

The logo for 'Trails' is displayed in a stylized font. The letter 't' is white and the remaining letters 'rails' are black. The logo is set against a yellow background that is part of a larger graphic design on the left side of the cover.

Trails

**THE ATHERTON
TABLELANDS**

**MOUNTAIN BIKE
DESTINATION**

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THE ATHERTON TABLELANDS MOUNTAIN BIKE DESTINATION

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THE ATHERTON TABLELANDS MOUNTAIN BIKE DESTINATION

1. BACKGROUND AND CONTEXT

A community based organisation has, over recent years, been seeking to develop the Atherton Tablelands as a major recreational mountain biking destination. The Tablelands Integrated Mountain Bike Alliance (TIMBA) which is a sub committee of The Tablelands Futures Corporation has taken a number of key steps to formally investigate the potential of the area, build partnerships and engage specialists in developing outline plans for trails. I have been asked to provide my perspective on what the community group has done so far in pursuing their goal and, if appropriate, provide some outline guidance on taking the idea forward.

I visited the Atherton Tablelands at the invitation of the group during the period between 3rd and 7th of September 2011 in order to assess the steps taken so far in developing the area as a mountain biking destination and to take a broad look at the potential that the area might have. I had previously seen and read a report and concept plan prepared by Glenn Jacobs of World Trail, which outlined the potential that the area has for the development of a recreational trail system and which also outlined a potential trail concept.

At this stage it is important to put any observations or comments I might have as a result of my visit into context and to provide some information relating to the kinds of ideas and concepts that inform my work. To this end I have outlined below information related to strategic trail development and provision related to the following:

- Trail users and types related to off road cycling
- Off road cycling markets
- Mountain bike tourism
- Sustainability frameworks
- Trail planning and design methodologies

1.1 TRAIL SYSTEMS AND PRODUCTS

Trails used by off road cyclists come in a variety of types and configurations and there are a number of trail models that also apply to these users. In the context of the Atherton Tablelands and the ideas for trail development related to the area, it is very important to understand how differing trail systems and models work. It is also very important to understand some of the key management, provision and planning issues associated with them.

Broadly, trail systems can be divided into the following groups:

- Social trail networks
- Prescribed route systems

1.1.1 Social Trail Networks

Social trail networks are permeable trail systems that may be accessed in any number of ways from a variety of locations with little or no formal signage or direction given on the ground. Social trail networks may be used in any combination of ways in different directions and by a variety of users and are mostly based around both existing and old land management infrastructures and networks and also around transportation infrastructures.

Most social trail networks are informal in nature and have little status in law and access to them can be informal, unsanctioned by the landowner and not guaranteed. In Australia, off road cyclists have access to very extensive social trail networks in the form of fire roads, logging tracks, gravel roads and other paths on public lands. In addition there are numerous examples of purpose built trails that fit with the social trail network model, some permissive routes and agricultural tracks elsewhere and some historically established routes.

All social trail networks can be characterised as allowing low key informal access for a variety of recreational uses and have a number of key positive features:

- Landowners or trail providers generally have a low level of duty of care to trail users
- They require minimal management (if their status allows)
- They allow widespread informal recreational access
- They are flexible and can be used in a wide variety of ways by a wide variety of users
- They can be accessed from numerous locations
- They can be used in differing directions and in a number of permutations

As indicated above, social trail networks allow for informal recreational access and in many cases form the bedrock of recreational access.

Providers of social trail networks, such as the Department of the Environment and Resource Management (DERM) generally have a fairly low level of duty of care to the user of such trails. This means that the providers of social trails do not have an obligation to maintain trails at any standard (unless the status of the trail demands this) and do not need to inspect them or manage access to the trails. This means that social trails can be of little significance to landowners; however, as will be demonstrated below, the impact of social trails and their users on land use can be a problem.

Social trail networks can be incredibly flexible enabling trail users to make use of networks for either very short periods of time such as for a ten minute dog walk or for extended periods such as a day long or multi day trip. They can allow trail users to create their own routes, extend or cut short trips and they can enable a wide variety of experiences to be created and enjoyed. Because they are accessible from different locations, social trail networks can provide access to the countryside for people over a wide area often making the trail network of considerable social importance. The flexibility inherent in many social trail networks also makes them of great value to communities since their flexibility means that regular trail users can vary the way in which they choose to use the trail network. That flexibility means that social trail networks are very important in the long term in that they are very often repeatedly used, often on a daily basis by the same users.

However social trail networks can also give rise to a number of problematic issues, as follows:

- Lack of status means that access is not guaranteed
- Access to the trails and to areas of land can be difficult to control
- There can be conflict between recreation and land use
- It is difficult for landowners to predict patterns of use
- Management of risk and liability can be difficult
- Trails can be difficult to access for some user groups
- The quality of the trails can vary
- Recreational users can have negative impacts on landscapes and habitats
- Sustainability can be a problem

Many, if not most, social trail networks do not have any formal status in law and access to them is therefore not guaranteed. It is possible therefore that social trail networks can be damaged or even eradicated by landowners and access to the trails disappear and this clearly undermines their effectiveness as a recreation resource.

If the trails have no formal status it is difficult to protect access to the trails and it is virtually impossible to protect them from impacts related to land use. Any trail with a clear legal status can exist within areas of even intensive land use and be protected from damage by its status. Likewise trails where access is enshrined in law can also be protected and must often remain at a given standard.

On the other hand where social trail networks have no formal status they can easily become unusable if there is no obligation on landowners or local authorities to maintain them and this can have a very significant effect on the value and effectiveness of trail networks. This is particularly the case in relation to areas of intensive land use where the land use can lead to significant damage to trails. Social trail networks that have little or no formal status in law are therefore vulnerable and potentially can become degraded over time.

Depending on the status of the trails and nature of the land use, social trail networks can be very difficult to manage in the context of intensive land use such as agriculture, habitat management or forestry. This can be exacerbated when the social trail network is also the land management infrastructure (such as forest roads) leading to differing and conflicting pressures from both recreation and land use.

In the case of social trail networks on DERM land the vast majority of this consists of a very important land management infrastructure i.e. forest roads and tracks. The primary function of these roads and tracks is to enable effective management and/or timber production to take place and this must therefore take precedence over their recreational use. These tracks and roads can be unusable for recreation both during and after any intensive operations, in particular for health and safety and operational reasons. In addition the nature and quality of the social trail network can be very heavily compromised by the use of forest or dirt roads by heavy haulage vehicles and the use of tracks for timber extraction

In areas of intensive land use with large social trail networks (such as forests) it is important for landowners and managers to be able to predict patterns of public access and use. This is important if operational activities are to take place safely and not expose the public to unacceptable levels of risk, whilst also not exposing landowners and managers to litigation. Being able to predict where members of the public are likely to be is potentially of great value to land owners and managers, particularly where off road cycling is concerned since this activity carries with it inherent risks. Landowners and managers must always try and balance the risks associated with allowing public access and being able to carry out core land use.

Social trail networks by their very nature are permeable and physically accessible but they may not necessarily be accessible to all users since access to social trail networks can be dependent on local knowledge and/or the ability to read maps and this can limit the extent to which such networks are used and by whom. In addition, most social trail networks have never been designed to allow for multiple user groups and this leads to potential conflict between users such as cyclists and pedestrians. The nature of social trail networks also means that they tend to be of limited accessibility to the less able, the less confident and to people without local knowledge.

Because the majority of social trail networks have not been designed for recreational use and since most consist largely of land management and transportation infrastructure, their use for recreation can often lead to significant impacts on landscapes and habitats. This is particularly true where levels of use are high or on trails that are used by cyclists and equestrians. Many social trail networks are not subject to any significant levels of maintenance and many of the trails are simply unsuited to the levels and types of usage they receive.

In areas of intensive land use such as in commercial forestry or areas where habitat management is ongoing it is important for land managers and others to be able to predict (at least to some extent) where recreational users are likely to be and what, if any, are the patterns of recreational use. This is important in being able to manage the risk that operational activities such as tree felling, haulage along roads and the use of machinery pose to recreational users. It is also important in being able to minimise the disruptive influence and cost that managing the safety of recreational users can have on operations.

1.1.2 Social Trail Networks For Off Road Cycling

As outlined above social trail networks are extremely flexible, accessible and often extensive trail networks. The majority of off road cyclists the world over predominantly make use of social trail networks for recreational riding of all kinds and in most countries the trails that are used in this way have no status in law. The social trail networks used by off road cyclists in Australia is mostly on DERM land and consists

of forest roads and tracks with a growing network of unsanctioned user developed trails appearing in a number of locations. The growth of user developed trails indicates that the social trail networks as they stand do not fully meet the needs of some of the existing users and their development raises very significant liability and safety issues for landowners/mangers.

However the use of DERM's forest road and track network by off road cyclists does not on the whole raise significant issues for DERM other than in key locations such as around major population centres. The use of the social trail network on DERM land by off road cyclists tends to be quite dissipated and low key and it is only in areas where recreation pressure is high that management issues are problematic.

An important issue that relates to off road cycling on the social trail network on DERM land is that the nature of the trail system means that it does not fully meet the needs of users and the majority of management issues are a result of the nature of the trail network itself. The nature of the social trail network means that not all segments of the off road cycling market can easily access it since it is currently only accessible to those with a reasonable level of map reading and navigational skills, relatively high levels of fitness, local knowledge or all of these. This means that the social trail network is only of significance to a relatively small number of off road cyclists despite its scope and scale.

