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The Problem of Mountain Biking as Leisure and Sporting Activity in Protected Areas

David Newsome
School of Environmental Science
Murdoch University, Perth, Western Australia

Abstract

Mountain biking has grown rapidly as a leisure activity over the last 10 years and is undertaken in a range of outdoor settings and protected areas. Participants can be related to a spectrum of activity that needs to be understood for effective management. At one end of the spectrum lies the family group who are seeking to enjoy exercise in an outdoor setting where cycling speeds are likely to be low to moderate. At the other end are those that seek physically demanding rides and technical challenge as part of the riding experience. Interlinked with this group is a casual user group who are adrenaline junkies and thrill seekers who disregard park regulations, codes of conduct and environmental values. Environmental impacts include loosened track surfaces, soil displacement and liner rut development. Long narrow channels tend to form on trails where tyres depress the soil in wet and damp conditions. The most significant environmental impacts, however, are the development of user created trails and the construction of technical trail features. Such impacts are of major management concern when mountain bike activity takes the form of adventure racing and competitive events. All forms of mountain biking in protected areas need to be understood, monitored and proactively managed. Furthermore, because of the implications for managers and other more passive users competition racing should not be permitted in the vast majority of national parks and protected areas.

Keywords: Impacts, environmental impacts, leisure, social impacts, sport,

Introduction

Mountain biking is a relatively new leisure activity and sport and has shown a rapid recent growth with substantial interest in the activity being undertaken in a range of outdoor settings and particularly natural areas in many different countries (for example, Mason and Leberman, 2000; Amberger, 2006; Hales and Kiewa, 2007; Naber, 2008). In Australia bike sales increased by 29% in the period 2002-03, and 80% of all bikes being sold were mountain bikes with around 1 billion dollars being spent on cycling in Australia each year (Bradshaw 2006). Surveys in the USA reveal that since 1998 around 50 million people participated in mountain bike activity (Outdoor Industry Foundation 2006). Mountain biking continues to grow as a recreational activity and in recent years has become a competitive sport placing demands on resource managers to provide facilities and unrestricted access to favoured cycling destinations.
Since the advent of mountain biking as an important leisure activity a number of social and environmental problems have been recognised (Davies and Newsome, 2009; Newsome and Davies, 2009; Pickering et al. 2010 a, b). Ryan (2005) acknowledges that managers have responded slowly to the needs of mountain bikers in terms of providing access and facilities in natural and especially protected areas, such as national parks. This slow response is likely due to the perception, 10-15 years ago, that mountain biking was a low impact leisure and sport. As noted by Ryan (2005) managers were aware that mountain bikers where accessing land in protected areas but did not anticipate significant environmental problems and took no management action. For example, in the USA the increase in popularity of mountain biking has outpaced efforts to understand and therefore manage mountain biking in natural areas (White et al. 2006). There is now a common trend worldwide of unplanned growth and mountain bike activity in natural areas along with reactive management intervention such as the development of codes of conduct, assessment of trail damage, closure of tracks and community engagement.

The increase in mountain biking is also associated, and closely connected with, a rise in more active, adventure orientated leisure activity. Additionally, there has been a rapid rise in sporting activities and competitive events that involve substantial organisation, the presence of control points and spectator participation. Moreover, the rise in organised sporting activities often has a retail/commercial aspect that includes the promotion and sale of vehicles, clothing and equipment. Such sporting events are increasingly targeting natural areas as ‘exciting’ venues where the events may also include running, rock and mountain climbing, horse riding, kayaking, swimming and white water rafting. Because, as indicated above, this type of leisure activity poses the risk of negative environmental impact it is argued here that the mountain bike activity in natural areas needs to be understood, monitored and proactively managed. Moreover, because of their environmental implications, the approval of sporting events in natural and protected areas needs to be very carefully considered, require policy directives and rigourous environmental impact assessment.

