Lincoln University Digital Dissertation

Copyright Statement

The digital copy of this dissertation is protected by the Copyright Act 1994 (New Zealand).

This dissertation may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- you will use the copy only for the purposes of research or private study
- you will recognise the author's right to be identified as the author of the dissertation and due acknowledgement will be made to the author where appropriate
- you will obtain the author's permission before publishing any material from the dissertation.
CASTLE HILL ROCK CLIMBING

A CASE STUDY OF A RECREATION VERSUS PRESERVATION CONFLICT

SHAUN BARNETT
CASTLE HILL ROCK CLIMBING
A CASE STUDY OF A RECREATION VERSUS PRESERVATION CONFLICT

A dissertation submitted in partial fulfilment
of the requirements for the
Post Graduate Diploma in Parks, Recreation and Tourism
at Lincoln University

by
Shaun C. Barnett

Lincoln University
1991
ABSTRACT

Castle Hill basin is a unique area of limestone tors in the Broken River catchment of Canterbury. The limestone provides specialised habitats for a number of plants in the area, some of which are endemic to the basin. The area also has important cultural values in both Maori and European History. The remarkable limestone tors and setting of Castle Hill has become a focus for recreationists. One recreational activity, rock climbing, has become particularly popular. Castle Hill provides unique recreation experiences for rock climbers that are not paralleled in other climbing areas of Canterbury. Rock climbing has associated biophysical and social impacts that are likely to escalate in magnitude without appropriate management. As a consequence, the biological and social values of the area may be degraded. These impacts are outlined and discussed in the context of the resource values. This is the recreation versus preservation conflict. The aim of this report is to highlight the important values that are jeopardized by rock climbing and to identify some means to resolve the conflict.

An important step towards resolving the conflict is to investigate climbers' needs, and to establish their perceptions of impacts. A survey of 52 rock climbers was conducted at Castle Hill and their views on impacts and climbing at Castle Hill were investigated by means of a verbal questionnaire. Education of the climbing community has potential to encourage climbers to minimise their impact. Measures to provide information to climbers were established, and some possible courses of management action to minimise the resource degradation have been made.
PREFACE

No report can hope to escape the subjective element of its author. This subjectivity includes the way I interpret the texts I have used, those communications I have with other people and the manner in which I write. As a consequence I do not claim that this report is anything other than my own interpretation of a recreation versus preservation conflict. I view things from my position as a rock climber with a keen interest in conservation. Nevertheless, I hope that I have provided a thorough account of the issues surrounding rock climbing at Castle Hill and offered some possible courses of action to help maintain the integrity of this unique, magnificent area.

Many people have helped me with this dissertation. I am in debt to all those climbers who willingly gave their time to be interviewed at Castle Hill. I hope that this information will be of use in protecting the resource at Castle Hill for climbing and conservation. Thank you also to Steve Baker, Jo Stilwell and Lynley Johnston for helping with the interviews, and of course, for all the climbing! Bob Gidlow and Pip Lynch were most helpful in developing the survey questions. Robin Smith gave me insights into the role of D.o.C at Castle Hill, and for that I am grateful. Finally, thanks to Pat Devlin for supervising, when he was so busy with many other students as well.

All photographs are by the author.

Cover Photograph Climber top-roping on 'Nether Edge' Quantum Field.
<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
</tr>
<tr>
<td>Preface</td>
</tr>
<tr>
<td>Contents</td>
</tr>
<tr>
<td>Chapter</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chapter</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chapter</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chapter</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chapter</td>
</tr>
<tr>
<td>References</td>
</tr>
<tr>
<td>Appendices</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION

1.1 Recreation as a Land Use
Recreation, when viewed as a land use, often appears to be compatible with the physical and biological values of natural and semi-natural areas. Other more exploitative land uses such as deforestation, mining, agriculture, wildlife exploitation and urban development require modifications that, more often than not, jeopardise the physical and biological values of natural areas. Recreation can require modifications to areas in the form of developments including, for example, tracks, access roads and huts. However, the essence of recreation in natural areas is to experience the natural setting, rather than extract something from it.

Protective status is often afforded to natural areas, in part, because of their recreational value. Much of New Zealand’s mountain land resources have been so protected.

Recreation, however, has associated impacts. Trampling of vegetation, disturbance of wildlife, increased erosion, litter and waste are some examples of such impacts. Many of the environmental impacts are not obvious in the short term, but gain significance with the passing of time and with increasing use. All recreational impacts are of great importance, however, for two reasons.

