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**OFF-ROAD MOUNTAIN BIKING:  
A PROFILE OF PARTICIPANTS AND  
THEIR RECREATION SETTING AND  
EXPERIENCE PREFERENCES**

by

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## **PREFACE**

This research was undertaken to aid Department of Conservation managers in their consideration of mountain biking issues. The research recommendations are advisory in nature, and do not represent Department policy. The Departmental response to mountain biking issues is governed by the "General Policy for National Parks" and the "Department of Conservation Guidelines on Mountain Bikes".

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**ABSTRACT**

Mountain biking is a new and growing activity in off-road recreation areas. For the managers of these areas, it poses a new array of physical and social impact issues. While little research has been done on mountain biking, that which has been completed has addressed these impact issues. However, no substantial research has been undertaken to identify what actually are the preferred physical setting and recreation experience requirements of mountain bike riders. This report presents the results from a postal survey of 504 off-road mountain bike riders. The report describes their characteristics and activity levels, their preferences for settings and experiences, and some of their management-related attitudes. Riders displayed a diversity of setting and experience preferences, and many of these changed in importance with more riding experience. These changes generally emphasised an increased desire for challenge in riding experiences. Natural settings, challenging riding, variety in settings and experiences, and opportunities for excitement and speed were important components for most riders. Riders acknowledged some impacts were occurring, but considered they were exaggerated and generally misunderstood. They considered voluntary self-regulation in setting choices and riding behaviour was most appropriate for dealing with them. The report identifies some key findings from this research, and makes some recommendations for future management and research.

## EXECUTIVE SUMMARY

This provides a brief view of the main findings of this study. Additional summary sections precede each of the Results sections (3-5). Discussion (Section 6) and Recommendations (Section 7) sections review the main findings. Reference to these summaries and the concluding sections is recommended for those requiring only summary information. Closer reference to the main Results text and the appendices may be required for those requiring more detailed information.

### (i) **Mountain Bike Rider Characteristics**

Riders are a distinct recreationist group characterised by younger male participants with professional-type backgrounds, an interest in "active" types of recreation, and a high degree of club involvement. Activity levels and experience levels amongst these riders are high, although experience (in years) is limited since mountain biking is only a recent development.

### (ii) **Rider Setting and Experience Preferences**

Rider responses indicated preference for a variety of riding features, which are summarised in the summary table (opposite). Riders demonstrated their diverse needs through indicating a variety of activity preferences based upon challenging riding, natural forested settings, single-track, speed and excitement experiences, scenery, and general variety in riding conditions. The emphasis placed on these, and other preferred features varied with rider experience.

### (iii) **Rider Management Opinions**

Riders accepted that some limits to access were necessary, but considered that social and physical impacts of mountain bikes were exaggerated. They considered self-regulation to be the most appropriate form of access and behaviour management. These attitudes generally grew stronger with greater rider experience.

### (v) **Management and Research Recommendations**

This study generated a number of recommendations for management and research. These are briefly summarised below, and are discussed in more detail in Sections 6 and 7 of the report.

#### **Management Recommendations:**

- "core" track features which include opportunities for exploring new areas, appreciating scenery and nature, experiencing speed and excitement, native forest, undulating route variety, some socialising with others, and around 2-3 hours duration should be common elements to most tracks considered for mountain bike access.

Setting/Experience Attributes	Novice/Beginner/Casual Riders	More Experienced Off-Road Riders	Expert Off-Road Riders
Preferred features of mountain bike riding. (as <u>rated</u> by riders)	<i>General preference for appreciating views/scenery/nature; exploring new areas; and riding/socialising with friends.</i>		
	The attribute of exercise/fitness is particularly important for these riders.	Attributes of speed/excitement/risk; physical challenge; skill/technical challenge; and developing and improving skills become more important for these riders.	Increased preference amongst expert riders for speed/excitement/risk; skill/technical challenge, and racing/training (latter reflects race-entry sample selection).
Statements of most preferred riding features. (from <u>open-ended</u> question)	<i>General preference for undulating routes; forest settings; smooth/fast/open tracks; good scenery/viewpoints; and rides of 2-3 hours.</i>		
	Prefer gradual/easy uphills; tracks being smooth/easy/open; tracks being not difficult/few obstructions; and rides 1-2 hours duration.	Preference for technical difficulty/challenge; down-hills being fast/smooth/open and fast/technical/tight; harder uphills; and tight/narrow/winding single-track.	Increased preference for technical difficulty/challenge; downhills being fast/technical/tight; and tight/narrow/winding single-track.
Landscape Preferences	<i>Greatest preference for native forest/bush settings (least for farmland). Beginners had least preference for forestry (pine) areas.</i>		
Track-Type Preferences	Greater preference for sealed roads, and more tolerant of gravel roads. Much lower preferences for single-track.	Emphasis shifts to less-developed routes, and single-track in particular.	Distinguished by much stronger preference for single-track.
Track Condition and Difficulty Preferences	Greater preference for tracks which are smooth/benched/open/clear. Much lower preference for obstructions/difficulties on tracks, or for pushing/carrying bikes.	Preference for rougher tracks/more obstacles; and rough/uneven/tight/narrow tracks. More tolerance for pushing/carrying bikes.	Similar preferences for rougher tracks, but less interest in wet conditions and mud. Even more tolerance for pushing/carrying bikes.
Downhill Attribute Preferences	Strong preference for slow/gentle/easy downhills. Least preference for speed/excitement/risk.	Preference for fast/rough/technical downhills. Increased preference for speed/excitement/risk.	Increased preference for downhills which are fast/rough/tight and slow/steep/more technical, and for speed/excitement/risk.
Uphill Attribute Preferences	Strong preference for gradual/easy/relaxed up-hills.	Increased preference for uphills with short/hard/steep sections. Little specific preference for easy uphills.	Increased preference for more difficult uphills with short/hard/steep sections, and climbs which are long/hard/steep.
Social Encounter Attribute Preferences	<i>Riders strongly preferred to avoid motorised vehicles, and walkers (to a lesser extent). Most are tolerant of meeting other riders.</i>		