1.2 Prescribed Route Systems

Prescribed route systems differ from social trail networks in that they are based on waymarked routes that are clearly defined on the ground and have some kind of clear legal status. In addition, prescribed route systems have clearly defined trailheads where trails start or finish or both.

Prescribed route systems can be a single linear route, a single circular route or a network of inter linked loops, but the very fact that they are waymarked and promoted in some way gives them some kind of status which can affect the duties of the trail provider.

Crucially the identity of the provider of prescribed routes can differ from that of the owner of the trail and the duties of the trail provider can vary according to the nature of the prescribed routes, their status and the nature of the land use, but generally the duty of care in relation to prescribed routes is higher than that associated with social trail networks. Whilst prescribed routes can be a very useful way of managing issues such as liability and impact on land use they can also lead to unsustainable levels of management and maintenance if not carefully planned and implemented.

Typically, prescribed route systems have been established for a number of reasons as follows:

- To improve accessibility
- To manage the impact of recreation on land use
- To manage business risk and liability
- To manage the impact of recreation on landscapes and habitats
- To manage conflict between different recreational users
- To create a recreation or tourism product/resource

Social trail networks are important in enabling informal access to the countryside for the public; however their unplanned, somewhat chaotic nature does not encourage access by the following groups:

- The less able
- People without local knowledge or without knowledge of the network
- People with limited or no map reading skills
- People from outside the immediate areas of the trails

However, it is possible to improve access for all these groups by developing prescribed routes with waymarking, signage and information and by planning and designing trails that are targeted at particular

user groups. Developing prescribed routes can dramatically increase accessibility and this (as is highlighted below) brings with it a set of particular issues and problems.

As outlined above, in areas of intensive land use, recreation and land use can come into direct conflict, particularly if the trail infrastructure and the land management infrastructure are one and the same. Developing prescribed routes can manage the impact of recreation on land use by creating routes that trail users are encouraged to use over other routes, thereby introducing an element of predictability to recreational use of any area. Being able to predict with some confidence where recreational users are most likely to be concentrated enables landowners and managers to put in place effective management measures.

Critically this also enables landowners and managers to go some way to managing health and safety, liability and business risk. However this can only be achieved by implementing careful trail planning and effective trail design, as well as an understanding of the needs and expectations of both the landowner/manager and the intended trail user. Prescribed routes can only effectively manage the impact of recreation on land use if the intended users prefer to use them as opposed to other routes or the social trail network as a whole.

Liability for landowners can be increased by the provision of prescribed routes if trails do not meet particular sustainability criteria (see below) or if they do not conform to clearly set out standards. If liability is to be managed by the development of prescribed routes they must be delivered using a robust planning and design process, which leaves a clear paper trail, and any trail construction must be carried out to clear unambiguous standards. In addition, it is essential that prescribed routes be effectively managed and maintained at consistent standards if liability and business risk is to be minimised.

As highlighted above, trails can have negative impacts on landscapes and habitats, particularly if access to the trails is not managed or if the trails are not inherently sustainable. In addition social trail networks can be prone to conflict between users such as pedestrians and cyclists. Prescribed routes can very effectively manage the impact of recreational activities on landscapes and habitats, particularly in intensively used areas. They can also be very effective in managing conflict, but these issues can only be addressed by providing routes and trails that meet the needs of users whilst also relieving pressure on sensitive areas and addressing conflict.

However, this cannot be achieved unless the prescribed route is fit for purpose and crucially is sustainable in every sense of the word. Effective trail planning and design are essential in achieving this and this must be underpinned by sustainability frameworks, robust trail planning and design protocols and robust trail construction standards. Without these in place, prescribed routes can simply create new management issues where there were none previously.

Developing prescribed routes can also be a very effective way of creating a tourism product by making landscapes and sites more accessible to more people and by creating an entity that can be marketed to potential visitors.

Whilst it is clear that prescribed routes do have many positive features it must be noted that there are a number of negative issues that are also synonymous with these sorts of trail systems, as follows:

- Providers of prescribed routes have a higher duty of care to trail users
- Landowners and/or trail providers potentially carry greater liability
- There can be a much higher management and maintenance requirement

Because the providers of prescribed routes are in effect “inviting” the public to use a facility, there is an increased duty of care to trail users. In order to fulfil such a duty of care the providers of prescribed routes often provide trail users with information relating to the nature of the undertaking and this allows potential users to make informed decisions whether or not they should use the trail.

Crucially it is then important for trail providers to ensure that the information that they are providing is both accurate and up to date and this means that the trails must then be maintained at a standard that reflects the information provided. This can clearly be a problem if the trails require ongoing management and maintenance to keep them at a consistent standard, thereby bringing the sustainability of the trail into question.

It is therefore extremely important to develop prescribed trails that are sustainable in every sense of the word, but particularly in terms of management and maintenance, and this can only be done by adopting effective trail planning and design systems and by having an understanding of sustainability.

Prescribed routes are very often developed by waymarking and signing parts of existing social trail networks, with little understanding of sustainability. It is very rare that such prescribed routes are actually successful or sustainable since most existing social trail networks are comprised of land management and/or transport infrastructure and these have never been designed with recreation in mind.

1.2.1 Off Road Cycling and Prescribed Route Models

There are a number of prescribed route models that relate to off road cycling as follows:

- Single circular dedicated routes
- Linear dedicated routes
- Off road cycling as part of a multi use trail network
- Dedicated off road cycling trail centres
- Bike Parks

1.2.1.1 Single Circular Dedicated Routes

Prescribed routes of this type can be made up of parts of the social trail network that have been waymarked and possibly modified to allow for off road cycling use and purpose built trails. They are generally single use trails which are centred on small trailheads and are circular in nature i.e. they start and finish in the same place.

This model can be a loop of anything from 5km to 50km long and can be focused on virtually any part of the off road cycling market. It can be extremely useful in areas where there is existing off road cycling activity which needs to be managed but it can also lead to problems if the trail or route does not fully meet the needs of the intended user. Trails of this kind require that there is accurate up to date information at the trailhead and that trails remain at a consistent standard.

Trails of this type generally have a prescribed direction of travel, which is a key part of managing safety and conflict and effective trail planning and design is essential in achieving this.

This model can form part of a wider tourism product that might include other similar trails within a given area, but it is very difficult to create an off road cycling tourism product with just one trail of this type. This can only be achieved with this model by developing several dedicated loops within close proximity to each other, but such a product can lack focus or a central management or visitor hub.

1.2.1.2 Linear Dedicated Routes

As the name might suggest these are linear routes linking two separate locations and can be virtually any distance, but they are more often than not long distance routes. They are usually made up entirely of parts of the social trail network that have been waymarked but can also include purpose built trails.

Routes of this kind are generally intended as either tourism products such as cycle touring routes or a local transportation route. The Sustrans network in the UK is a good example of this model and there are a growing number of such trails around Europe. In Australia the Munda Biddi Trail in WA is a good example of a linear route that is dedicated to off road cyclists and which is intended to be an iconic tourism product.

The configuration and nature of linear routes need to be very carefully considered alongside the nature of the intended market. It is very easy for this model to fall between two stools and not be particularly successful by poor route choice and trail design. Linear routes tend to have very particular markets such as local family and leisure riders riding close to home, long distance cycle tourers and trail riders. Each of these segments requires very particular trail products such as for family and leisure riders, wide, well graded and level trails. Similarly, cycle tourers require even surface and gentle gradients, whilst trail riders are looking for challenging trails with technical interest.

It is important for linear routes to be very focused on the intended users or markets and that this is reflected in trail planning and design.

1.2.1.3 Off Road Cycling as Part of a Multi Use Trail Network

Prescribed routes can be focused on a number of recreational activities such as walking, horse riding, running and cycling. Occasionally off road cycling can be incorporated into a network of prescribed multi use routes such as in State Parks, Country Parks, urban parks or Forest Parks and these are invariably focused on one or possibly two formal trailheads.

This model can be extremely successful in encouraging and facilitating access to the countryside for cyclists, but it is very important to ensure effective trail design within a framework of sustainability principles. The development of this model requires extremely careful trail planning and design if sustainability is to be achieved and it is possible for this model to be extremely successful commercially.

However it is also possible for this model to be fraught with management problems such as conflict and safety issues. Grizedale Forest in the English Lake District is very much an example of this model where there are very significant management issues caused by poor trail planning and design, very large visitor numbers and insufficient management resources.

The location of this model along with the nature of the trail system and its users must be very carefully considered and a rigorous planning and design process should be followed.

1.2.1.4 Dedicated Trail Centres

This model was developed in the UK in the mid 90's and is arguably the most successful trail model relating to off road cycling anywhere in the world. It is centred on the provision of mostly purpose built trails for key parts of the off road cycling market, which are centred on visitor facilities such as cafes, car parking, toilets, showers, bike hire and repair.

Trails centres (as this model is often referred to) are generally orientated towards the mountain bike market with a particular emphasis on the Enthusiast market. They were created to enable the development of mountain biking destinations where mountain bikers make special short break visits and stay overnight for at least one night.

