restrictions on these cliffs during the nesting season, but this is a self-regulated policy (Cliffcare 2014).

While vegetation removal below cliffs and the construction of unauthorised paths have been observed in the Grampians National Park and at all other rock art sites in Greater Gariwerd, only a few studies appear to have attempted to quantify the specific effects of intensive rock climbing on the natural environment (e.g. Adams and Zaniewski 2012; Holzschuh 2016; Tessler and Clark 2016; Covy et al. 2019). There is, however, little in the way of comprehensive assessments of these impacts and there is now an urgent need for additional studies to clarify whether or not such impacts are deleterious to the conservation aims of the Park and how they might be best managed.

From a management perspective, site protection and respect does not necessarily preclude other activities, such as rock climbing, but it does require some sensitivity as to where, and to what level, these activities and their associated impacts are permitted to occur. Given the broader significant landscape in which the site or place occurs, management must now look at the spaces between 'dots on maps' when reviewing the suitability of particular activities or developments.

The regulations from the Grampians National Parks Management Plan have been in operation for over 15 years, including the exclusion of rock climbing from the Special Protected Areas (SPA) of the northern Victoria Range. However, as the significance of SPA's was poorly communicated by Parks Victoria, and policing never enforced, rock climbers and the broader public had little awareness of these restrictions or the reasons they were in place. Also, as bolting is regarded as an inappropriate activity within all Parks Victoria estates, these land management authorities must be fully aware of the restrictions under the *National Parks Act 1975* and the *Aboriginal Heritage Act 2006* and more proactive in the policing and publicising of their own recommendations. More broadly, it is also incumbent upon heritage bodies (such as Aboriginal Victoria in Victoria) to undertake a greater role in public education about the value of cultural heritage sites, their recognition and the likely location in which particular site types might be encountered.

Conclusion

While graffiti and floor-deposit damage in rock-shelters is a common problem for management, embracing the full range of visitors to (and feral animals

within) Greater Gariwerd, bolting and bouldering are problems unique to the rock climbing community. With the explosion of sport climbing and rock climber numbers in recent years, it is they who currently pose the greatest human threat to cultural heritage sites within the Grampians National Park and surrounding sandstone ranges, and potentially to other National and State Parks elsewhere in Australia. This development is likely to be echoed in rock climbing areas throughout the world.

While the use of bolts to enhance safety and speed on climbing routes remains a controversial issue within the rock climbing fraternity, regardless of these internal issues, any damage to an Aboriginal place is a criminal act in all states of Australia and, like all others, climbers caught acting illegally can be prosecuted under the relevant legislation.

From this study, it is clear that land management authorities need to educate the public and police their own recommendations under the requirements of their Act regarding climbing and the preservation of cultural heritage sites and to regularly monitor their cultural heritage sites for any increase in threatening developments.

It is also crucial that the rock climbing community instil in their members an awareness of the damage that rock climbing and bouldering do to cultural sites, as well as informing them of any restrictions or particular cultural or environmental values of places they wish to climb. All climbers should be educated about the relevant State/Federal Acts and their ramifications concerning rock climbing in proximity to cultural heritage sites.

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