Summary Table: Mountain Bike Rider Preferences for Recreation Settings and Experiences.

- Riding preferences change towards more challenge and single-track riding with experience. Managers need to apply Recreation Opportunity Spectrum (ROS) concepts<sup>1</sup> to mountain biking to accommodate these changes.
- Management attention should focus on high-use short tracks near population centres or roads, as use by riders and others is likely to peak in such areas.
- Prohibition of riding from more remote and difficult tracks may be unnecessary due to likely low use levels. Occasional use could be considered acceptable.
- Interest in multi-day off-road routes is likely to increase. A few key backcountry tracks will be most suitable and highly preferred by riders. Managers of these tracks should consider their place in the national spectrum of recreation opportunities when deciding on access policy.
- Track maintenance features may be located in a manner similar to road "judder-bars" to manage rider behaviour where hazard potential exists, or where "managed difficulty" is being used to keep rider numbers low.
- Occasions of excessive rider speed are likely to be an ongoing problem, and managers should encourage rider self-regulation, along with taking steps to minimise hazard situations (e.g., using "managed difficulty").
- Consultation with riders and other track users should be undertaken throughout the processes of deciding riding access and use issues.

#### **Research Recommendations:**

- Complementary studies of other rider samples would assist in the definition of different rider categories, and in the range of their setting and experience preferences.
- Research on the nature and variation of walker perceptions of mountain biking should be undertaken to assist in better determining "bike-sensitive" users, and key elements in the conflicts perceived.
- Longitudinal research on any changes in conflict perceptions over time as walker and manager familiarity with mountain biking increases will be an important topic to assist in longer term planning.
- The assumption that more experienced riders will be more responsible in their riding behaviour needs to be tested. This assumption is the basis for calls for first reliance on rider self-regulation. This would represent an evaluation of self-regulation as a possible strategy.

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<sup>1</sup> See Department of Conservation (1993).



- Research to identify trends in the patterns of rider characteristics, preferences and behaviour will be required to assist prediction of rider demand for settings and experiences as the activity "matures".
- Identification of those key tracks most valued by riders for multi-day riding trips will be important if opportunities are to be provided for these experiences.
- Research should be considered on the way rider behaviour may change when obstacles and track difficulties are used to moderate rider behaviour or limit use. This would represent an evaluation of the effectiveness of "managed difficulty" as a possible strategy.
- Comparative research on the relative physical impacts of mountain bikes and walkers will be required to address the physical impact component of recreation conflicts.
- The nature of hazard perceptions and the actual risks associated with mountain biking require more investigation. This would help managers identify where real hazards occur, and cases where they are actually dealing with perceived rather than real risks.

## **1. INTRODUCTION**

### **1.1 The Department of Conservation and mountain biking**

The Department of Conservation manages conservation lands which comprise approximately 30% of New Zealand's land area. Included in these areas are over 7500km of walking tracks. Most of these tracks are in remote areas, are managed at a low state of development, and are largely accessible only to fit and experienced back-country walkers. They are generally used for multi-day trips by visitors who are most often male, professional and from younger age-groups.

However, many tracks have been subject to greater levels of development due to their suitability and past popularity for day-use and overnight trips. The day walks in particular tend to be located closer to main roads, tourism attractions and population centres. These tracks have been constructed along well-graded routes, have relatively smooth and un-obstructed track surfaces, and pass through high-quality natural environments. These types of tracks attract a wider variety of walkers than the back-country tracks, including families, older people, children, overseas visitors, and people involved in more passive types of recreation activity.