Trail centres invariably include a number of independent waymarked loops, which start and finish at the trailhead where trail information is located. They also normally include trails of differing levels of difficulty but the general level of the trails is moderately difficult. This is key to ensuring that the trail products are accessible to a wide range of users since this is the basic precept that this model was developed under. Crucially trail centres have made authentic mountain biking accessible to a much wider audience than was previously the case. Before the development of the trail centre model, mountain bikers in the UK essentially made use of the social trail network and this restricted the activity to skilled, fit outdoor enthusiasts or competitive cyclists. Trail centres have brought a whole new segment of the off road cycling market to the fore – namely the Enthusiast mountain biker who now forms the core of the market for this model.

Trial centres by their nature attract sometimes very large visitor numbers and this can result in the development of key management issues around trailheads, poor visitor flow and potential conflict. In addition large user numbers can lead to the need to maintain trails more often and more frequently. The frequency and intensity of maintenance is directly linked to trail design and construction standards and it

is also very much linked to the kind of trails that are actually developed since some trails, namely those with numerous artificial features, require much more maintenance than others.

The provision of up to date and accurate trail information is a crucial part of this model and it is very important that trails remain at a consistent standard that reflects the trail information. Trail inspections and the effective keeping of records is therefore a key part of the management of this model and this can be quite onerous depending on the nature of the trails and the users.

Crucially though this model also has some distinct advantages in that it can focus off road cycling into well managed “honey pots”, where resources can be well targeted. It also enables the development of very effective destinations that can have very significant impacts on local economies, and it also centres visitors on to facilities that can generate income. The latter point is significant in that the generation of income can make the management and maintenance of the trail possible.

1.2.1.5 Bike Parks

Bike parks are the name given to facilities that are centred on the more “gravity focused” end of the off road cycling market. The gravity focused market encompasses the mountain bike disciplines of downhill, freeride and dirt jumping.

Downhill mountain biking is where riders descend very steep and technically challenging trails at speed without riding their bike to the top of the hill. Downhillers ride very specialist bikes with long travel suspension, very wide tires and heavy frames that cannot easily be ridden uphill and they are looking for trails with numerous features such as berms, tabletops, step downs and rollers, which they endeavour to ride as quickly as possible. In essence downhill is about speed and technical difficulty.

Freeride is slightly different to downhill in that riders are more focused on riding down and over particular features such as drops and jumps and the trails that are used tend to be shorter and concentrated within a smaller area. Freeriders tend to ride slightly lighter bikes than downhillers but again they are not particularly suited to riding uphill. Freeriders are also very concerned with “getting air” off certain features and they will spend prolonged periods of time on one feature perfecting a jump.

Dirt jumps are where there is an area with a number of tracks through it with each track featuring numerous jumps of differing kinds. The tracks tend to be very short (a maximum of 300m) with a high concentration of jumps and numerous berms. Dirt jumpers usually ride light but strong “hardtail” bikes, that is, bikes with suspension on the front only, and can congregate in large numbers around key areas.

The majority of bike parks initially developed through the introduction of purpose built downhill trails at ski resorts in North America and Europe and downhill trails are still the mainstay of this model with freeride and dirt jumps playing a more secondary role. Bike parks are often associated with ski areas due to the need for mechanical uplift of some kind, which is a key component of this product. Indeed bike parks totally rely on the presence of uplift since it is essential in making the product work both on an operational and commercial basis. Without uplift, bike parks could not operate since this is also the mainstay of their income.

Bike parks are almost exclusively on private land with the provider of the trails also taking on the ongoing management and maintenance of the trails and taking on liability. The nature of the trails that support this product means that they require almost constant formal inspection, maintenance and management and this clearly demands considerable resources.

Whilst bike parks can generate considerable income through uplift and support services they also demand very considerable resources to operate. Most bike parks operate a “Bike Patrol” to help manage trail users safety, deal with accidents (often very numerous) and inspect the trails on a daily basis. This kind of management input is only possible if income can support it and this is only really possible at particular sites.

1.3 WHICH SYSTEM AND WHICH MODEL?

Given the above information the Tablelands Integrated Mountain Bike Alliance (TIMBA) must decide which kind of trail systems it wants to develop as part of their plan to develop the Atherton Tablelands as a mountain biking destination. There are clear pluses and minuses related to differing trail systems and models and it is essential that trail providers understand the issues related to each.

In addition, it is very important to have a clear idea of what the implications of adopting any particular model are and how any model is best and most effectively developed and managed. The nature of the trail model and the associated management model should reflect the aims and objectives of any trail development. For instance; if managing mountain biking is a key aim then developing a prescribed single loop may be the best option, whilst if the aim is to develop a tourist destination for mountain bikers, than the trail centre model may be most appropriate.

As outlined above creating prescribed loops introduces an element of predictability into how areas are used for recreation, which makes managing the interface between recreation and land use much more effective. It manages where, and the way in which off road cyclists access any area and helps to manage impacts on landscapes, habitats and other recreational users. However introducing prescribed route systems also brings with it a number of important issues which together affect the nature of the trail model that can be sustainably developed and accommodated.

By developing prescribed route systems the trail provider will have a much greater duty of care to off road cyclists using those trails. To fulfil this duty of care the trail provider will need to provide trail users with accurate up to date information on the nature of the undertaking and trails will need to be maintained at consistent standards. The trail provider will need to find resources to carry out trail management and maintenance and these are best generated at trailhead facilities such as those associated with the trail centre model. By adopting this model it should be possible to create income streams that can support the ongoing management and maintenance of trails; however this can only be achieved by underpinning trail planning and design with key sustainability principles. In addition the nature of the trail model can affect the long term sustainability of developments that are focused on creating a tourism resource.

2. OFF ROAD CYCLING MARKETS

Off Road cycling like all outdoor recreational activities is segmented into cohorts or segments, which are defined by how they undertake the activity, where they do it, their level of expertise and the kind of bikes they ride. It is extremely important to understand how the activity is segmented and also to understand the requirements of each cohort or segment.

From my work in a number of countries I believe that the off road cycling market is divided into the following key cohort:

- Family and Leisure Riders
- Enthusiasts
- Trail Riders
- Sport riders
- Downhillers/freeriders/gravity focused riders

2.1 FAMILY AND LEISURE RIDERS

This cohort is by far the largest segment of the off road cycling market in terms of volume and is often the most overlooked in terms of trail development. Family/Leisure Riders are people who occasionally ride mountain bikes off road on a wide variety of trails, tracks and routes. The routes and trails that are used by this cohort have little or no technical interest, even running surfaces, variable widths and low gradients. This group generally have low levels of expertise in skills such a map reading and navigation and are often ill prepared for the outdoors and are not particularly adventurous or fit. In the UK it is estimated by the bicycle industry trade association that there are an estimated 20 million bikes in the country that can be defined as mountain bikes i.e. they have flat handlebars and knobby tyres, and that four out of five bikes that are sold in the country can be described as such. The majority of those 20 million bikes and the

people who ride them can most likely be described as Family/Leisure Riders and off road markets in other part of the world are very likely to include this cohort in the same kind of proportions.

Whilst clearly very significant in terms of volume, the cohort is not that important in terms of off road cycling tourism since they do not make frequent special journeys to key locations with the primary purpose of riding off road. This cohort is much more likely to ride off road as part of a trip or visit but it will not be the primary motivation behind the visit itself and for this reason they can be considered of less value in tourism terms per head. However it is clear that this market by its very size has great potential if particular trail products are developed and promoted and if such products are of high quality and crucially market centred. It is also from this cohort that members of other segments or cohorts are drawn by the right kinds of trail developments.

It is worth remembering that this cohort can be of great significance in areas such as peri-urban or urban fringe locations where suitable trails can be hugely popular. In addition, certain kinds of trail products in tourist or holiday locations can be very popular and draw visitors to them that are holidaying in the area.

2.2 ENTHUSIASTS

This cohort represents recreational mountain bikers with a wide range of expertise, fitness and confidence and who have generally limited outdoor skills such as navigation etc. It is most developed in the UK where the development of the trail centre model in Wales in the mid to late 90's and in Scotland and England in the period since has led to unprecedented growth of this segment of the market. The volume and value of the mountain bike market in the UK is now very significant and this cohort makes up the vast majority of this market. In effect the development of authentic accessible mountain biking that is of high quality has reshaped the UK off road cycling market beyond all recognition with the Enthusiast now of very significant volume and value.

In the UK this segment is made up of well educated middle class professionals with relatively high disposable incomes with a male to female ratio of 60:40. They are generally not involved in competitive mountain biking and are looking for fun riding that is not too demanding but still with an authentic feel. In Australia as in other countries this segment is currently underdeveloped but as has been shown in the UK it is of potentially great value. This segment is generally prepared to travel considerable distances to ride good trails and will make weekend trips away with the primary purpose of riding at least every two months. Since the segment consists primarily of middle class professionals, their spend per head per visit is generally significantly higher than other segments making them of great importance in developing mountain bike tourism.