First, many of the remaining natural areas in New Zealand are in mountainous regions, where there are very few other possible ‘uses’. Much of the protection of natural areas in New Zealand has been so afforded because of this attribute. Mark (1985) quotes a figure of 0.5% of protected natural areas that have been preserved against alternative economic uses. From this view, recreational impacts take on a new meaning. Recreational impacts become the major human impact on such areas.
Second, human demands for resource based recreation are increasing. Technological advances constantly improve the mobility of tourists giving greater access to New Zealand. This, coupled with the increasing importance of recreation within New Zealand, means the resultant user impacts are likely to escalate in magnitude in the future.

1.2 Recreation versus Preservation

Many authors have defined conservation as the wise use of resources at a sustainable level. Preservation, on the other hand, is saving from use (Howell 1986:4). Preservation and recreation are clearly incompatible land ‘uses’. Given that an area is to be used for recreation, what then is the ‘wise use’ of the resources at a ‘sustainable’ level?

Defining which recreational activities are compatible with an area may be relatively simple to decide. The physical and biological characteristics of an area will largely dictate the appropriate recreational uses. For example, four wheel driving may be not be an appropriate use for an area, whereas tramping over a boardwalk may have minimal impact. Other vital considerations are the availability of alternative recreation opportunities for users.

Deciding what is a sustainable level of use is not as easy. I do not propose to initiate a discussion on sustainability, but wish to emphasize that some regulatory management practises are inevitable to manage recreation on natural estates to ensure the resource base is not degraded to an extent where it loses important values. Recreation researchers have developed two tools to ensure that there is a continuum of recreation opportunities, and that the resource base is not degraded to an unacceptable level. The Recreation Opportunity Spectrum (R.O.S) is a planning framework used to categorise a full range of recreation opportunities for a particular resource base (Manning 1986).

The Limits of Acceptable Change (L.A.C) process is a planning tool used to set acceptable standards of resource degradation from recreation. An indicator (such as tracking) is used to define an appropriate amount of use. Management measures are required if the use degradation exceeds the predetermined limit.
The values of a natural area are dependent on its biological and physical characteristics as well as its' cultural importance. Managers of natural areas need to carefully balance the recreational use with the other social and biological values. Increasing pressure on these areas from recreationists requires managers to make decisions regarding the control of recreational impacts, using tools such as R.O.S and L.A.C. This is the recreation versus preservation conflict.

1.3 Rock Climbing at Castle Hill

Castle Hill is an area of remarkable limestone tors in the Broken River catchment of the Waimakariri basin. The tors are a spectacular visual feature that are clearly visible from State Highway 73. Rock climbing is a recreational activity that has become increasingly popular at Castle Hill over the last ten years. The area provides the closest limestone climbing for Christchurch climbers, and provides opportunities to climbers that are not available on the Banks Peninsula rock climbing areas.

These opportunities are a product of the nature of the limestone. The angle and texture of the limestone tors provides climbers with a different style of climbing, involving balance moves and smearing\(^1\) or friction climbing.

This is opposed to more strenuous climbing or pock-pulling\(^1\) which is available on the igneous rocks of Banks Peninsula.

\(^1\) See Appendix A for a description of climbing terms
This is not to say that climbs at Castle Hill cannot provide opportunities for such climbs. Many more strenuous climbs are available. In addition, due to the absence of suitable cracks or pocks, the majority of the limestone is unprotectable with conventional forms of protection. This fact restricted climbing at Castle Hill prior to the 1980s, when the use of coach bolts began (Wethey 1989). Twelve inch coach bolts are driven into holes drilled in the limestone. This has enabled climbers to protect themselves by clipping onto the bolts with 'wires'.

Bolting has become widespread at Castle Hill with the majority of routes being bolted. This practice has created further opportunities for climbers. Lead climbing is possible for those not able to lead climb using natural protection due to lack of confidence or suitable gear. This is significant, as lead climbing can afford challenges to climbers that cannot be achieved through top-roping or seconding.

Controversy has surrounded the issue of rock climbing ever since bolting began due to a variety of factors. Bolts inevitably result in visual and physical impacts on the rock. Furthermore, many climbs are 'scrubbed' with wire or nylon brushes to remove flora such as lichens, which inhibit the friction necessary to climb on many routes. Some climbers have gone to the extent of modifying the rock itself by chipping or gluing holds onto the rock.

1.4 Biological and Cultural Values

The limestones effect on the soils of the area have enabled the evolution of a number of unique and specialised plants that occur on the limestone screes and soils (Gooch et al 1990). The best known of these is the Castle Hill Buttercup, which is contained within a nature reserve in the area. There are concerns over the impact of climbers on these plants.
Castle Hill is also of spiritual and cultural significance for Maori people. There are six known sites with rock drawings at Castle Hill, and Maori artifacts have been found in the basin and surrounding areas (Gooch et al 1990). These values are important in all considerations of rock climbing impacts, and must be carefully managed.