Such track characteristics are also attractive to the growing numbers of people riding mountain bikes off-road. Since the arrival of mountain-biking in New Zealand during the late 1980s, numbers participating in this activity have grown rapidly. According to cycle retail and enthusiast sources, up to 80% of all bicycle sales in New Zealand are now mountain bikes. The advent of such developments provides managers with an added challenge in their decision-making processes. The main questions they face relate to how any new activity interacts with existing use types and patterns, and how the new activity can be accommodated.

In general, the initial management response to recognition of mountain biking as a potential use of conservation lands has been based upon an interpretation of bicycles as "vehicles" under the legislation governing the management of these lands. This approach has been used both in New Zealand and overseas, and has generally resulted in limiting mountain bikes to legal roads only. The guidelines for mountain biking management developed by the Department of Conservation do allow some flexibility to provide access to some tracks (Department of Conservation 1994). This is possible where the activity could occur without compromising the conservation of natural and historic resources, and the experiences of other recreation visitors.

### **1.2 Management issues and information needs**

Managers are faced with three main issues in identifying "suitable" tracks:

- What are the physical impacts of mountain-biking upon tracks, facilities and the environment?

- What are the social impacts of mountain-biking upon other users of tracks and facilities?
- What recreation settings and experiences do mountain bikers want?

Compared to other outdoor activities, there is little research available on mountain biking. Even in America, where the issues have been prominent since the early 1980s, the limited research which has been undertaken has not usually been published. In association with this study, a review of the available research has been undertaken. This is published separately to this study (Cessford 1995), and includes some of its findings. The following three sections briefly summarise the main points identified in this review.

**1.2.1 Physical Impacts of Mountain Biking** Like the physical impacts of foot traffic, those of mountain biking are concentrated on tracks. The four main impact damage problems arising from recreation use of tracks are:

- Excessive erosion from enhanced water flows and disturbed soil surfaces on sloping sections of track, and at natural or managed drainage points across them.
- Muddy stretches in water-saturated sections of tracks, often including major disruption of soil structure, and lateral spread of tracks.
- Development of lateral spread and multiple parallel tracks, where the track surface is harder to travel on than the adjacent surfaces (e.g., too rocky, muddy, deeply incised, slippery).
- Development of informal tracks, including shortcuts on corners and switchbacks, and around focal points such as huts, campsites, attractions, and viewpoints.

Although comparative research is not extensive, it appears that the "foot-action" effects of walkers may in some cases more disruptive to track surfaces (particularly on downhill sections), than are the "wheel-action" effects of mountain bikes. The distinctly unique impact effect of mountain bikes is the linear tyre-track produced, particularly in soft or wet surfaces. When this effect is accompanied by downhill skidding through over-braking, it can contribute to development of "ruts", which over time may form erosive channels for water on sloping sections of track.

However, despite the different types of effects from mountain bikes and walkers, research provides no conclusive evidence that one is any "worse" than the other in the overall degree of impact created. General impact research indicates that the location and condition of the track (particularly with regard to drainage); the number of users overall; and the individual behaviour of these users, are more important for the development of track impacts than are differences in the type of recreation activity (e.g., walking and mountain biking).

**1.2.2 Social Impacts of Mountain Biking** The social impacts of mountain biking on the recreation experiences of other users, are interpreted best through the recreation

conflict concept. This occurs when the presence and/or behaviour of some users interferes with the achievement of the desired recreation experience "goals" of other users. Extensive research exists on this topic, although virtually none deals specifically with mountain bikes. The general research concludes that conflict is more complex than simply "one activity versus another". In general however, the clearest examples of conflict are demonstrated in the inter-activity conflicts of "motorised" and "non-motorised" groups. From the limited research, article and commentary sources available, three main types of impact perceptions are clearly associated with mountain biking by other users (e.g., walkers):

- Perceptions that mountain biking has too much environmental impact.
- Perceptions that mountain biking represents a safety hazard to others.
- Perceptions that mountain biking is an "inappropriate" activity in settings where walking takes place.

The perceptions of environmental impact appear exaggerated on the basis of the research undertaken on such impacts (both for mountain bikes and for recreation use in general). Perceptions of safety hazard from mountain biking appear to reflect concern about the presence of mountain bikes and the possible hazards. In areas of high interaction between walkers and mountain bikes, actual accidents appeared very rare. However, the potential for hazard from the irresponsible behaviour of some riders was widely acknowledged. Generally, both these types of perceptions appeared to be associated with general feelings of disapproval toward mountain biking by walkers, and that it is an "inappropriate" activity on tracks used for walking.

The situations where walkers perceived that mountain biking was "inappropriate" appear to represent a tendency to perceptually associate mountain biking with "motorised" activity groups. In the extensive research documenting perceived conflict between "motorised" and "non-motorised" groups, the differences in activity type represented fundamental differences in user characteristics, behaviour, motivations, preferences, and environmental attitudes. However, despite strong walker perceptions to the contrary, the differences arising between walkers and mountain bike riders were much more subtle. Associating mountain bike riders with the types of characteristics commonly associated with "motorised" users was misleading.