However, the trail product must match the needs and expectation of this market if it is to be accessed, grown and developed. In Wales the trail product centred on waymarked looped rides radiating out from a highly accessible trailhead, which included support facilities, with a high proportion of the loops consisting of purpose built singletrack trails. The key to the success of this model has been the accessibility of the purpose built trails, the waymarking and the support facilities. Providing waymarked looped trails has proven to be of great importance in accessing this market, particularly loops that have distinctive characters or have trails of varying levels of difficulty. This allows riders to ride different loops during different visits, encourages repeat visits and builds in longevity. The clearly defined and distinctive looped riders have also been important in creating distinctive trail products at different sites and in some cases producing iconic or aspirational trails

Whilst this cohort or segment is probably currently insignificant in Australia, it should be the one to target if sustainable growth is to be stimulated in the market as a whole. Recent trail developments in Australia at locations such as Forrest, Victoria and Mt Stirling, Victoria as well as a plethora of others, will without doubt have stimulated growth in the mountain biking market for the country as a whole. But, as has been clearly demonstrated in the UK, the Enthusiast cohort must be accessed and developed if sustainable growth in the volume and value of the market is to be achieved. This can only be achieved however if the trail model is the right one and if the balance between accessibility and authenticity is right.

2.3 TRAIL RIDERS

This cohort is by far and away the most dominant in terms of mountain biking markets, as distinct from off road cycling markets, around the world and also in Australia. These riders are skilled, fit outdoor enthusiasts who are often involved with other outdoor activities such as, mountaineering, climbing, trail running or hiking. They have variable but generally not particularly high levels of technical ability and undertake rides of up to six hours in length. They are often members of pressure groups or advocacy organisations such as IMBA and think of themselves as “proper” mountain bikers. Whilst very significant in undeveloped markets, since they represent a large proportion of that market, this cohort is relatively small in volume.

Prior to the development of the trail centre model this segment or cohort was the most significant in terms of the mountain bike market in the UK and, although a fraction of the volume of the Family/Leisure segment, Trail Riders formed the “hard core” of recreational mountain biking in the UK at that time. This is very likely to be case in Australia today and this is due primarily to the nature of the trail offerings that are available around the country. The majority of this cohort largely makes use of social trail networks, making up their own routes from maps and/or local knowledge and sometimes even developing their own unsanctioned trails. This cohort would seem to be getting increasingly involved in developing purpose built trails around Australia, often working in partnership with land management bodies and agencies to do so.

Whilst this cohort does not necessarily need waymarked routes, they will make enthusiastic use of them if they meet their needs and expectations. This has been very clearly demonstrated in the UK where this segment is just as likely to use waymarked looped trails at trail centres as any other part of the mountain bike segment, especially if the trails are sufficiently long or challenging. This part of the mountain biking market is though still relatively small in volume relative to the off road cycling market as a whole but it is very significant in that this cohort can often be the most vociferous in terms of wanting to affect trail developments.

It is therefore very important to make sure that this cohort is taken into account in any trail development, particularly when you consider that this group also make regular weekend trips to go mountain biking and can form a very important part of any tourism market.

2.4 SPORT RIDERS

This cohort can be characterised as competitive cross country mountain bike racers with high levels of fitness and generally above average bike handling skill levels. They are often involved in other forms of competitive cycling such as road racing, time trialling or cyclo-cross and are more often than not members of clubs. They are essentially “cyclists” in the true sense of the word rather than “outdoor enthusiasts” and often do not have particularly high levels of outdoor skills such as map reading and navigation.

Many unsanctioned mountain bike trails are developed by this cohort, in particular for use in events such as cross country races but they largely make use of the social trail networks, especially close to where they live. Whilst this cohort is primarily focused on competitive mountain biking they are also a part of the recreational mountain biking market in that they are committed, active mountain bikers who will travel significant distances to go mountain biking. However they are a relatively small proportion of the recreational market but they can also have a significant influence over trail developments. This cohort often want to see trail development focus on race courses, which are not always effective recreational resources, and which are often difficult to manage outside of events.

In the UK this segment has actually got smaller with the development of recreational trail products in particular the trail centre model. The development of authentic yet accessible mountain biking has made it much less necessary to get involved with racing to access good riding opportunities in the UK, but in most parts of the world racing is still an important part of mountain biking in general.

2.5 THE GRAVITY FOCUSED

This cohort is very small in volume relative to all other parts of the off road cycling market, but very significant in the influence it can have over trail development. It is made up of riders with generally much

higher levels of bike handling skill than other parts of the off road cycling market and they have very particular demands in terms of the types of trails and facilities that they require.

This cohort, as the name suggest, are involved in the more “extreme” end of off road cycling in particular, downhill and freeriding. Downhill mountain biking involves riding very specialised bikes down very steep, highly technical trails as fast as possible. The bikes that are used are essentially too heavy to be ridden uphill and the trails are often accessed by some form of uplift. Uplift can consist of something as basic as an informal vehicle shuttle to the top of the hill, a fee based vehicle service such as a minibus and trailer or even a cable car or chairlift. Formal downhill facilities are often to be found in ski resorts where there are existing uplift facilities and sufficient elevation to allow for the development of suitable trails.

Freeride on the other had is often somewhat less formalised and is focused on highly skilled riders riding key obstacles such as drops, jumps etc within a relatively confined area but with less specialised bikes than downhillers. Freeride often does not require uplift since riders often “session” obstacles or trails within a small area and it can be developed in areas of only very limited elevation change.

Both of these groups of riders can be considered as “gravity focused” since they do not involve riding uphill and do involve riding of a similar nature. They are also very similar demographically in that they are largely young males of between 14 and 30 years of age who are often involved in other “adrenaline” sports such as skateboarding, surfing or snowboarding. They can therefore be loosely grouped together to form the Gravity Focused cohort and can be looked at in similar ways in the context of trail development and market requirements.

As already indicated this cohort is small in volume but can be significant in terms of its value. Whilst this demographic does not generally have high disposable incomes, this cohort spends relatively large amounts on bikes and equipment and also travel considerable distances to make use of dedicated facilities. Dedicated downhill facilities with mechanised uplift in particular can be extremely high value tourism resources. At ski resorts all over the world dedicated downhill trails are now an integral part of the economic model of these areas and downhillers travel to some from all over the world. For example Whistler in British Columbia, Canada is now a major international destination for downhillers from all over the world with up to 1000 riders a day using the cable car at peak times. Many downhill facilities also include freeride facilities within the same area and these often consist of dedicated freeride areas made up of numerous purpose built features such as jumps and drops. Areas where downhill and freeride facilities are provided together are often referred to as “bike parks” and these are predominantly on private land and operated as commercial ventures, though some are also provided by the public sector in some countries.

Downhill facilities and bike parks can be commercially very viable; however the most successful facilities are those that are most accessible in terms of the trails and the riding. The majority of bike parks and downhill facilities feature trails that are very much at the higher end of the difficulty spectrum and the market for facilities such as this is somewhat limited in volume and therefore value. At locations where trails are more accessible and less extreme there have been very significant increases in user numbers and therefore the commercial viability of the facilities. At Whistler the development of a very accessible, fun but still authentic downhill track known as the “A Line” radically increased the number of people able to access the site. The A Line shows that the development of accessible authentic trails also leads to growth in the Gravity Focused market and that the higher end of the market has less potential for growth.

3. MOUNTAIN BIKE TOURISM

In recent years recreational mountain biking has become a significant branch of active outdoor recreation with numerous sites around the world marketing themselves as mountain biking destinations. These destinations are centred very much on mountain bike tourism and the most successful of these have carefully targeted their product at key parts of the mountain bike market. As indicated above mountain biking is a very diverse activity which can be split into several segments or cohorts and for mountain bike tourism to succeed it must be developed with the segmented market in mind.

The development of mountain bike tourism probably began in the USA in the mid to late 1980's. Many parts of the US are blessed with incredible social trail networks of enormous scope and scale and great quality and the first mountain bike destinations developed where these networks were at their best. Places like Crested Butte in Colorado, Lake Tahoe in California, Marin County in California and Vail in Colorado quickly became hotspots for the new sport of mountain biking and people travelled from all over the world to ride the social trail networks found at these sites. As mountain biking developed and grew in other countries a similar process took place in the UK and Europe with key locations like the English Lake District, and the Yorkshire Dales in the UK and alpine resorts like Chamonix in France developing into destinations for mountain biking.

These destinations were centred on networks of existing trails that made up the social trail networks in those areas and their use was informal and unstructured. They were not marketed as mountain biking destinations as such, rather they were seen as places where mountain bikers visited and rode the trails. The mountain bikers riding these trails and visiting these destinations can best be described as Trail Riders i.e. skilled outdoor enthusiasts who were able to use their map reading and navigation skills to utilise the trail systems.

During the mid to late 90's such informal destinations began to develop with the introduction of trail guidebooks, better mapping and at many locations the development of purpose built trails. However all of these destinations were still centred on social trail networks which required some level of outdoor skill or expertise to navigate them and this somewhat limited the range of the market to skilled trail riders. At around the same time ski areas began to develop uplift served downhill facilities often making use of existing vehicle tracks, snowmobile tracks, walking trails and ski trails as the core of their trail product. Whilst there were clear differences between the trail riding destinations and the downhill focused sites, the common factors were that they were both catering for existing markets centred on riders with good skill sets and who were able to easily make use of the trail products on offer. This essentially restricted mountain bike tourism to relatively small niche markets that had only low levels of growth and this made mountain bike tourism relatively small in terms of value and volume. There were however notable exceptions such as Moab in Utah USA where distinctive trail products drew in large numbers of visitors from around the world and these visitors were relatively high volume.

