Appendix 1: What is Mountain Biking?

1. Mountain bike riding is the riding of a bike off-roads and often over rugged narrow trails. Mountain bike riding started in the early 1980's in Marin, California, where cyclists rode on forest walking trails. Desirable trails for mountain bikers to ride on are narrow trails, in a variety of bushland settings and over a variety of terrains. Experienced mountain bike riders often desire trails that require experience and skill to successfully navigate.

2. Mountain bikes are specially designed to be ridden off-road. The most notable difference compared to conventional road bikes is that mountain bikes have wider tyres, often have front and rear suspension, and have straight handle bars.

3. The two most common forms of mountain bike riding are cross country and downhill. The Olympic and Commonwealth Games sport of Cross country riding is where a cyclist will ride up and down hills, along contour lines, on fire/management roads and on narrow trails (similar to walking trails). Cross country riding is endurance orientated and events last from thirty minutes to two hours. Downhill riding (similar in nature to downhill skiing) is where a cyclist will ride their bike from the top of a hill to the bottom, generally going down a steep slope and it is usually desirable to have natural obstacles that require skill to ride over. A commercial operator at Thredbo, NSW, offers downhill riding down the Cannonball Run.

4. There is a wide community cross section that enjoy mountain biking. MTBA is the national mountain bike body for competition events. Registered members of MTBA range from 10 to over 60 years of age. Most members are between 15 and 49 years of age and the average age is 30.2 years old, 12% of members are female. The Australian Sports Commission report [4] shows that people who cycle tend to do so frequently - weekly or more often.

Appendix 2: Background Information on Cycling in Natural Areas

AP1.1 Benefits to the Community

5. There are numerous benefits to the community that a healthy open trail network provides [18]. These benefits include: economic, health and fitness, social, educational, recreational, environmental and the preservation of our history.

6. The provision of good mountain bike facilities is another initiative that will help keep community health and fitness high for people at all stages of life [17]. Cycling will also encourage our youth to be physically active and outdoors. The peak age for off-road cyclists is early thirties and professionally (usually through university) trained, a segment of the population which is traditionally giving up other forms of sport [4], so cycling is keeping this segment physically active.

7. Mountain bike riding is enjoyed by a wide community cross section (all age groups and both genders). Cycling provides excellent cardiovascular fitness benefits and riding within a natural setting will help improve mental health [17]. If good, safe and enjoyable, off-road riding opportunities are available it will encourage more people to undertake mountain biking, which in turn will proved a healthy lifestyle and encourage the appreciated and support for bushland.

8. Mountain bike riding is a fast growing sport (the national mountain bike body, MTBA, has doubled its membership base in two years to over 3000) and given current trends even more significant numbers of mountain bike riders will be using forest locations. Permitting mountain bike riding in forests locations will allow more people to enjoy the forest environment. However, it is also important to develop effective management of bicycles in our parks.

9. As the demographic that undertakes off-road cycling is wide and varied the provision of mountain bike riding opportunities can also bolster the parks volunteer base which maintains the park and keep trails in good condition through regular maintenance.

10. The Australian Sports Commission in 2003 conducted a survey [4] to determine physical activity undertaken by Australians. This report stated that in the SA 9.7% of our population or 117,000 people participated in cycling related activities in 2003. Specific figures about mountain bike riding are not available, however, it is reasonable to assume that a reasonable proportion of this figure relates to off-road riding. As examples, according to the report in SA cycling is more popular that bush walking (5.3%), golf (7.2%), running (7.4%), netball (6%) and tennis (9.5%). A significant number of people that enjoy cycling do in a non-organized manner compared to participating in organized events (roughly, 12:1 comparison). Also, compared to many other activities cycling is enjoyed regularly, on average weekly or more often.