Understanding the nature of mountain bike activity in natural areas

Mountain biking is complicated to understand due to the nature of the activity spectrum along which it operates. Biking activities are recognised to vary greatly in terms of skills, exercise, motivation and use of equipment (Goeft & Alder 2001; IMBA 2007). Mountain biking has also been recognised to fit into several different riding styles namely, cross country, touring, downhill, free riding and dirt jumping (IMBA 2007). Interchange between these categories is also observed as riders may participate in more than one type of riding (IMBA 2007; Davies and Newsome, 2009). For the purposes of this discussion mountain biking will be divided into categories that fit both ends and the centre of the activity spectrum.
At one end of the spectrum lies the family group who is interested in cycling in rural areas and outdoor settings. Such groups often comprise adults and children interested in utilising formed paths and approved trails. This mountain biking demographic varies from inexperienced general cyclists to avid riders (IMBA 2007; CALM 2007). The general cyclists and inexperienced riders tend to prefer riding on wide paths, roads or dedicated bike paths. Such groups because they dominantly use standard mountain bikes, that have little or no suspension tend to be limited to riding on formed roads and paths with no difficult ground to traverse (CALM 2007, IMBA 2007).

Part of this general cycling (family oriented) demographic can be more experienced and demanding of riding conditions and seek out more remote, longer trails for solitude, to desire additional exercise and/or more remote nature experiences (IMBA 2007). Such groups may wish to travel long distances and self may carry tools, food, water and first aid kits (IMBA 2007). Part of the experience for this end of the demographic (family group) may be the desire to ride trails that are only wide enough for a single rider or groups in a single line (CALM 2007, IMBA 2007). At this end of the spectrum cycling speeds are likely to be low to moderate but the nature of the group suggests that they are seeking to enjoy exercise in an outdoor setting, experience nature and some degree of solitude and do not require technical challenge to be part of the riding experience.

The central part of the mountain biking activity spectrum contains the touring and downhill riding categories of IMBA (2007). Touring involves more dedicated riding and frequently comprises longer trips including overnight stays. Because these cyclists are often carrying camping equipment in panniers they are generally not seeking highly technical, steep or narrow trails as panniers alter the balance and increase the weight and width of the bike, (Davies and Newsome, 2009). In contrast as the spectrum shifts away from the centre to more active mountain biking activity the downhill riding category can be recognised. Downhill riders tend to use heavy full suspension bikes for descending technically challenging trails (IMBA 2007). Mountain bikers interviewed in Western Australia identified the downhill style as the most popular riding activity and desired to ride on trails with features such as long curves, tight curves, steep slopes, jumps, rocks, logs and short uphill sections (Goeft & Alder 2001). Furthermore, the downhill riding style is also recognised as a competitive category in the Perth mountain bike club (PMBC 2007).

The spectrum of activity thus contains a demographic that rides faster and demands technically challenging rides. As the desire for more challenging cycling increases the spectrum of activity moves to mountain bikers who are interested in demanding and technically difficult cycling opportunities. The free riding and dirt jumping categories recognised by IMBA (2007) lie here. Free riders are interested in technical challenges in the form of obstacles (rocks, logs) and various constructed features such as elevated bridges, dirt jumps; drop offs and see saws in combination with steep descents (IMBA 2007). This is a higher risk situation occurring in unconventional or rough and unpredictable) terrain (Davies and Newsome, 2009). Dirt jumpers would lie at the opposite end of the spectrum to the family group in that they use a range of bikes that can tolerate a
range of jumping areas and styles (IMBA 2007).

In summary, therefore, at the opposite end of the spectrum from where the family group, who like to cycle on formed tracks, is the group that desires technical challenge. This end of the spectrum is in itself rather complex. Here there may be adventure sports riders. Intertwined with this group is a casual user group who is adrenaline junkies and thrill seekers. This group may operate without competitive sporting interests in mind or develop an interest in and graduate towards sporting interests. It is this end of the spectrum that poses the greatest challenge and problems for land managers. Where there are heavy bikes, steep slopes and aggressive riding styles there is likely to be environmental damage (Davies and Newsome, 2009). Furthermore where riders have a complete disregard for park regulations, codes of conduct and environmental values there is likely to be ongoing and significant environmental impact.