Another finding from this conflict research was that the recreation experiences of "non-motorised" types of users were more susceptible to disturbance than were those of "motorised" types of users. This reflected their different activity motivations and expectations. It appears that this situation exists for walkers, when considering how they feel about real or potential encounters with mountain bikes. There is also some suggestion that over time, as more actual experience of mountain bikes is achieved, some decrease of conflict perceptions does occur. However, research to date is insufficient to draw conclusions.

**1.2.3 Demand for Recreation Settings and Experiences** Different activity motivations, and perceptions of the different motivations of other users, were considered to be very important in the development of recreation conflicts. However, almost no research on the characteristics, motivations and preferences of mountain bike riders has been done. When considering how to deal with mountain bike issues, and possible provision of opportunities for mountain biking, managers have had only anecdotal comments and observations to guide their judgements.

From the limited material available, it was apparent that mountain bike riders desired a variety of riding conditions. Important components often included riding in natural forested settings, experiencing scenery, and being challenged. There also appeared to be some variation in these preferences between riders with different levels of off-road riding experience.

Given the importance attributed to the role of activity preferences in the development of recreation conflict, and the need for managers to have information on mountain biking demand, this study was directed at providing a comprehensive view of rider preferences for recreation settings and experiences. Assessment of social impacts was not the focus of this study as other work is currently underway for the Department (Horn, 1994), and this type of information is more readily available from other sources. Assessment of physical impacts was not addressed as it represents a different research field, and is likely to be included in general impact assessment work being considered by the Department.

### **1.3 Objectives of this study**

The objectives of this study were to:

- Provide a profile of mountain bike rider characteristics.
- Describe their preferences for recreation settings and experiences.
- Determine their attitudes toward key management issues.
- Make recommendations for management options and future research needs.

The results from addressing these questions are presented in Sections 3-5, with subsequent discussion and recommendations in Sections 6 and 7. Additional analyses are presented in the Appendices. It is anticipated that those with greater interest in any of these more detailed areas will refer to the appropriate appendix.

## 2. RESEARCH METHODS

### 2.1 Data collection

The target group for the survey were those more "active" riders likely to be using tracks and facilities managed by the department. A sample of such riders was readily available from two major mountain bike races in the Wellington area. One was the "Karapoti Classic", which was first staged in 1986. It is one of New Zealand's premier mountain bike events, attracting over 700 entries in 1993 when the sample was compiled (reached 1000 in 1994). The other was the "Orongorongo Classic" which includes many of the same riders. In addition, a list of bike shop customers was used to provide a contrast between the "race" sample and more general riders.

When combined, the total initial sample comprised 786 riders. These were sent postal questionnaires to complete and return. Envelopes with postage and return-address were provided, and a letter endorsing the study from a representative of the New Zealand Mountain Bike Association was included. In addition, reminder notices were sent to encourage response. The questionnaire, the covering letter, and the reminder notice are included in Appendix 1.

### 2.2 Response Rate

As shown in Table 1, response to the survey was high, particularly amongst the more committed riders (as defined by their race class). A much lower response was received from the sample of bike shop customers (referred to as "shop" sample). This provided justification for the decision to concentrate sampling effort upon the more specific "active" riders represented by the "race-entry" sample. In the following tables, unless otherwise indicated, the sample size being referred to by the percentage figures is 504 responses.

### 2.3 Analysis Notes

Most of the analysis presented in this report deals with the total response of the sample, and additional comparison of these responses based upon rider experience. The experience level groups were identified using the rider's own definition of how experienced they were at mountain biking.<sup>2</sup> While this was a subjective self-assessment, comparison of the "rated experience" with other experience indicators such as "years of riding", "riding trip frequency" and "number of races" indicated rider self-assessments were representative of the other experience criteria.<sup>3</sup> In addition, riders who indicated they were more experienced had visited a greater variety of Wellington riding sites.<sup>4</sup>

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<sup>2</sup> On this basis the responses in each group were 59 for beginners, 121 for riders with moderate experience, 222 for riders with much experience, and 102 for very experienced/expert riders (see Table 3).

<sup>3</sup> This comparative analysis is presented in Appendix 5.

<sup>4</sup> The number of sites used by riders is presented in Appendix 3, along with other information about Wellington riding sites.

**Table 1 Response rate to the postal survey.**

RACE CLASS (based on race entry)	Original Post-out	Not received	Actual Post-out	Final Returns	Response Rate
Expert Riders	141	4	137	113	82.3%
Sport Riders	235	3	232	183	78.9%
Novice Race Riders	140	1	139	96	69.0%
Novice/Fun Riders	78	2	76	46	60.5%
<b>TOTAL RACE SAMPLE</b>	<b>594</b>	<b>10</b>	<b>584</b>	<b>438</b>	<b>75.0%</b>
Bike Shop Customers	192	12	180	66	36.6%
<b>TOTAL OVERALL</b>	<b>786</b>	<b>22</b>	<b>764</b>	<b>504</b>	<b>65.9%</b>

And while the sample was drawn from riders who had entered a race, it was not considered that they would therefore represent a group dedicated to racing. The race events providing the sample included a range of race classes (refer Table 1), which represented a cross-section of rider experience and orientation towards racing.<sup>5</sup>

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<sup>5</sup> The sample could be split into separate "racer" and "non-racer" groups, and comparison of these enabled the type and degree of any possible bias resulting from race-orientation to be identified. Due to the extensive nature of these additional analyses, they are presented in Appendix 2 rather than in the main results.