11. From a whole-of-government perspective, the economic benefit of mountain biking can be significant. There is an economic benefit from the sale of mountain bikes, however, there are also significant benefits to the community through tourism. The economic benefit (through travel and accommodation expenditure) of mountain bike tourism to Wales is estimated to be $25m per year [20]. Here in Australia, the 2003 Mont Australian 24 Hour Mountain Bike Championships in the ACT is estimated to contribute $1.6m to the local economy excluding the ongoing economic benefit from casual visits to the ACT [12]. The SA town of Melrose is fast becoming a holiday destination for mountain bike riders. This town, whose tourist opportunities were limited, can capitalize on the growing number of off-road cyclists [19].

In 2005 a Fat Tyre Festival was held on the Easter weekend, and a round of the State Cross-Country Championships was held in Melrose in October. Both events attracted significant numbers of participants staying for multiple nights.

12. A desirable mountain bike experience differs depending on the person. There are a wide variety of people who cycle off-road, seeking a wide variety of experiences. In the same way that walkers all seek differing experiences. Some cyclists are simply seeking fitness benefits. Some cyclists may wish to ride to moderate distances through established bushland to appreciate and experience nature along with the fitness benefits. Extending this riding on narrow trail offers the feeling of being closer to nature. Other cyclists might desire trails that require a level of skill to ride over, these trails, consisting of technical trail features, could be wide or narrow but generally the more experienced cyclists seeks narrow trails. Downhill riders are generally seeking trails with more significant technical features. A typical cross-country ride could last anywhere between one and three hours and would cover from 10 to 40km of trails.

AP1.2 Managing User Interactions – Trail Sharing Issues

13. Often reasons to prevent mountain bike access on shared trails in natural areas is the perceived conflicts between walkers and cyclists. A shared trail can:

    - provide a desirable experience for all users;
    - encourage the sharing of a community resource;
    - be safe, and;
    - is an efficient use of natural bushland.

14. By sensible trail design and management, multi-use trails can provide an enjoyable trail experience for all users [10]. Even if cyclists and other users had separate but equal trail distance they would often use each other's trails. Many trail users would want to see what other users were enjoying [7]. Trail users like to explore. Also, twenty kilometres of multi-use trail is worth significantly more than two separate ten kilometre sections. A shared trail helps build a trail community and allows trail users to establish mutual respect and courtesy.

15. Serious conflict issues tend to be more of a perception rather than in reality. In a report by Cessford [8], the survey results suggest that most people (87% of walkers on the Queen Charlotte Track NZ) found bikes caused trail users no dissatisfaction. Bikes were reported as having no actual or anticipated effect on enjoyment by 69% of walkers and having a positive enhancing effect by a further 10%.

16. Statistics, supplied in Cessford, indicate that very few bike-walker collisions occur. More likely are accidents involving other bikes or only a single bike. A survey of almost 1500 walkers noted that most did not consider bikes a safety hazard, and in fact characterized riders as being polite. From this survey only 15 bike encounters were cited by walkers as potentially hazardous and no accident involving a walker was reported.

17. Reports suggest that increased familiarity with biking and accumulated experience of encounters with bikes may change the hazard perception of walkers. The survey of users on the Queen Charlotte Track [8] indicated that negative opinions about bicycles were higher in the group that did not encounter a bike.

18. In a separate report, Cessford [23], concludes that while potential hazards do exist from irresponsible riding (which could be mitigated by trail design or alterations), cases of actual accidents or injuries are not common. From a sample of 40 resource managers that only one case was known which had resulted in injury. Most mountain bike riders considered the safety hazard to others from bikes was over-estim-

ated, and that the actions of a few irresponsible riders caused most problems. It appears that in most cases, the "safety" concerns relate more to an anticipation of potential threat than any actual experiences of hazardous riding.

19. Trail encounters with other users will occur. Procedures and policies can be used to minimize the occurrence of negative conflicts, these include [9]:

    - providing adequate trail opportunities;
    - minimising the number of contacts in problem areas (especially around trailheads);
    - involving and working with all user groups as early as possible;
    - understanding user needs;
    - identifying the actual sources of conflict;
    - promoting trail etiquette – behaviour of all trail users is appropriate;
    - encouraging positive interaction among different users;
    - favouring light-handed management;
    - planing and acting locally;
    - monitoring progress;
    - indicating that bikes may be encountered.