**Impacts and management of mountain biking in natural areas**

The environmental impacts of mountain biking and particularly in the Australian context have recently been explored by Davies and Newsome (2009), Newsome and Davies (2009), Pickering *et al.* (2010a, b). Impacts of mountain bike use in protected areas can be divided into social, on trail, off trail and institutional.

Social impacts involve the perceptions of other users such as hikers and those people seeking authentic natural experiences towards mountain biking. Other users may feel that mountain biking already causes unacceptable environmental impacts, be concerned that mountain biking is not an appropriate leisure activity in protected areas and that sharing trails with mountain bikers constitutes a safety hazard (Davies and Newsome, 2009). The latter point may become particularly significant when walk trails, not designated for mountain biking, are used by bikers.

Where mountain bikers use trail networks the actions of applying the breaks and sliding cause erosion by creating loosened track surfaces, displacing soil and linear rut development. Long narrow channels may form where tyres depress the soil in wet and damp conditions. The resulting compaction and linear rill network constitutes a significant erosion risk in sloping terrain (Newsome and Davies, 2009). Leung & Marion (1999), Goeft & Alder (2001), Chiu & Kriwoken (2003) all identify the actions of cornering, skidding or breaking on slopes or wet ground as contributing to trail degradation.

The most significant environmental impact, however, brought about by mountain bikers is the creation of their own (illegally developed) trails to foster their own riding interests. Mountain bikers who occupy the ‘adrenaline junkie’ end of the activity spectrum create their own cycle pathways in order to locate and develop more challenging rides, as a short cut, to reach specific destinations or to connect existing tracks (IMBA 2007; Newsome and Davies, 2009). Significant damage to natural areas can occur when mountain bikers go deliberately off track. User created trail development increases the area of land, fauna and flora subject to disturbance through the adding of
linear cleared track ways or widening existing trails (Cessford, 2003; Davies and Newsome, 2009). Informal trails can be created very quickly with a substantial amount of vegetation loss and soil damage occurring in the first year of their development (IMBA 2007). For example, it was found that in one small area of John Forrest National Park in Western Australia mountain bikers had created an informal trail 2.34 km in length with 199 m of bypass trail creating an informal trail network of 2.54 km. Using an approximate trail width of 1m it was shown that 2540 m² of forest area has been cleared to create this informal trail network (Newsome and Davies, 2009). Given that John Forrest National Park is regularly used by mountain bikers and that other areas in the park have been impacted (for example, at another site in the park 18 mountain biker created trails have been counted on an 800m segment of walk trail) the total area impacted for this peri-urban protected area is likely to be unacceptably large.

In addition to this there is the problem of the creation of technical trail features (TTF’s) either on existing trail networks or illegally constructed access routes. TTF’s are trail elements that enhance the character and difficulty in riding a trail (Davies and Newsome, 2009). TTF’s come in the form of (1) natural features such as rocky terrain and fallen trees, (2) modified trail substrates, such as created banks, holes and piles of rocks or (3) as artificially constructed features such as ladders, drop offs, narrow items that can be traversed and see saws. In relation to the mountain biker created trail network in John Forrest National Park described earlier, 18 TTF’s were identified and riders had created 1 TTF every 140 m or 7 TTF’s every kilometre of mountain biker created trail (Newsome and Davies, 2009). Recent work by Pickering et al. (2010 b) found 116 TTF’s creating an area of 1601 m² of bare soil in a 29ha patch of remnant eucalypt forest in Queensland, Australia.

The fourth impact is the cost of management response to mountain biking in protected areas. The complexity of the demographic makes it a difficult leisure activity to manage in terms of controlling damage, satisfying the different participants according to the spectrum and repairing damage that has already taken place. This is why approved mountain biking activity is an important consideration. The management of mountain biking in protected area context is considered in more detail by Davies and Newsome (2009); Newsome and Davies (2009) and Pickering et al. (2010 b).