Mountain bike tourism continued to develop and grow at numerous locations around the world and as bikes, clothing and equipment improved mountain biking became more accessible to more people. Trail systems developed apace, especially in North America, however mountain bikers still needed to have some level of outdoor expertise/skill to access them since the dominant model was social trail networks. The development of more prescriptive trail systems for recreational cross country riding in the UK led to the development of the "Trail Centre" model, where prescribed, waymarked loops were centred on visitor facilities such as cafes, bike hire, showers and toilets. Crucially this model was also centred on very robust purpose built trails that are rideable all year round that are accessible to a wide range of riders. The trail centre model mixed accessible trails that are easy to follow with a certain authenticity and this led to a very rapid growth in mountain bike tourism in places like Wales and Scotland.

This growth was centred on the development of regional or national strategies that developed the trail centre model at key locations and the most important part of this development was the nature of the trail model and the nature of the trails themselves. The prescribed loop systems made the product accessible to markets other than Trail Riders and the Gravity Focussed as did trails that were fun, authentic and accessible and this led to unprecedented growth in the volume and value of the mountain bike market in the UK. So much so that the Enthusiast now makes up the vast majority of the mountain bike market by volume in the UK but it is also the most important part of the mountain bike tourism market in terms of value.

The success of the Trail Centre model in Wales and Scotland has stimulated further development around the UK, to the point that there are now 30 trail centres around the country. Far from diluting the product and displacing the market around numerous sites, this development has led to continued growth in the Enthusiast market which is also feeding into the Trail Rider and Gravity Focused markets. The Enthusiast market is now the mainstream of the mountain bike market in the UK, which is now of very considerable

size and value. Elsewhere, mountain bike tourism has continued to develop around the world but most development is still very much focused on the social trail network model and this is to a large extent restricting growth in key areas of the market. This is because the key market for social trail networks are skilled Trail Riders, which whilst a significant market in its own right, does not come close to the potential volume of the Enthusiast market.

Bike Parks have continued to develop and grow, particularly in North America and Europe, with the emphasis shifting from high end, extremely challenging trails to more accessible “gravity focused” trails. Initially bike parks were characterised by very challenging steep and extremely technical trails but this was in effect restricting the market to a very small niche of highly skilled riders. The development of more rollable, fun and accessible trails has led to very significant growth in this area, though it still remains somewhat specialised.

Mountain bike tourism is now well established around the world and is built around a number of key trail models. The social trail network model that is prevalent in North America has been successful in developing viable mountain bike tourism but the size and value of the market is somewhat restricted to key parts of the market. The bike park model continues to develop around the world and recent developments have begun to broaden the appeal of this model to a wider audience. The trail centre model that has developed in the UK has had a profound effect on the shape of the mountain bike market there and has crucially defined the size and value of mountain bike tourism in that country. What this shows is that some models are more effective at creating a viable mountain bike tourism industry than others and accessibility and authenticity are very important in generating sustainable growth in markets.

Generating growth in mountain bike tourism markets must be seen as an essential part of developing facilities and trail systems, otherwise development can have the effect of diluting or displacing relatively small markets. The development of accessible, authentic and high quality trails in the UK has transformed the mountain bike market and created a very significant and high value tourism market. The key to this has been in understanding the way that differing trail models work and which parts of the market have the most potential for growth. Fifteen years ago the mountain bike tourism market was very small in the UK and dominated by the Trail Rider segments. Today it is very much part of mainstream tourism with millions being spent on trail development in that country and the Enthusiast making up the majority of the market.

I believe that if the Atherton Tablelands is to succeed as a mountain bike tourism destination it must stimulate sustainable growth in the mountain biking market in both the State and nationally in order to create more significant volume and value. The Atherton Tablelands cannot create this growth on its own, that can only be done by taking a strategic approach to trail development across the state and country. However the Atherton Tablelands can begin to take a lead in developing the trail model that can allow this process to take place.

Outside of Bike Parks the Trail Centre model has been the most successful in generating sustainable growth in mountain bike tourism markets and this success is built upon a number of key factors. Firstly the trail systems are prescribed with fixed trailheads, clear waymarking and trail information, and well defined looped routes. Secondly the looped routes are of variable lengths and duration, which encourages repeat visitation, and the trails themselves are largely purpose built. Finally the purpose built trails are accessible and fun yet challenging enough to feel authentic and there are clear hierarchies within the trail system that allow progression. This would appear to be the right model for the Atherton Tablelands to consider, providing the resources are available to manage such facilities. Crucially though the Atherton Tablelands trail model will need to be of the right scope and scale to succeed as a regional and national tourism destination and will also need to access the existing domestic market.

The mountain biking market would appear to not be as well developed in Australia as it is in the UK but there is very considerable scope to stimulate growth and to create a high volume and viable market if the right kinds of trail developments take place.

4. STRATEGIC TRAIL DEVELOPMENT

Strategic trail development can be undertaken for all kinds of reasons such as managing the impact of recreation on land use, landscapes and habitats, developing recreational opportunities or developing tourism resources. Strategic trail development has fuelled the development of mountain bike tourism particularly in the UK, where it has pretty much centred on the development of the Trail Centre model and has been funded on a large scale from public funds. However, strategic trail development can take place at a number of levels from local and community level, right up to national or even international level. Strategic trail development can therefore be divided into the following key categories:

- Local and community level recreation facilities
- Regional level recreational and tourism facilities
- National or international tourism facilities

Projects of local significance should meet the following criteria:

- The development should provide an important local recreational resource
- The development should take place either adjacent to or not less than 10km from local communities
- The development should be not less than 20km from another local level facility
- The development should be a day visit destination only
- If a prescribed trail system the development should consist of not more than 25km of waymarked trails
- If a prescribed system it should consist of not more than 2 waymarked loops of between 40 minutes and 2 hours duration
- The development should consist of not less than 30% purpose built singletrack trails
- The development should be associated with very basic facilities e.g. parking and toilets

Projects of regional significance should meet the following criteria:

- The development should aim to create a high value regional recreation and tourism resource, which is also part of a national tourism product
- The development should be not less than 50km from regional centres of population
- The development should be not less than 50km from another regional level development or from a national level development
- The development should primarily be a day visit destination for the domestic market, however when combined with other regional and national facilities it forms part of a larger tourism destination
- The development can, when combined with other facilities, be a short break destination for both domestic and international markets
- If a prescribed trail system the development should consist of at least 40km of waymarked trails
- The development must consist of not less than 60% purpose built singletrack
- The development should consist of not less than 2 independent waymarked loops of not less than 2 hours duration each
- The development should be associated with basic visitor facilities e.g. toilets, parking, bike hire, light refreshments

Projects of national significance should meet the following criteria:

- The development should aim to create a high value, high quality tourism product of national importance
- The development should be not less than 100km from another national level facility or 50km from a regional level facility
- Any development should primarily appeal to both domestic and international markets
- The development should be a stand alone short break destination

- The development should also form part of a larger national longer term destination
- The development must be of the highest possible quality
- If a prescribed trail system the development must consist of at least 100km of waymarked trails
- If a prescribed trail system the development must consist of at least 4 independent waymarked loops of not less than 2 hours duration each with at least one loop of up to 4 hours duration
- If a prescribed system the development should consist of not less than 70% purpose built singletrack trails
- The development must be associated with high quality visitor facilities e.g. toilets, showers, café, bike hire

Being clear about the scope and scale of any strategic trail development is extremely important in ensuring that it is fit for purpose and able to meet its objectives.

Strategic trail development has centred on the trail centre model in the UK largely because this has been shown to be the most effective model in stimulating growth in the mountain bike market due to its accessibility to a range of market segments. It has also been shown to be the most effective model to market on a national or regional scale because it can be consistently implemented and delivered across a range of sites.

The strategic trail developments in the UK were stimulated by the development of one model at Coed y Brenin, Wales, where key outputs such as visitor numbers, visitor satisfaction, visitor trends, visitor spends and economic impact were collected and collated. This helped to develop a case for strategic trail development and major capital investment across the UK, which has had a profound effect on the mountain bike market and communities across the country. Crucially though work at Coed y Brenin helped develop a clear visitor profile and identify potential for growth in the market, which informed the development of strategic plans.

Having such clarity relating to markets, users and trail models is vitally important to strategic trail development, particularly if stimulating sustainable growth in markets is required. Any strategic development that is centred on mountain bike tourism must have growing the market at its centre and I think that this is particularly the case in a place like the Atherton Tablelands.

5. THE ATHERTON TABLELANDS AS A MOUNTAIN BIKING DESTINATION

The Atherton Tablelands is a beautiful and unique area with a diversity of landscape and habitat that beggars belief for such a relatively small area. The landscape of rolling farmland, volcanic cinder cones, woodland, rainforest, thrusting peaks, steep ravines, gullies and crags is truly remarkable and can be considered world class.

Whilst a substantial portion of the area is agricultural land a significant part is state owned forest and National Park and these areas are by far the Tableland's best asset in relation to the development of a mountain biking destination. However, these areas are potentially very fragile and of great ecological and biodiversity value and the development of mountain bike tourism should not in any way devalue or impact negatively on these areas. In fact if truly sustainable, high quality trails could be developed in this landscape it would both connect people to those areas and enhance any mountain bike trail product.