20. It's difficult to compare the current unauthorised users of a park with the potential user group once off-road cycling is authorised. When off-road cycling is unauthorised, cyclists will often try to avoid confrontation with other trail users (so they wont necessarily yield to other users), in fact, there is likely to be more conflict between trail users, bicycles may travel on trails that are inappropriate, there isn't a code-of-conduct to follow, and it is difficult to manage the renegade cyclists. Once authorised, the demographic of off-road cyclists will become more “mainstream”.

21. Authorised share use trails will

    - foster a community trail spirit;
    - will assist with park volunteer days;
    - attract a wider demographic of users (from young kids to family groups);
    - sustainable trails can be designed or existing trails can be modified to be sustainable;
    - a code of conduct and trail user education will help all users understand and appreciate each other;
    - trail user education can also educate all trail users about the park, its sensitive environment and its community value;
    - and by having a wider demographic then peer-policing will help normalise all trail users to behave in an acceptable way and up holding the code of conduct.

AP1.3 Environmental Impact and Erosion

22. AMTBC endorses the protection, in term of physical and cultural heritage, of our bushland. The long term future of these areas is not only important from a viewpoint of the preservation of wild flora and fauna, but also as important recreational opportunity areas. Recreating within bushland encourages the appreciation and support for bushland. A survey conduction by Wellington Park Management Trust, Tasmania, found 72% of mountain bikers visited the park to appreciate the nature and scenery - the highest reason for mountain biking at Wellington Park [5]. The vast majority of mountain bike riders appreciate and value the natural environment. Mountain bike riders also want to see environmental protection, they want to continue to ride in wild places.

23. In the community, there is often the incorrectly held perception that mountain bikes unduly impact the environment by causing significant erosion and creating arbitrary trails. Like walkers, mountain bikes will have a localised impact (around the trail only). Studies have shown that mountain bikes have comparable impact on narrow trails as walkers and significantly less impact than motorised users and horses [13,14,23,24]. Greater trail wear may be because of higher usage by a particular trail user group.

24. In some situations, walkers may have greater impact than cyclists. Walkers are more likely to widen trails because they may walk two abreast, and, walkers are more likely to digress off established trails.On a narrow trail cyclists simply cannot travel more than single-file and by digressing off a trail significant damage could be caused to the bicycle.

25. Trail erosion is just as likely to occur on walking trails as on mountain bike trails [24]. Trail design and maintenance are imperative in preventing erosion [1,25,26]. In short, trails need to be designed for water to run across the trail rather than down the trail.

26. Mountain bike riding can contribute to conservation solution [6]. Mountain bikes will, if given the opportunity, disperse over a wide area. This dispersion will move users from one highly used common and short visitor track. Significant environmental impact occurs, for all users groups, on lightly used (or newly created) trails. Therefore, it is suggested that it is best to have an established network of moderately used trails, than a few heavily used trails and a number of lightly used trails.

27. In addition by attracting a user group that wouldn't normally utilize the park, may lead to wider community appreciation of the park.

28. Beyond the environment of the immediate bushland. Many mountain bikers ride to the trail-head. Hence, minimising the use of an vehicle. Secondly, by encouraging mountain biking, people are more likely to rider to work or school, further lowering pollution emissions.

AP1.4 Trail Construction

29. In general, AMTBC advocates the development of multi-use shared trails. Multi-use trails are suitable for many uses, including walking, running and cycling. Shared-use trails have the following advantages for user groups and land managers alike:

- shared-use trails can best accommodate the needs of the most users;
- sharing trails help build a trail community by increasing the need for all users to cooperate to preserve and protect a common resource;
- shared trails are most cost effective for land managers;
- shared trails enable responsible, experienced users to educate "outlaws" and novices; and,
- single-user trails increase demands for the construction of additional trails to serve other single user groups.