The aim of this report is to identify the surrounding issues of rock climbing impacts at Castle Hill, highlighting management and user concerns. Prior to this study, no thorough account of rock climbing impacts had been conducted at Castle Hill. Interviews were conducted with 52 climbers at Castle Hill during September and October 1991 to investigate the views of rock climbers using the area. In particular, I wished to establish climbers' awareness of rock climbing impacts, their views on bolting and manufacturing holds, and the values they placed on Castle Hill as a recreational area. Furthermore, it was hoped the survey would identify which are the best means for management to pass on information to climbers. I have made some recommendations for management which I believe will minimise the extent of impacts. These recommendations are made realising the limited resources available to the Department of Conservation for such management. The report has highlighted the need for continuing research into rock climbing impacts, and I have made some suggestions for further studies.
2.0 BACKGROUND

2.1 Geology and Botany of Castle Hill

The rocks of Castle Hill are derived from Tertiary limestone, mudstone, sandstone and tuff. These deposits have been downfaulted into the greywacke rocks of the surrounding Torlesse and Craigieburn Ranges (Gooch et al 1990:4). Canterbury limestones are the result of shell fragments accumulating on the sea floor some 30 million years ago. Extensive uplift has resulted in massive erosion of the limestones, with the only major areas remaining at Castle Hill and Hanging Rock (Main, as cited in Wetney 1989:135). Limestone is slightly soluble in water. The distinct shapes of Castle Hill boulders has resulted from water erosion. The undercut nature of many boulders has probably arisen from erosion by slightly acidic soils.

The limestone has had a profound effect on the soils of the basin, resulting in a range of soils containing silt and clay loams, with fine limestone fragments and stones. As a consequence, a variety of habitats exist for plants (and possibly invertebrates) that are distinct and uncommon in New Zealand (Gooch et al 1990:5).

The original vegetation at Castle Hill has been substantially altered through Polynesian and early European fires and subsequent grazing of sheep. Native plants now exist in those sites among the tors where grazing is minimal (Smith 1991).

Shanks et al (1990) have surveyed the vegetation of Castle Hill for the Protected Natural Area Programme. They defined three main groups of vegetation; (1) the limestone scree vegetation of short tussock grasses and limestone herbs; (2) rock ledge and crevice shrubs and herbs; and (3) calciphilic vegetation of mosses and lichens.
I do not intend to comprehensively describe the vegetation, but to highlight some of the distinct species that are of major importance in the Castle Hill basin.

**Plants Endemic to the Castle Hill Basin**

A herb (*Myosotis traversii var. cinerascens*), now considered extinct, is thought to have existed only on limestone scree at Castle Hill. It is possible that it is still present somewhere in the basin. *Carex inopinata* is a mat forming sedge found only on limestone, and is considered to be endangered (Gooch *et al* 1990:6).

There are three mosses (*Seligeria diminuta*, *Grimmia argentea*, *Orthotrichum austrooculatum*) that are restricted to, or most abundant in, the basin. Recently, an endemic grass yet to be described taxonomically has been identified (Smith pers. comm. 1991).

**Other Plants of Interest**

The Castle Hill Buttercup (*Ranunculus crithmifolius*) is the most well known species of the basin. It was once considered to be a separate species (*R. paucifolius*) and afforded the status of one of the rarest plants in the world. Although it's taxonomic importance has been reduced to that of a relatively common species, it is still a unique population. The Castle Hill population is the only one known to exist on limestone soils.

All of the buttercups are fenced from grazing within the Lance McCaskill Nature Reserve, which was gazetted in 1954. Permits are required for entry to the reserve, and as such climbers are excluded from the area.

The Castle Hill forget-me-not (*Myosotis colensoi*) is a vulnerable calciphilic species found only in the Castle Hill basin and in the Chalk Range, Marlborough (Gooch *et al* 1990:6).

Brockies harebell (*Wahlenbergia brockii*) is common at Castle Hill. It's taxonomic status is in question, and as such it's importance as a species is unknown. It was once considered to be endemic to Castle Hill, but is now thought to be more widespread (Gooch *et al* 1990:6).
*Poa acicularifolia* is an uncommon grass common on limestone screees at Castle Hill.

The Castle Hill basin is also of significance due to the unique combination of plants found in the area. Many plants normally existing in widely different habitats are found in the area (Burrows as cited in Gooch *et al* 1990:9).