The unique landscape of the area should be showcased by the development of sustainable trail systems, that explore the contrasts and diversity that exists whilst adding value to the landscape. The fragile beauty of the area is all at once a threat to the development of a mountain biking destination and something that could make it a very special place to visit for mountain bikers from all over the world; but only if the right kinds of trails are developed. In particular I believe that any trails that are developed in this area should be sympathetic to the landscape and environment, and should reflect the landforms and topography, rather than be imposed upon it. Any trails that are developed in this area should provide users with an intimate, discrete and sustainable experience of this unique landscape and should be developed in appropriate ways.

This would almost by default give any trail product a truly unique character and feel and this is absolutely essential in developing a successful mountain bike destination in this area. Distinctiveness and quality are the key elements that will make this area a successful and sustainable mountain bike destination as well as the right trail model that facilitates sustainable growth in the market. Trails should be planned, designed and developed in ways that facilitate a sympathetic low impact approach to construction and which also ensures longevity and sustainability.

I believe that the right trail system to be developed as a mountain bike product in the context of the Atherton Tablelands landscape and environment is a prescribed loop system. This kind of trail system allows the impacts of recreational mountain biking to be carefully managed, whilst also ensuring accessibility. Any trail system should be focused on a formal trailhead with high quality support facilities such as trail information, parking, bike washing, toilets, showers and refreshments, since this enables visitors to be effectively managed, information to be disseminated and access to be carefully monitored and controlled where necessary.

A prescribed trail system potentially allows for far easier access across a range of abilities which is essential if the area is to succeed as a mountain biking destination. I would also suggest that the prescribed routes be broken up into a series of distinctive loops of varying distances and severity and each with a different feel or character. It is very important that the trail system be as extensive and diverse as possible and include enough riding to satisfy most segments of the market for at least two days. In addition the waymarked loops should be interlinkable to allow for longevity, flexibility and to encourage repeat visits.

The Tablelands are close to Cairns which is already a world class tourist destination and there is a well developed transportation, accommodation and service infrastructure in the area which could support a world class mountain biking destination. Whilst mountain biking in Australia is an established recreational activity, as a market it is not particularly well developed and it is vital that the Atherton Tablelands look beyond existing markets if it is to succeed as a mountain biking destination. With this in mind trail developments here should focus on three key areas as follows:

- Providing high quality distinctive trail experiences for Trail Riders and Sport Riders from all over Australia
- Provide high quality distinctive trail experiences for Trail Riders from outside of Australia
- Provide accessible yet authentic trail experiences for the domestic Enthusiast market

In the short to medium term the most important element in developing the Atherton Tablelands as a mountain biking destination is to provide existing key domestic markets with trail products of sufficient distinctiveness and quality to encourage travel to the area from all over the country. This means that the existing key markets of Trail Riders and Sport Riders must be accessed and to do this the trail product should include the following:

- Singletrack trails of predominantly IMBA Blue Square and Black Diamond standards
- Long “signature” descents
- Rides of between 2 and 5 hours
- Enough riding to support a two to three day visit
- Iconic aspirational trails

In addition to the domestic market the Atherton Tablelands should aim to attract mountain bikers from overseas and to do this the trail product should include the following:

- Singletrack trails of predominantly IMBA Blue Square and Black Diamond standards
- Long “signature” descents
- Rides of between 2 and 5 hours
- Iconic aspirational trails
- Enough riding to support a 5 to 7 day visit

Crucially though the Atherton Tablelands must stimulate growth in the Enthusiast market if it is to be sustainable in the long term. In order to attract the Enthusiast market the trail product should include the following:

- Waymarked prescribed trails
- At least 5 independent looped routes
- Singletrack trails of between IMBA Green Circle and Blue Square
- Rides of between 1.5 and 3 hours
- Enough riding to support a 2 to 3 day visit

With the above in mind a prescribed trail system is the clear choice in terms of developing a mountain bike destination in the Atherton Tablelands. In addition it is also clear that a series of semi-independent loops centred on a formal trailhead would be the most effective trail model in terms of accessing the required markets. In particular prescribed waymarked loops can be more effectively marketed as specific entities in themselves and it is also easier to establish an iconic and aspirational trail within this model. As outlined above an aspirational or iconic trail is a crucial part of marketing any destination (look for instance at the Slickrock Trail in Moab, the Black Trail in Glentress or Rustler's Loop in Fruita) particularly internationally and the scope and scale of the trail system must be sufficient to allow this to be developed.

However the way in which any trail system is developed in the Atherton Tablelands must be very carefully considered, particularly given the nature of the landscape, ground conditions, prevailing weather conditions and the very sensitive and fragile nature of the environment. Below is an outline of a sustainability framework within which any trail system that may be developed in the Atherton Tablelands could be implemented.

6. SUSTAINABILITY FRAMEWORK

Trails are all about connecting people to landscapes, places and habitats, whether those people are in a wheelchair, on foot, on a horse or on a bike. People use trails to make connections to landscapes and places at all kinds of levels and this is as true of off road cyclists as it is of any other recreational activity. In order to make those connections mountain bike trails should have as little visual and physical impact on landscapes, places and habitats as possible and should in fact add value to landscapes and places and not de-value them.

Trails that have negative physical and visual impacts can have the effect of devaluing landscapes, places and habitats and can in the worst cases damage and degrade habitats. Trails should therefore be sympathetic to landscapes, places and habitats and where possible actually add to any "sense of place".

To do this, trails should be as low impact as possible and should be built to standards that allow for the kind and levels of use that they are intended. If they are not constructed to the right standards the use of the trails can lead to them becoming damaged or eroded thereby impacting negatively on landscapes, places and habitats.

Crucially the way in which mountain bike trails are constructed has an enormous influence on how much impact they have on landscapes, places and habitats and it is essential that trail planning and design methodologies as well as trail construction standards be underpinned by sustainability values and standards.

If off road cycling trails are not developed within clear sustainability values, they can have negative effects and impacts as follows:

- They can affect the landowner's and/or manager's ability to effectively carry out the core land use (such as forestry or agriculture etc)
- They can have negative visual and physical impacts on landscapes
- They can negatively affect the sense of place of any location

- They can have negative impacts on habitats and wildlife
- They can negatively affect the experiences of other recreational users
- They can lead to increased levels of conflict between off road cyclists and other recreational users
- They can have negative impacts on communities in particular where they devalue places and landscapes where there is existing recreational activity
- They can result in higher levels of management and maintenance on the part of the trail provider

However sustainable mountain bike trails can have substantial positive impacts as follows:

- They can provide mountain bikers with positive experiences
- They can connect mountain bikers to places, landscapes and habitats in a positive way
- They can reduce impacts on sensitive landscapes, places and habitats
- They can reduce the impact of mountain biking on land use in particular commercial forestry
- They can manage liability and risk
- They can reduce management and maintenance requirements
- They can bring benefits to both local and wider communities by developing recreation and tourism resources

With this in mind developing mountain bike trails with a clear sustainability framework has considerable benefits, whilst not doing so can lead to significant problems.

The sustainability framework which should underpin and inform all parts of the mountain bike trail development process is as follows:

- Mountain bike trails should connect people to landscapes, places and habitats without impacting negatively on them
- Mountain bike trails should meet the needs of the intended user
- Mountain bike trails should add value and not devalue places, landscapes and habitats
- Mountain bike trails should not have negative impacts on communities
- Mountain bike trails should not significantly impact upon DERM's ability to effectively carry out habitat management
- Mountain bike trails should address and not create significant new management or maintenance issues, or exacerbate existing ones
- Mountain bike trails should have long term appeal to the intended users
- They should be an asset to the community and to DERM and not a liability

7. TRAIL PLANNING AND DESIGN METHODOLOGY RELATING TO MOUNTAIN BIKE TRAILS

The trail planning and design protocol which is outlined below is the process by which trails are best developed in a sustainable way particularly in sensitive landscapes or habitats. The process consists of a series of steps, which, when taken together form a robust and effective protocol that ensures sustainability, minimises risks to the delivery of trails and ensures effective consultation with all stakeholders. Indeed consultation is the key component of the protocol outlined below and the stepped nature of the process allows for all stakeholders to fully and effectively engage in consultation.

The trail planning and design protocol that relates to the development of any mountain bike trail development can be outlined as follows:

- Development of frames of reference
- Site Assessments
- Developments of Concept plans

This outline protocol applies regardless of whether trail developments are of National, Regional or Local significance and regardless of whether trail development is capital funded or resourced in some other way e.g. volunteer built.

7.1 FRAME OF REFERENCE

What is a Frame of Reference?

A frame of reference is a framework which informs the trail planning process and establishes and clarifies the key issues highlighted below:

- What is the scope and scale of the trail development?
- What are the aims and objectives of the trail development?
- What will the status of the trails be and how will they be managed?
- What is the most appropriate trail model given the above?
- How will the trails be delivered

Why Do We Need Frames of Reference?

The development of clear frames of reference is essential in ensuring trail sustainability and in delivering the right trail products in the right places and in the right ways.

Having a clear frame of reference ensures that there is clarity in relation to the key issues that affect and inform the trail development and it can ensure that the trail development stays on the right track.