### 3. RESULTS - RIDER CHARACTERISTICS

**SUMMARY:** Riders are a distinct recreationist group characterised by younger male participants with professional-type backgrounds, an interest in "active" types of recreation, and a high degree of club involvement. Activity levels and relative experience levels are high, although experience is limited as mountain biking is only a recent development.

- The age, gender and occupation characteristics of these riders were representative of "active" outdoor recreationists. Women were a small minority of riders overall, although they represented almost half those rating themselves as beginners.
- Few riders had over 5 years experience, although activity levels and self-rated experience were high.
- More experienced riders had high club involvement, more experience of overnight trips, and had spent more on their bikes and associated improvements.
- Many riders also participated in running, walking, tramping and road cycling. With experience, more riders were involved in tramping and skiing, and less involved in walking and team sports, reflecting a more "active" outdoor orientation.

The descriptive characteristics of mountain bike riders were addressed in three ways: their socio-demographic features, their experience levels, and their degree of commitment to mountain biking.

#### 3.1 Socio-demographic characteristics of riders

The patterns of age, gender and occupation (Table 2) generally match those of other "active" outdoor recreationists such as trampers; being characterised by a predominance of younger age groups, and of those with higher educational and occupational status. One distinction amongst mountain bikers was the gender balance, which was weighted more heavily towards men, to levels characteristic of activities such as climbing, hunting

**Table 2 Socio-demographic characteristics (%).**

AGE (years)	Under 20	19	OCCUPATION	Professional/Technical	36
	20 – 29	42		Student	18
	30 – 39	27		Admin/Management	12
	40 – 49	9		Clerical/Sales/Service	10
	50 – 59	3		Labour/Transport	3
	Over 60	0		Not Working	3
GENDER	Male	85	School	3	
	Female	15	Agriculture/Forestry	1	
			Other (non-specific)	14	



Table 3 Experience characteristics of riders (%).

EXPERIENCE (self-rated)	Beginners	12	EXPERIENCE (years riding a Mountain bike)	1 year or less	20
	Moderately experienced	24		Between 1 – 2 years	23
	Have much experience	44		Between 2 – 3 years	19
	Very experienced/expert	20		Between 3 – 4 years	16
				Between 4 – 5 years	11
				More than 5 years	10
EXPERIENCE (races done)	None done before	12	EXPERIENCE (days off-road riding per year)	Only ride on road	2
	Only 1 race	12		Off-road under 6 days	5
	2 – 5	22		7 – 12 days	9
	6 – 10	14		13 – 24 days	10
	11 – 20	17		25 – 50 days	28
	21 – 50	17		50 – 100 days	23
	50 – 100	4		Over 100 days	23
	Over 100 races	2			

and fishing. More general activities such as walking or tramping tend to have more even gender balances (but most often still dominated by males).<sup>6</sup> These characteristics can be considered to make mountain biking more representative of the other "active" types of outdoor recreation (e.g., climbing, backcountry tramping), as compared with the more "passive" types of outdoor recreation represented by walking.<sup>7</sup>

### 3.2 Experience characteristics of riders

**3.2.1 Overall riding experience** Rider experience at off-road riding was addressed directly by the number of years they had been riding mountain bikes, the number of races they had done, and their usual number of days spent riding off-road in the year. It was also addressed indirectly by riders rating their own experience and skill levels on a scale provided (Question 4). Results of these questions for all riders are summarised in Table 3.

The main finding of these experience related questions was that only 10% of the sample had been riding mountain bikes for more than 5 years. This emphasises how new this activity is in the outdoor recreation environment. Although riders had not been active for many years, their activity levels were high. Almost 50% were riding off-road on over 50 days per year, representing a frequency of 1-2 times per week on average.

<sup>6</sup> Differences in responses between male and female riders are presented in Appendix 4.

<sup>7</sup> This distinction between "active" and "passive" orientations in activities is used later to describe some of the conflicts which may arise between mountain biking and walking in the same settings.

**Table 4 Descriptive characteristics by Experience levels (self-rated) (%).**

PROFILE CHARACTERISTIC		Beginners (combined)	Moderately Experienced	Have Much Experience	Experienced Expert rider
AGE	Under 20	22	21	19	18
	20 – 29	24	42	43	50
	30 – 39	32	27	28	22
	40 – 49	15	7	8	8
	50 – 59	7	3	1	2
GENDER	Male	58	82	90	93
	Female	42	18	10	7

When seasonality is considered, the activity level in the peak season (non-winter) would appear much higher.