**The significance of mountain biking as a leisure activity for managers**

Davies and Newsome (2009) point out that different user groups need to be educated to understand each others’ needs in order to remove social conflict. Clearly, managers need to understand what various users want while users, and especially mountain bikers need to appreciate that the core function of protected areas is conservation of flora, fauna and landscape and the promotion of natural values and experiences.

Education of mountain bikers is critical and can take the form of signage, promotion of user etiquette such as low impact usage and respect for park rules as well as law enforcement activities (Moore 1994; Carothers et al. 2001). Understanding mountain bike rider preferences and providing
a range of suitable trails can prevent riders creating their own trails (Geof & Alder 2001; CALM 2007). Educating riders about the environmental and social impacts of illegally created trails might reduce the number of such trails formed by bikers. In terms of trail usage ‘expert’ high-speed riders can be directed onto dedicated single use (mountain bike specific) tracks within suitable park planning, zoning and infrastructure settings. Engagement with mountain bike clubs and associations and members of the mountain biking community will provide managers with knowledge of what the adventure oriented mountain bikers seek from a riding experience at a specific location (Bicycle SA 2001, IMBA 2007).

Environmental damage of existing trail networks can be minimised through appropriate trail location, design and management (see Goeft & Alder 2001; Lathrop 2003; Marion & Leung 2004, CALM 2007). Trail construction techniques such as tread hardening and geosynthetic materials can be utilised where trail segments are susceptible to erosion (Meyer 2002, Marion & Leung 2004). The problem with this approach, however, is that many mountain bikers prefer trail features such as bare rocks, roots and uneven surfaces as these add to their experience. Providing jumps, steep sections and obstacles within the design of the trail may help to reduce the chance of users creating them informally (Goeft & Alder (2001). However, such approaches modify the natural features and trafficability of a trail and can pose difficulties and prove to be unacceptable if also used by hikers or horse riders. Where mountain bikers desire technically difficult and challenging trails and this is not deemed acceptable in a protected area setting then lower conservation value specific areas, such as a skills park concept, could be allocated for mountain bike activity. Purpose built networks can be constructed, where TTF’s can also be incorporated into a downhill course, in order to satisfy the demand for technically difficult trails (see Pickering et al. 2010 b for details).

**Challenges for the future: a complex demographic and the rise of competitive racing events**

As Davies and Newsome (2009) observe many riders are ‘free agents’ as they do not join clubs but instead organise their biking activity and mountain bike social connections more informally via the internet or mobile phone text messaging. In this way websites can be utilised for organising rides and gaining information. Park managers in Western Australia have noticed that because of the speed of electronic communication and their informal structure it is difficult for managers to address the problem of organised informal trail use and the encouragement of TTF construction (Annear pers. comm. 2007). Another dimension is the non-organised casual user; mountain bikers who are not particularly interested in long distance cycling or affiliation with a club, but who undertake mountain biking as a thrill seeking experience. Such people may use existing mountain biker created trails or create their own trails and install TTF’s in a non-organised and haphazard way.

Many natural and protected areas are increasingly being targeted as areas for adventure racing and sporting events. This is of increasing concern to managers and conservationists who see
this trend as inappropriate use of a protected area. Although many events that take place at present, which are actively promoted by tourism agencies, do not request access to or are not allowed to take place in many conservation estates, protected areas around the world are increasingly the focus of the rising interest and participation in mountain biking races. Mountain bike adventure racing also poses an additional problem in that such events can gain support through their promotion as sporting activities, healthy lifestyles and as local community income generators.

Organised competitive events can result in environmental impacts as described earlier. These include damage to trails, soil erosion, trampling of vegetation, disturbance of wildlife and noise and crowding at control points, finish lines, spectator viewing areas and car parks. As with the situations already described with mountain biking as a leisure activity the severity and frequency of environmental impacts caused by organised events will be dependent on capacity of the management agency to maintain infrastructure, control impacts, and adequately audit any sporting events. This is in turn is reliant on adequate staffing levels, staff expertise in understanding the nature of the activity and suitable funding to carry out required operations and visitor management.