30. Multi-use trails will need to traverse a variety of terrains and gradients. Some mountain bike trails, although still available for use by walkers and runners and other user groups, may tend to be over more rugged terrain providing trails that require more technical skill to navigate or with obstacles that are not easily walked over.

31. The International Mountain Bike Association (IMBA) is considered to promote *worlds-best-practice* for trail design [1]. IMBA shows that using a methodological trail design and building following key principles then environmentally sustainable trails that accommodate a number of different user groups are possible.

32. A standard loop design of interconnected multi-use trails is proposed as the most efficient way to design trails. This network of trails can cater for all experience levels by ensuring trails travel over varying terrain. This network also provides a variety of routes which will maintain user interest for longer. A stacked loop network may also have a number of access points (trail heads) which will allow the load to be spread over the entire network.

33. Considering the specific trail construction, a full bench trail, which is cut into a slope is the preferred trail construction method. A full bench cut will minimize trail widening, softening and erosion as it is cut into compacted soil. Gradient reversals of the trail will prevent water pooling and running down the trail causing erosion. The optimal trail width is between 25 and 40cm and the corridor will be an average width of one metre. It is important that a trail is formed across the face of a hill. A fall line trail will funnel water and cause significant trail erosion. Also, the maximum sustained gradient of a trail needs to be limited depending on the specific terrain and geology. As a rule of thumb, the average gradient of a sustainable trail should be kept below 10%.

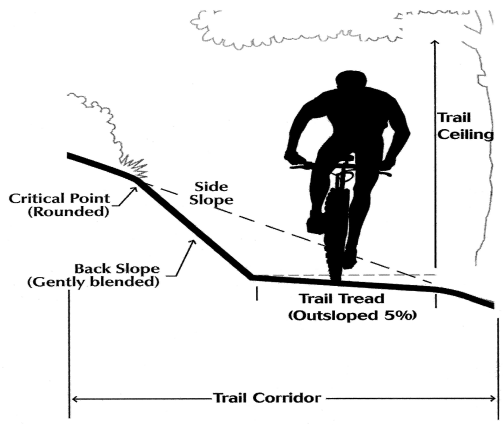

Figure 4: Full bench trail design.

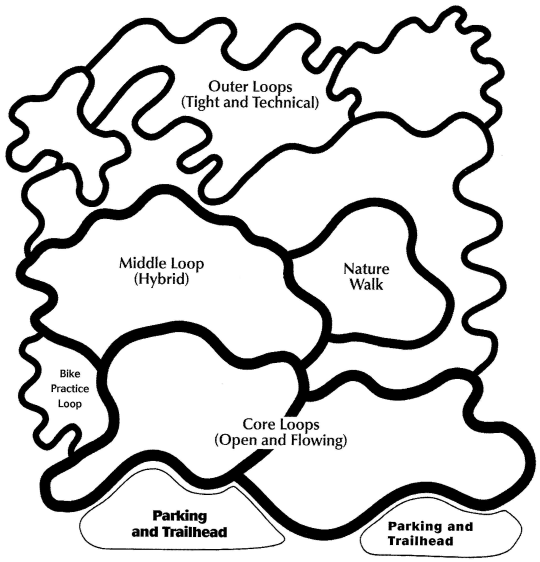

Figure 5: Stacked loop approach for trail design, consisting trails of varying difficulty.

34. Trail armouring may be used to protect sensitive spots. Sensitive spots may be dry creek beds, landing spots from a jump or erosion protection for steep hills. Trail armouring consists of using existing rock formations and the placement of rock within the trail bed. Alternatively, wooden or metal structures can be used to protect sensitive spots, either through a boardwalk or a bridge to span a river crossing.

35. Trail design can also act as an effective speed control mechanism. By utilizing natural obstacles, such as rock formations, and including speed reducing corners trails may be designed or modified to limit the speed difference between trail users without detracting from the bushland experience.