Considering that this sample was drawn from race entrants, experience of racing is not extensive. Less than 25% had done more than 20 races. This may reflect the recent development of the activity. However, when compared to the number of days riding, these results suggest that racing is not currently a big part of mountain biking activity for most riders.

Overall, riders did consider themselves experienced, with only 12% classifying themselves as beginners.

**3.2.2 Variation in age and gender by experience** Changes in rider age and gender did occur across different experience levels (Table 4). In age, the proportion of riders aged 20-29 increased with experience. However, this may not reflect a stable pattern, as the activity is very new, and current rider numbers amongst the young may be maintained into the older age-groups with time.

High interest in mountain biking by women was indicated by their high proportion amongst the "Beginners" (42%). But their numbers declined to only 7% amongst experts. This could represent reluctance amongst women to acknowledge their experience, a high activity "drop-out" rate, or a more recent interest in riding amongst women which with time will translate into greater numbers of more experienced women riders.

### **3.3 Commitment characteristics of riders**

An increasing commitment of participants to mountain biking with increasing experience levels was shown by their investment in equipment, involvement in clubs, and patterns of outdoor activities. These are listed in Tables 5 - 7. An important implication of club membership is the role clubs may play in enhancing the self-regulation of riding attitudes and behaviour.

Table 5 Commitment characteristics of riders.

COMMITMENT CHARACTERISTICS	TOTAL %	Beginners (combined)	Moderately experienced	Have much experience	Expert/very experienced
Club Membership Yes	33	5	22	36	55
No	67	95	78	64	45
Bike Value (\$) Under 1000	16	46	31	9	1
1000 – 2000	44	49	60	44	22
2000 – 3000	24	5	4	32	38
Over 3000	16	0	6	14	38
Done overnight trips Yes	41	10	34	47	53
No	59	90	66	53	47
% who have modified their bikes	22	9	11	40	56

Increased club involvement by the more experienced riders is notably high when compared with that apparent for other outdoor activities<sup>8</sup>. Local Wellington riding clubs dominated membership at the lower experience levels, but other clubs from elsewhere in the North Island increased their proportion as experience levels increased. However, the race events sampled are important on the national race calendar and attract many committed riders from further afield. This may explain the high membership levels with greater experience, and the presence of some members from distant clubs.

Further commitment is indicated by the increasing investments made in bikes and modifications by the more experienced riders. Amongst beginners, most modifications involved addition of minor items such as handlebar extensions (bar-ends). The more expensive bikes favoured by the more experienced riders usually came with these items. However these riders carried out other more substantial modifications (e.g., suspension forks and clip pedals).

A high proportion of riders (41%) also indicated they had done multi-day riding trips (Table 5), and particularly amongst the more experienced riders. This suggested riders have a high familiarity with the potential for multi-day riding, and a high interest in doing more such rides. Overall, 30% of riders did specify particular places they would like to do such rides in the future. The locations of these rides are summarised in Table 6, along with those places such rides had already been done.

Riders' initial interest in multi-day rides had been largely confined to road-rides, but they appear more interested in undertaking off-road rides in the future. The diversity of riding areas named, and the high apparent interest in more localised trips (e.g., in

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<sup>8</sup> Shultis (1991) found outdoor recreation club membership of only 13% for a general public sample, 20% for a national park visitor sample, and 35% for a backcountry users sample.

Wellington area), suggests that pressure on specific backcountry areas from multi-day riding trips will not be great. However, interest in having the options available to do such rides appears high.

Rider commitment to their activity was also investigated by the relative importance they attributed mountain biking in their outdoor activities. Table 7 summarises the top three outdoor activities indicated by riders. The % figures represent the proportion of the whole sample who indicated the activity as one of their top three.

Most riders included mountain biking in their top three outdoor activities (93%). Beginners differed mainly in that 41% did not. As experience levels increased, involvement in walking declined, while that in tramping increased. This may be indicative of a more "active" approach to walking amongst the more committed riders. Road cycling was indicated by many beginners (32%), possibly reflecting their generally greater preference for riding on sealed roads (refer Table 6). This road-cycling preference then decreased, but increased again amongst the expert riders (29%), perhaps reflecting the preference of many competitive mountain bike riders for road training.

These riders are active outdoor participants, and the emphasis on "physical" outdoor pursuits appears greater amongst the more experienced riders. Because mountain biking is a new activity to most, it is likely that it has generally complemented existing outdoor activity preferences, rather than being the means by which new users have been introduced to the outdoors. Over a third (37%) included tramping/walking in their top three activities, suggesting that many may be aware of the potential conflicts with other track users.