Not having a clear frame of reference can mean that there is confusion in relation to important issues and this can undermine the delivery of a project and the long term sustainability of the trails.

A clear frame of reference is also important in ensuring that all stakeholders and partners buy into any project and understand the way in which it needs to be delivered.

How Do You Develop a Frame of Reference?

This can only be done by formal and effective consultation with all relevant stakeholders and partners. It is crucial that all partners and stakeholders understand the trail planning and design process and that they also understand and buy into key sustainability criteria.

Frames of reference should be established using face to face meetings and discussions with partners and stakeholders. This should lead to the production of a formal document which clarifies all of the key points and which can be referred to at all stages of the development.

7.1.1 Scope and Scale

What is meant by scope and scale is whether the proposed facility is of Local, Regional or national significance. For example:

Projects of national significance could meet the following criteria:

- The development should aim to create a high value, high quality tourism product of national or even international significance
- Any development should primarily appeal to both domestic and international markets
- The trail system should be of the highest possible quality

- The development should consist of at least 80km of waymarked trails
- The trail system should consist mostly of trails of Category 3 and above (Green to Double Black using the IMBA system) with the proportions of each category depending on the aims and objectives related to the individual development/project and the nature of the sites

Projects of regional significance must meet the following criteria:

- The development should aim to create a high value regional recreation resource, which could also form part of a national tourism product
- The development should primarily be a day visit destination for domestic markets
- The development can, when combined with other facilities, be a short break destination for both domestic and international markets
- The trail system should consist of at least 40km of waymarked trails
- The trail system should consist of not less than 50% purpose built singletrack
- The trail system should consist of trails of Category 3 and above (Green to Double Black using the IMBA system) with the proportions of each category depending on the aims and objectives related to the individual development/project and the nature of the sites

Projects of local significance should meet the following criteria:

- The development should provide an important local recreational resource
- The development should be a day visit destination only
- The trail system should consist of not more than 25km of waymarked trails
- The trail system should consist of not more than 2 waymarked loops
- The trail system should consist of not less than 30% purpose built singletrack trails
- The trail system should consist of Category 3 and above (Green to Double Black using the IMBA system) with the proportions of each category depending on the aims and objectives related to the individual development/project and the nature of the sites

Establishing the scope and scale within the context of the above is essential in ensuring that trail systems of the right types, scale and extent are established in the right areas and locations.

7.1.2 Aims and Objectives

Establishing the aims and objectives of any development is essential in ensuring that the right trails are established in the right ways and that this results in the right outcomes.

Without very clear aims and objectives that all stakeholders agree on and buy into, trail developments can become unsustainable ill informed and ultimately unsuccessful.

Aims and objectives can include the following:

- Creating a tourism facility of national and regional importance
- Creating a local and regional recreation resource
- Managing the impact of off road cycling on land use
- Managing the environmental and landscape impacts of off road cycling
- Managing safety and liability
- Managing business risk

It is essential that aims and objectives are clear, concise and agreed by all stakeholders and partners. This enables the trail planning, design and construction process to be focused, achieving those aims and objectives and ensures that projects are successful.

7.1.3 Status of the Trails

Establishing and agreeing the status of the trails is vitally important in informing the nature of the trails themselves, how they are designed and how they are built. It is also important to establish and agree the mechanisms through which the trails are to be managed and where resources for carrying out management are to come from.

Establishing the status of the trails means tying down the following key issues:

- Who is the trail owner
- Who is the trail provider

The trail owner is the entity that owns the physical structure of the trails and is usually the owner of the land that the trail is on.

The trail provider is the entity that manages and maintains the trail and carries liability of the health and safety of trail users.

Trail owners and trail providers can be the same entity but in some cases they can be different, for example, DERM may own trails on their land but a local authority, club or community group may be responsible for managing and maintaining the trails and are therefore the trail providers.

These issues must be clarified before any trail planning or design takes place in order to make sure that the nature of the trails is compatible with the nature, capacities and capabilities of the trail owners and trail providers.

In addition it is very important to establish what resources might be available for trail management and maintenance since this can significantly affect the nature, configuration and accessibility of the trails.

All of the above issues must inform and shape the planning, design and construction of trails and it is essential that trails are compatible with their status. If they are not compatible management and maintenance can become a problem and the sustainability of the trails compromised.

7.1.4 Trail Model

Establishing the appropriate trail models and types is essential in informing the trail planning and design process.

Broadly there are two trail types:

- Social trail networks
- Prescribed routes

Social trail networks are, broadly speaking permeable, flexible networks of trails that are now waymarked and have numerous informal accesses.

Prescribed routes are where particular routes are waymarked on the ground, either linear or circular and where there is some form of trail information associated with in.

There are a number of models that are associated with prescribed routes:

- The trail centre model
- The dispersed loops model
- The single route model

Each model is associated with differing issues associated with management, facilities, income generation and the nature of the trails on the ground.

It is essential that the nature of the trail model be established as part of the frame of reference since this will directly and heavily influence all parts of the trail planning, design and construction process.

In particular the nature of the trail model will have a very significant bearing on the location, configuration and design of trails on the ground and will influence the location, nature and extent of issues such as visitor facilities, signage and trail information.

The trail model must be agreed with all stakeholders at an early stage for the trail planning and design process to take place in an effective and efficient manner.

7.1.5 Delivery

Agreeing the way in which the delivery of any project is to take place is again essential in informing the planning and design process.

Trail projects can be delivered in a number of ways:

- Capital projects with construction put out to tender and taking place over a fixed timescale
- Capital projects split into phases with each phase put out to tender separately
- Projects only partly capital funded with remainder made up by volunteers or with resources provided by partners
- Projects to be delivered by volunteers and partners with no capital funding

Clearly each of the above ways of delivering projects raises differing issues which can affect the way in which trail planning and design take place on the ground and the structures surrounding individual projects.

Establishing at an early stage how a project is to be delivered will therefore have a very strong bearing on issues such as exactly how trail design takes place, the level of detail required in construction specifications and when trail design work needs to take place.

Failing to clarify how delivery is to take place can lead to resources being wasted or not used to their fullest capacity and to deadlines not being met.

7.2 SITE ASSESSMENTS

Following the establishment of clear frames of reference the next part of the process is assessing sites in order to build up detailed pictures of any issues which might influence the development of concept plans.

Site assessments require very extensive field work and consultation with local managers and stakeholders and should focus on the following key issues:

- **Access** – what is the distribution and nature of physical access into the site and what are the concept plans
- **Land Use** – what is the nature and intensity of land use within the site and how might this influence the development of concept plans?
- **Topography** – what is the nature of the topography of the site, in particular issues such as elevation changes, the size of landforms and the size and gradients of slopes, and how might these issues influence the development of concept plans?
- **Ground Conditions** – what is the nature of the ground conditions, in particular the nature of soils, vegetation, ground cover and hydrology and how might these issues affect the development of sustainable trails?
- **Existing Recreational Use** – what is the nature, intensity and distribution of existing recreational activities and how might these influence the development and provision of trails?
- **Constraints and Conflicts** – Are there any issues such as land use (forest management and timber production, habitat management and restoration, agriculture or wildlife management), designations (conservation and/or landscape) that might constrain the development of a viable and sustainable trail product.
- **Opportunities** – what issues or features present significant opportunities for the development of an effective trail product?

Looking at the above issues in detail enables a clear picture of the sites to be developed and this, coupled with an agreed frame of reference informs the development of effective concept plan.

7.3 CONCEPT OR MASTER PLANS

The purpose of developing concept or master plans is to develop a clear picture of what shape future trail development might take and to identify key strategic priorities. In addition concept plans form a crucial formal consultation tool which can be presented to partners and stakeholders.

Concept or master plans identify trailheads, trail corridors, the configuration of trails and the proposed classification/grading of each trail. The concept or master plans can also identify key issues or features such as landforms, views or topographical features which might enhance the proposed trail system.

Concept or master plans should consist of clear, concise documents centred mainly on maps and should be broken down into numbered trail corridors and trail loops, dependant on the nature of the trail model agreed as part of the frame of reference. This enables more effective consultation to take place with key stakeholders and partners and can assist in establishing priorities for development.

The development of concept or master plans must be a collaborative process, which involves stakeholders and partners. It is during this stage that the configuration, layout and nature of trail systems and networks can be changed or tweaked to meet the needs of trail providers and to fit with the agreed frame of reference.

7.4 CORRIDOR EVALUATION

The purpose of this work is to formally establish and agree the location of trail corridors with managers and other stakeholders prior to more detailed (and time consuming) trail design taking place.

Evaluating each corridor in turn is essential in establishing estimated design costs and broadly estimating construction and management costs as well as identifying appropriate ways in which trails can be developed.