Appendix 3: Mountain Bike Australia's (MTBA) Policy on Mountain Bike Access to Natural Areas

This policy gives MTBA's position on environmental and land access issues with regard to off-road cycling in natural spaces, with particular reference to protected areas such as reserves, state forests, national parks, urban forests and wilderness areas.
MTBA endorses the protection, in terms of physical and cultural heritage, of our bushland. The long term future of these areas is not only important from a viewpoint of the preservation of wild flora and fauna, but also as important recreational opportunity areas. Recreating within bushland encourages the appreciation and support for bushland.

Mountain bike riders enjoy riding through natural areas[1]. Cycling through forest locations is part of the attraction of off-road cycling, being close to and experiencing nature. Mountain bike riders also want to see environmental protection; they want to continue to ride in wild places.

In all protected areas, except designated conservation areas, land managers have a charter for both conservation and sustainable recreation. Conservation and protection are balanced with the need for outdoor recreation by applying the principle of acceptable impact on the environment.

MTBA promotes mountain biking as a legitimate recreational and sporting activity which encourages a healthy lifestyle. Cycling provides another choice for the way in which people exercise. MTBA accepts that all users of natural areas will have an impact of some degree and that it is the task of both users and land managers to minimise environmental impact and ensure sustainability. Documented trail design and trail maintenance methodologies can adhere to sustainability principles which will protect the environment.

MTBA's policy can be summarised as follows:

- Mountain bike riding is a legitimate non-motorised recreational land uses and as such, should have equitable access opportunities compared with other users. Environmental impact and user interactions can be managed..
- Trails should be used, managed and developed in a sustainable manner so as to minimise impact on limited natural resources.
- New trail developments should be designed as multi-use and built with all legitimate users in mind.

Access

Cycling in Natural areas is aligned and compatible with the generally accepted concept of 'self-reliant recreation'. It is thus significantly akin to other 'self-reliant' recreational pursuits such as camping, walking, hiking, backpacking, canoeing, mountaineering, orienteering and rogaining. Although a vehicle (bicycle) is used, mountain bike riding has far more in common with, and has similar environment impacts as the aforementioned recreational activities than it has with motorised activities such as off-road motor bike riding and 4W driving. Mountain bike riding should be afforded equitable access opportunities to natural areas. Studies have demonstrated that on correctly designed narrow trails, mountain bike riding has a comparable impact as hiking[2]. The placement of a trail is more critical in controlling erosion than the type of low impact trail users. Mountain bike riders tend to remain on formed trails, as such, environmental impact is confined to the localized area of the trails and less vegetation and wildlife tends to be disturbed when compared to hikers[2].

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[1] A survey conducted by Wellington Park Management Trust (Tas.) found 72% of mountain bike riders visited the park to appreciate the nature and scenery - the highest reason for mountain bike riding at Wellington Park, *Wellington Park Bike Strategy,* Wellington Park Management Trust, September 2000. http://www.wellingtonpark.tas.gov.au

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Due to a variety of mountain biking styles, age range of riders and rider preferences, a wide range of riding opportunities should be provided for off-road cyclists. The variety of trails should range from single track (narrow trails less than 2m corridor width) to graded dirt roads. Single track through natural bushland is a desirable trail type [3,4], hence the development of these trails are important. Properly developed single track has the additional advantaged of minimal impact on the environment

MTBA advocates that the following trails should be open to mountain bikers:

- all public roads within protected areas;
- access roads such as management tracks, fire trails and 4WD roads in protected areas;
- all roads within wilderness areas which cannot be completely rehabilitated; and,
- single tracks should be open to mountain bikers where these trails are of suitable design and construction to enable sustained use by mountain bike riders;

Generally, shared trails are preferable to single-use trails. Shared trails build a community of trail users and shared trails reduce the need to build new trails for each different user group. However, at times, different single use trails may need to be developed to cater for different styles of mountain bike riding. Not all styles of riding will necessarily be suitable for all areas.