**Table 6** Locations of multi-day riding trips (those already done and those desired).

Locations for Multi-day riding trips (categorised) (% of the sample who specified each location)	Ride done here	Want to ride
	before (n=195)	here (n=152)
South Island road riding	37	21
Wellington "Big Coast" event	25	1
North Island road riding	20	7
Queen Charlotte Walkway	12	5
Off-road riding (other South Island)	9	14
Off-road riding (other North Island)	9	12
Molesworth/Rainbow routes	9	5
Off-road riding (other Wellington)	9	10
Wellington coastal routes	8	8
Heaphy Track	3	7
Rimutaka Incline Track	2	0
National Parks Tracks	0	14
Other	6	17

**Table 7 Outdoor activity characteristics of riders (their top three activities).**

MAIN OUTDOOR ACTIVITIES	TOTAL %	Beginners (combined)	Moderately experienced	Have much experience	Expert/very experienced
Mountain Biking	93	59	95	98	100
Running	28	37	32	26	26
Road cycling	20	32	12	17	29
Tramping	20	3	18	22	26
Walking	17	37	22	13	8
Skiing	17	9	1	18	29
Sailing/Windsurfing	6	2	4	7	8
Hunting/Fishing	6	7	3	5	10
Kayaking	6	3	3	8	5
Climbing	6	2	8	8	4
Outdoor Team Sports	15	28	23	12	8
Other Activities	39	50	31	45	36

#### 4. RESULTS - SETTING/EXPERIENCE PREFERENCES

**SUMMARY** Riders demonstrated their diverse needs through indicating a variety of activity preferences based upon challenging riding, natural forested settings, single-track, speed and excitement experiences, scenery, and general variety in riding conditions. The emphasis placed on these, and other preferred features varied with rider experience.

- Setting and experience features which were consistently important for most riders included appreciating scenery/views/nature, an undulating route, forest settings (particularly native forests), socialising with others, exploring new areas, ride duration of 2-3 hours, smooth/fast/open track surfaces, some speed/excitement/risk, and some exercise/fitness workout.
- Features which were particularly more important to experienced riders were physical and technical challenge, single-track which is tight/narrow/winding, rough/technical/tight track surfaces, fast/technical/tight downhills, more challenging uphill, and racing. In addition, experiencing some speed/excitement/risk was generally more important for experienced riders than beginners.
- Features which were particularly more important to less experienced riders were gentle/gradual/easy uphill, smooth/easy/open track surfaces, ride duration of 1-2 hours, few obstructions or difficulties on tracks, relaxation/easy riding/cruising, slow/gentle/easy downhills, and riding on sealed roads. Experiencing peace/quiet/solitude was also a little more important to beginner riders.
- Most riders indicated some tolerance for carrying/pushing their bikes, although this was generally for no more than 25% of any ride.

Riders were asked about the features of mountain biking most important to them, and the setting attributes they preferred for their riding experiences. The former required riders to select their preferences from a list of feature options. The latter required riders to score the importance of listed setting attributes, and to state their favourite riding conditions in an open ended question. This chapter is divided into three corresponding sections.

##### 4.1 Preferred Features of Mountain Bike Riding

Riders were asked to indicate their top-three features of mountain biking from the list provided. Table 8 summarises<sup>9</sup> these responses for the whole sample, and also for respective-experience level groups.

While experiencing speed, exercise and scenery were the top three features for the whole sample, it is clear from Table 8 that preference for these features changed with increasing experience. The only features which appeared to be of generally similar importance to all riders were appreciation of views/scenery/nature, socialising with

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<sup>9</sup> The percentage figures represent the proportion of the sample who included the feature amongst their top three. When these responses were looked at in order of preference (see Appendix 6), no particular features were dominant as first choices.

**Table 8 Top Three Features of Mountain Biking (n = 495).**

MOUNTAIN BIKING FEATURES (the top three features)	TOTAL %	Beginners (combined)	Moderately experienced	Have much experience	Expert/very experienced
Speed/excitement/risk	43	17	43	46	51
Exercise/fitness workout	42	59	48	44	23
Appreciating views/scenery/nature	38	47	37	39	31
Exploring new areas	33	34	42	33	23
Riding/socialising with friends	33	37	34	33	30
Racing and race training	28	0	4	21	44
Physical challenge (hard riding)	24	12	24	26	27
Skill challenge (technical riding)	22	4	17	21	41
Developing and improving skills	15	5	22	15	11
Commuting around town/transport	7	17	8	9	7
Relaxation/easy riding/cruising	7	31	7	2	3
Peace/quiet/solitude	2	19	7	2	3
Overnight trips/touring options	2	4	1	4	4
Other	2	4	2	2	2

friends, and exploring new areas. The variation in the importance of the other features indicated that changes in rider preferences were occurring with their greater experience.

Features which became progressively more important with greater experience included skill challenge (technical riding), physical challenge (hard riding), and racing. Speed/excitement/risk was also consistently important for the more experienced riders (less important for beginners). By contrast, features which became progressively less important included relaxation/easy riding/cruising, and to a lesser extent peace/quiet /solitude.