Corridor evaluations examine the following key issues in relation to each trail corridor:

- **Trail Category** – what category or grade is the trail that is proposed within the trail corridor
- **Purpose** – what is the purpose of the trail corridor e.g. is it a linking trail, does it avoid negative control points or does it link into positive control points?
- **Strategic Value** – how important is the trail corridor to the integrity of the trail system as a whole?
- **Topography** – what is the nature of the topography within the proposed trail corridor and how might this affect the development of a sustainable trail?
- **Ground Conditions** – what are the prevailing ground conditions within the trail corridor and how might these affect the development of a sustainable trail?
- **Constraints** – what are the nature and extent of any constraints (e.g. land use, landscape, habitat, conservation issues) and how might these affect the development of a sustainable trail?
- **Mitigation** – What mitigation measures are required to deliver a sustainable trail given the above issues?
- **Estimated Design Costs** – what are the estimated costs of establishing and marking definitive trail lines and of developing construction prescriptions?
- **Estimated Construction Costs** – what are the estimated construction costs relative to the constraints, mitigation measure, ground conditions and topography?
- **Estimated Management Costs** – what are the estimated costs of managing and maintaining any trail that might be developed within the corridor?

The corridor evaluation should be presented in the form of a consultation document which can be used for formal consultation with stakeholders and can form part of any planning applications or environmental impact assessments that may be required.

7.5 DETAILED TRAIL DESIGN

Once trail corridors have been formally agreed with all stakeholders, the process of detailed trail design can take place.

This is a very time consuming and detailed process which involves the following key steps:

- Plotting and marking of definitive trail lines within previously established and agreed trail corridors
- Surveying definitive lines to establish construction prescriptions
- The development of written trail construction prescriptions

7.5.1 Plotting and Marking Definitive Trail Lines

The purpose of this work is to establish a definitive trail line within the agreed trail corridors, which can then be surveyed in order to develop prescriptive trail construction plans. These can then form the basis for the tendering of trail construction works, for the allocation of resources or for providing guidance to volunteers, depending upon the agreed method of delivery. In addition the trail construction prescriptions form a crucial component of works monitoring and quality assurance systems.

Establishing definitive trail lines involves the following key steps:

- Plotting the trail corridor on the ground using an inclinometer
- Marking the definitive line on the ground
- Identifying the location of key trail feature (depending on the trail type and model)
- Clearing the corridor sufficiently to allow for later re-survey

Definitive lines must be clearly and unambiguously marked on the ground but the method for doing this will be dependent upon the method of delivery, the nature of the corridor and the location of the site.

7.5.2 Resurveying Marked Lines

Following on from the plotting and marking of the definitive trail lines within the agreed corridors, the definitive lines must be surveyed in order to establish construction requirements and methodologies. The trail systems will be divided into trail sections and each section will be surveyed individually and trail construction requirements will be further divided into chainage sections.

This will centre on walking definitive lines with a land measuring wheel, soil stick and shovel. The definitive line will be measured using the land measuring wheel and ground conditions will be tested at regular intervals using the soil stick. Where more detailed information is needed test pits will be opened up using the shovel and this process will allow a picture of the prevailing ground conditions to be developed which will inform the development of trail construction prescriptions.

The location of key features such as turns, culverts or boardwalks will also be determined at this time and marked as individual chainage points.

7.5.3 Prescriptive Construction Plans

Once the definitive lines have been established and the follow up survey completed detailed trail construction plans must be developed which prescribe all trail construction components.

Trail construction prescriptions must be divided into trail sections and each section be divided into chainage points as required by trail construction requirements. This will enable contractors to accurately price work, partners to allocate resources and will facilitate effective quality assurance.

The construction prescriptions for each section will include an introductory page, which will outline the following key issues as they relate to the trail section.

- **Purpose** – What is the purpose of the section and how does it relate to the trail product as a whole?

- **Trail classification/grading** – what is the classification or grading of the section in relation to a trail classification and grading system to be provided?
- **Trail requirements** – What specific requirements in terms of micro design i.e. lines of sight, speed, surface etc may relate to the section?
- **Trail gradient** – What is the maximum average gradient of the trail and what is the absolute maximum gradient of the trail?
- **Trail width** – What is the maximum and minimum width of the trail tread?
- **Trail surface** – What is the nature of the trail surface to be?
- **Trail features** – What kinds of trail features are required and what are the maximum and minimum dimensions?
- **Constraints** – What are the key constraints that affect trail construction and what mitigation measures may be required?
- **Construction** – What construction method(s) are required in relation to the section in question?

The prescriptive plans for each section will also include construction specifications broken down by chainage points (also clearly marked on the ground) relating to the following key construction components:

- **Clearing the corridor** – including any felling as indicated by marked trees, brashing and clearing undergrowth. Prescriptions will specify how all cleared material is to be disposed of
- **Groundwork** – including the size and type of excavator required, the minimum and maximum depths and widths of excavations and how spoil is to be disposed of
- **Hand finishing** – including blending back slopes, demarcation, trail profiles and shaping key features such as jumps etc.
- **Surfacing** – including material type, maximum and minimum width and depth, how material is to be imported on to site and how it is to be compacted
- **Sub base** – including material type, maximum and minimum width and depth, how material is to be imported on to site and how it is to be compacted
- **Revetment** – including the length of the revetment the maximum and minimum height and width, the material to be used and type of fill required. In addition prescriptions will specify how materials are to be imported on to site
- **Stone pitching** – including the maximum and minimum width, the minimum dimensions of stone and how stone is to be imported
- **Culverts and drainage** – including the maximum and minimum widths and depths of drains, the lengths of drains, the diameter of culvert pipes the nature of culvert headwalls and the minimum height and length of headwalls
- **Boardwalks** – including the minimum length and width and the maximum height

Prescriptions will also be underpinned by trail construction standards, which relate to each component of the trail construction process and which gives detail relating to particular trail construction techniques and to particular features such as turns etc.

In addition to the above it is proposed that estimated construction costs be developed in relation to each chainage and in relation to each trail section as a whole in addition to site specific trail construction guidelines, which outline each of the key trail construction methods specified in the prescriptive plans.

The development of construction prescriptions related to definitive lines and chainages and supported by trail construction guidelines will allow potential construction contractors to fairly and accurately price construction works and will allow for effective quality assurance and works monitoring. It can also enable partners to allocate resources, prioritise work and co-ordinate volunteers. This will minimise risks to projects whilst also ensuring appropriate levels of quality during delivery and can ensure the long term sustainability of trail products.

8. CONCLUSIONS

The Atherton Tablelands show a great deal of potential to be developed into a world class mountain biking destination. Its landscape, topography and ground conditions offer amazing opportunities for the development of sustainable trail products of great quality. There is no doubt that the development of the right kind of mountain bike trail system could bring great benefits to communities on the Tablelands for many years to come. As has been shown above, the development of mountain bike tourism through focusing on destinations has been successful the world over. However, it has been most successful where trail models have engendered sustainable and significant growth in recreational mountain bike markets by combining authenticity with accessibility. Where this has taken place it has led to very significant growth in recreational mountain bike markets, which is an essential part of developing mountain bike tourism as a whole.

TiMBA has taken some very clear messages from developments elsewhere in the world has tailored its approach to fit local conditions. This is a very wise approach, which is both considered and careful and which ensures that the right kind of developments take place. The decision to develop a trail model based on a prescribed system is a wise one since it allows a wide range of markets to access the trails, encourages growth in key parts of the market and ensures manageable impacts on landscapes, habitats and land use. It also enables the trail system to be effectively marketed and allows for the development of an iconic or aspirational trail, which is a crucial part of marketing any mountain biking destination.

The Atherton Tablelands venture is potentially groundbreaking in Australia since it is focused on more prescribed looped trails and a formal trail head. This, more than any other development that I have seen or heard of in Australia makes it possible to broaden its appeal across a range of markets, both regional and national. It also makes the trail system or product accessible to tourists visiting the adjacent world class attractions of the Great Barrier Reef, the tropical rainforests and the city of Cairns. An accessible, authentic trail product in the Atherton Tablelands which showcases the amazing diversity of landscapes and habitats will be another high quality and powerful addition to the area's repertoire of world class attractions.

However, to attract international mountain biking visitors I believe that the trail system will need to be significantly more extensive in its scope and scale and will need to focus on the distinctiveness of the area's landscape, terrain and habitats. In order to develop a facility of this kind the area under consideration for trail development will need to be greatly expanded to include the adjacent rainforest. Trails could only be sustainably developed within these areas by adopting a very measured step by step approach to planning and design, implemented within a very clear sustainability framework. In addition, very clear trail construction standards would need to be developed, implemented and applied and these steps together should enable sustainable trail development to take place in these areas in partnership with DERM. The current concept plan developed by World Trails makes excellent use of the area available to TiMBA and outlines what could be a high quality trail product, however, its scope and scale is currently too limited to enable the Atherton Tablelands to access significant international markets.

As already stated, I believe that TiMBA have a very clear vision of where they would like to take the Atherton Tablelands as a mountain bike destination. I think this vision is realistic and backed by a robust approach to planning, consultation and implementation which has been informed by effective research and consultation around the world. There is a very clear appetite amongst TiMBA to get this right, and an understanding of the pitfalls around trail development. From my experience of talking to key people within TiMBA there is a very good understanding of sustainability and this is informing the process that they are adopting. I would fully endorse this careful stepped approach and believe that it has the potential to reap very significant rewards. If done correctly, the Atherton Tablelands does, in my view, have the potential to be a mountain biking destination of international significance. However, this can only be done by working within a clear frame of reference and sustainability framework and underpinned by a robust trail planning and design process. In addition, any trails that are developed should be built to clear and effective trail construction standards that are agreed and endorsed by DERM.