In many locations around the world competitive events that target a protected area will require approval to operate according to protected area management plans and planning frameworks. In the case of Australia event organisers will submit an event plan or, if deemed necessary, an environmental management plan. Such a plan is designed to mitigate negative social and environmental impacts arising from participation in the event and the activities of support crews and spectators.

Sporting events can involve 200-300 (sometimes 1,000) participants, spectators, support vehicles and their own modes of transport. Adventure racing may be a 12 hour or 3-10 day event and involve on behalf of the participants physical strain, exhaustion, sometimes sleep deprivation and a competitive attitude. The last characteristic in particular is not conducive to the preservation or appreciation of natural values as the focus is on competition and winning and not caring for or learning about the environment. In relation to the formulation of policy and in regard to management choices decision makers have to be very careful in approving such activities and allowing a demographic to clearly view the natural setting/protected area as an adventure playground and as a place to compete. This issue is especially important given the impacts identified earlier.

Given that the impacts of mountain biking have increased dramatically in recent years it is vital that an appropriate message is sent to the community as to how a protected is to be viewed and used by the public and including mountain bikers. It is important therefore that the concept of protected environments, sustainable tourism and passive recreational activities are fostered in the public eye. Governments and managers have a responsibility in protecting highly valued natural areas and in the promotion of appropriate recreational activities. A significant argument being
presented here, therefore, is a call for managers to be proactive in the marketing and promotion of passive and appropriate recreational use, via interpretation and events policies, so that they are in a better position when having to respond to commercially driven and government supported (tourism organisations) interests in protected areas. If protected areas become adventure playgrounds and settings for extreme sporting events what message will be conveyed to the general public? Will the message be that it is acceptable to use protected areas as the backdrop for mountain biking events, adventure races and combined mountain biking, abseiling and running activities. Such activities are not conducive to contemplative appreciation of nature, learning about nature and which have the potential to negatively impact on a protected areas natural values thus compromising visitor perception of natural experiences.

If such activities are to be allowed or tolerated in some protected area a manager may wish to designate unimportant sacrificial areas where regular events are allowed to take place. But caution needs to be exercised here as if such a concept gains approval can managers be sure that the impacts of mountain biking will be reduced and contained elsewhere? The overall message that might be perceived by the public may be that it is acceptable to use protected areas in this way. Events taking place in designated protected areas need to be subject to environmental impact assessment. The assessment should explore the capacity of management to control impacts. If such an event is perceived as significant money earner will this influence decision-making? If controls are perceived as being too expensive and restrictive will these force event organisers to target locations elsewhere in the world that may have less rigorous environmental approvals programs?

Conclusion

Mountain biking has undergone rapid growth in recent times and comprises a complex demographic that needs to be understood in terms of its impact as a leisure and sporting activity. Extensive and regular activity is occurring in a range of natural environments which are proving to be a significant management problem. Environmental impacts include social impacts, liner rut development, soil erosion, the modification of existing trails, the proliferation of mountain bike user created trails and the construction of a range of technical trail features on trails that bikers use. Management of mountain bike activity in protected areas is going to be difficult due to the complexity of the user spectrum with slow riding family groups occupying one end and the thrill seeking, fast riding, technically difficult seeking group at the other. It is possible that the complex demands of the mountain biking spectrum will never be satisfied because the thrill seeking end of the spectrum are always searching for new areas and new, demanding riding experiences. A great deal of work remains to be done in educating and working with mountain bikers. Additional attention will have to focus on the provision of facilities such as dedicated mountain biking trails and mountain bike skills parks in the future.
The increasing trend for sporting activity and organized events to target protected areas should be viewed by managers with much caution. Pressure to host adventure races and cycling events may be fostered under the guise of health promotion and outdoor appreciation. It is important to realize that such events occurring in protected areas will often involve the intensive use of certain areas and trail networks and increase the risk of trampling, trail damage and social impacts. In order to deliver an appropriate message to the wider public and mountain bikers themselves it is therefore important that careful evaluation of the long-term consequences of mountain biking and other events is undertaken. Overall such events should not be permitted in the vast majority of national parks and protected areas.

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