These results show a number of features contribute to riding enjoyment. Beginners more often favoured socialising, appreciating views/scenery/nature, exercise and fitness, and relaxation/easy riding. Experienced riders more often favoured speed, technical challenge, and racing.<sup>10</sup>

#### **4.2 Preferred setting attributes**

Riders scored how important they considered a number of listed setting attributes were to their riding experiences. The results here are summarised in short sections for the

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<sup>10</sup> These general patterns of findings were repeated when riders were asked to specify their five most important of these features (see Appendix 6, Table A.6.6).

Table 9 Landscape setting preferences.

SETTING ATTRIBUTES – Landscape setting	I don't want this	I avoid if possible	OK some times	I usually prefer this	Always essential
Route in open farmland	2	15	64	17	2
Route in forestry area (Pine)	1	2	40	53	5
Route in native forest/bush	0	1	15	74	10

different attribute types. These attributes represent many of the physical and social components of mountain bike riding (e.g., landscape settings, track types, track conditions, downhill sections, uphill sections, social encounters). Variations in responses due to different levels of rider experience are tabulated fully in Appendix 7.

**4.2.1 Preferences for Landscape Settings** Some of the setting attributes listed dealt with landscape settings in which rides could take place. The overall responses of riders are presented in Table 9.

Rider preferences most favoured the native forest/bush settings. Most riders were prepared to ride in farmlands at some times, but active preference was for forested areas, and in particular those of native forests. This pattern of preferences varied little between riders of different experience (Table 10).

The largely consistent responses across the experience levels, suggested common preferences for most riders. Some variation was apparent in rider preferences for forestry areas (Pine), with beginners least interested in this setting. Higher preference was apparent for more experienced riders and expert riders.

Table 10 Landscape setting preferences (by experience level).

SETTING ATTRIBUTES – Landscape setting	I don't want this	I avoid if possible	OK some times	I usually prefer this	Always essential	NOTES
Route in open farmland						Most were tolerant of this some of the time. There was little variation across experience levels.
– Beginner	7	16	54	23	0	
– Moderate experience	1	14	60	19	6	
– Much experience	1	14	68	15	1	
– Expert experience	1	20	64	16	0	
Route in forestry area (Pine)						Most were neutral or positive towards this. Preference was least amongst beginners, but was consistently higher for more experienced riders.
– Beginner	5	3	53	33	5	
– Moderate experience	0	2	40	52	6	
– Much experience	0	1	41	54	4	
– Expert experience	0	2	33	60	5	
Route in native forest/bush						Most riders indicated a strong preference for this, although it was not considered always essential. This was consistent across experience levels.
– Beginner	3	2	23	65	7	
– Moderate experience	0	1	14	73	12	
– Much experience	0	0	11	79	10	
– Expert experience	0	1	20	70	10	



Table 11 Track type setting preferences.

SETTING ATTRIBUTES – Track type	I don't want this	I avoid if possible	OK some times	I usually prefer this	Always essential
On single-track (walking)	1	4	26	45	24
On farm roads/tracks (4WD)	1	6	54	34	5
On firebreaks/other (4WD)	1	4	38	48	9
On gravel roads	2	22	58	15	3
On sealed roads	15	47	32	4	2

The generally high interest in riding in all setting types suggested wide-ranging options for provision of mountain biking opportunities. Although greatest rider preference was for natural forested areas, where conservation values and other recreational uses are likely to be at highest levels, riders were also interested in other types of areas. In these farm and forestry areas, the potential management and social conflicts are likely to be less acute because of lower conservation priority or competing recreation uses. However, access to farm and forestry areas can also be difficult, because they are generally in private ownership and have management priorities which may conflict with recreation.

**4.2.2 Preferences for Track Type** Riders indicated preferences for different types of tracks. Those listed in Table 11 represent the range of tracks possible for riding. The track types are listed in a general order of increasing development, beginning with single-track (walking type) and ending with sealed road.

Overall, riders expressed greatest preference for single-track settings for their riding. As tracks become more "developed", rider preferences declined. Results indicated that sealed and gravel roads were generally unpopular settings for riding.

When variations according to rider experience were considered (refer Table 12), preference for single-track riding increased strongly amongst the more experienced riders. Only the beginner riders showed any negative preference against single-track riding (26% overall). A similar preference pattern was apparent for 4WD tracks in general (farms/firebreaks/others), although it was still clearly secondary to that for single-track riding. The 4WD tracks on farms were generally less preferred than those in other areas such as firebreaks. Expert riders in particular showed greater preference for the non-farm 4WD tracks.

**4.2.3 Preferences for Track Conditions** A large number of the setting attributes listed related to the condition of track surfaces. Overall results in Table 13 indicate that riders had a variety of preferences for these different conditions.

The condition most preferred overall was for tracks which were rough/uneven/tight/narrow. The next most preferred condition was for tracks which were smooth/benched/open/clear. This clear difference indicates that there is variety in the