Trail User Interactions

Everyone should have the opportunity to enjoy green, open space. Mountain bike riders, walkers, hikers and backpackers seek the similar experiences of the natural environment and it is possible for them to share trails. Harmonious interactions between trail users are possible through the use of sensible trail design, education and familiarity of user groups. Familiarity and education strategies are required to allow all trail users to feel safe and comfortable with each others and will allow rouge *rebels* to be corrected.

In many cases user conflict has been a convenient excuse to exclude mountain bike riders. However, it is widely reported that trail user conflict is rare[5,6,7], and in many cases, trail user interaction is a positive experience. Potential for trail user conflict can be minimised by a combination of user education and trail design. It should be noted that many trails in North America and Europe are multi-use, have greater numbers of users but have virtually no user conflict issues.

Trail Building Principles

MTBA subscribes to the trail building principles advocated by the International Mountain Bike Association (IMBA). These principles have been used to build enormously successful trail networks throughout the world. The guiding principle is that trails be sustainable, i.e. the trail[8]:

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3 "Mountain Biker Rider Preferences and Perceptions in the South-West of Western Australia.", U. Goeft, and J. Adler. CALM Science Vol. 3, No. 2, 2000.

4 "Off-Road mountain biking: A profile of participants and their recreation setting and experience preferences", Gordon R. Cessford, Science & Research Series No. 93, Department of Conservation, Wellington, New Zealand. 1995.

5 "A report to the Government on recreational trails", Ministerial Taskforce On Trails Network, Second Edition, October 1995.

6 "Perception and Reality of Conflict: Walkers and Mountain Bikes on the Queen Charlotte Track in New Zealand." Gordon R. Cessford, Journal of Nature Conservation, 2003.

7 "Off-Road Impacts of Mountain Bikes – A review and discussion", Gordon R. Cessford, Department of Conservation, Wellington, New Zealand, August 1995.

8 "Building Better Trails", International Mountain Bike Association, 2001.

- supports current and future use with minimal impact to the area's natural systems;
- produces negligible soil loss or movement while allowing vegetation to inhabit the area;
- recognizes that pruning or removal of certain plants may be necessary for proper maintenance;
- should not adversely affect the area's animal life;
- accommodates existing uses and will allow appropriate future use; and,
- requires little re-routing and minimal long-term maintenance.

In order to minimise environmental impact and resource use, trails should, wherever possible and appropriate, be multi-use. Correctly designed trails, used by educated users, are no more susceptible to erosion due to use by cyclists or walkers and negative trail-user interaction between walkers and cyclists is extremely rare.

Biodiversity

Due to the limited knowledge about the impact of trails on wildlife, management decisions about access should be applied equitably to all trail users.

MTBA promotes progressive conservation management policies. By permitting greater suitable patronage to natural areas, the community will perceive greater ownership and, as a consequence, value the region more highly. Conservation and protection of a region is an outcome due to this community ownership. By encouraging greater managed usage, natural areas will be preserved for our future generations. One way, which has been demonstrated in many regions throughout the world, of encouraging users to an area is by providing a desirable location for mountain bike riding.

Where there are particularly sensitive environmental areas, or areas that are affected by soil-borne diseases which must be contained, all recreational access to these areas should be prohibited.

Code of Conduct

MTBA promotes the responsible use of our natural resources in order to minimize environmental impact and ensure compatibility with other user groups. MTBA encourages all mountain bike riders to adopt the internationally recognised International Mountain Bike Association's (IMBA) “Rules of the Trail”.

This code is based on mutual respect for other visitors, respect for the environment and supports minimising impact on trails.

- Ride on open trails only. It is your responsibility to find out where you can ride. Respect land managers’ decisions about closures.
- Leave no trace: Keep to the trail. Don't cut corners. Don't skid. Don't litter.
- Control your bicycle: Obey speed limits. Be aware of other trail users. Ride within your ability.
- Be courteous: Warn others of your approach. Give way to other trail users.
- Don't startle animals: Give animals extra room and time to adjust to your presence.
- Plan ahead; be prepared; know your equipment, your ability and the area where you are riding. Wear appropriate clothing and a helmet.

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