This brief description of the flora of Castle Hill serves to highlight the importance of botanical values in the basin. These features must be preserved in the area, which may call for climbers' access to be restricted in areas where the unique plants are in danger from trampling (in particular *Myosotis* spp and the *Carex*). The Department of Conservation has already fenced off two small sites to protect these species (Smith 1991). Preservation of the flora of the basin is not a simple issue for management. Complications regarding grazing and competitive introduced plants (such as *Hieracium* spp) are evident (Gooch *et al* 1990).
2.2 Other Values of Castle Hill

I do not intend to provide an exhaustive list of the values and uses of the Castle Hill basin, but wish to emphasize some important values of the area that are relevant to rock climbers and associated impacts. Gooch et al (1990) have more fully described the values of Castle Hill. The scenic value of the area is an attraction to climbers which use the area. It is of major importance also because rock climbing can alter the aesthetic value for other users through biophysical and social impacts. The Cultural values of Castle Hill may also be under threat from rock climbers where they may impact on important sites.

Aesthetic/Scenic Value

The distinctive shapes of the limestone tors against the backdrop of the Craigieburn and Torlesse ranges has long been admired by visitors to the Castle Hill basin (See Figure 1). The tors provide a spectacular visual experience for the motorist along S.H. 73. Hayward and Boffa (1972:39) describe the "outstanding" view as:

"Extensive in length, breadth, scale and content and overpowering in its visual complexity".

They considered the magnificence of the setting was due to a variety of factors including the forms of the limestone outcrops contrasting with the sky, and the surrounds; the textual and colour contrasts between the natural and human landscapes; and the pastoral setting in the mountain environment. The scene is certainly magnificent and quite unparalleled elsewhere in New Zealand (See Figure 2).

The scenic qualities of the landscape are a major attraction for visitors to the area, with rock climbers being no exception. Rock climbing impacts may alter the aesthetic value of the area for some other users, or indeed rock climbers themselves.
Figure 1  Castle Hill tors with Craigieburn Range.

Figure 2  Limestone Forms at Castle Hill.
Cultural Values

Castle Hill traditionally was an important resting place for Maori on greenstone trails from Canterbury to the West Coast (Gooch et al 1990:15). Early users were the Wai Taka and Ngati Mamoe, with Ngai Tahu being the most recent users. The rocks were used as shelter, and as protection. Cave drawings are known to exist in six sites at Castle Hill (Smith pers. comm. 1991). In addition, artifacts have been found in the area (Gooch et al 1990:15). Castle Hill is of significant historical value both to Maori and Pakeha for these reasons.

Other Users of Castle Hill

Rock climbing is currently the predominant recreational use of the area. Before rock climbing gained its present popularity, more passive pursuits were the focus of most recreationists. Such pursuits as walking, photography, botanizing, picnicking and general scenic appreciation are still important recreational uses of the area. More active pursuits such as mountain biking and parapenting are occurring (Smith 1991).

Camping also has and does occur, although this is discouraged by the Department of Conservation (D.o.C) because of a lack of resources to service the camping area. There have been some suggestions from climbers to runholders to begin camping enterprises (Smith pers. comm. 1991), although none have surfaced. The majority of users spend just the day in the basin (Smith 1991).

A track counter set up by D.o.C (since removed) suggests that there is no apparent decline in winter usage of the area, despite the fact snow may be on the ground.
2.3 Land Tenure and Resource Management

The current status of land within the Castle Hill basin is varied (See Figure 3). The Department of Conservation has stewardship over two areas; the Lance McCaskill Nature Reserve comprising 6.4 hectares; and the Conservation Area of the limestone tors. This includes the climbing areas of Wuthering Heights and the Quantum Field. The legal ownership of part of the basin was disputed between D.o.C and the receivers of Castle Hill Run Ltd. The land is now legally owned by Mike and Lois Bradley of Castle Hill Station. This land has been part of a pastoral run, and the ownership is still contested by D.o.C. It contains the climbing areas of the Dark Castle and Lime Quarry Scarp. The southern area is owned by John Reid of Castle Hill Run Ltd, now in receivership and containing Spittle Hill climbing area.

Recreational use of Castle Hill has been subject to little active management by the Department of Conservation (Smith 1991). Two toilets have been constructed in the Quantum Field area by D.o.C. and a stile exists over the fence line bordering the Quantum Field (built by climbers).

D.o.C is currently constructing an interpretation panel which will have information on Maori use of the area, botanical and geological significance, European history and recreational use. This will include suggestions for a climbing code of practice (Smith pers. comm. 1991). This will be placed at the entranceway along with a sign marking the Castle Hill Conservation Area.

Little other recreation management is anticipated, with no visions for new facilities (Smith 1991). Robin Smith, D.o.C Waimakariri Conservation Officer, considers that the support and respect of the climbing community is necessary to ensure concern for the areas "wellbeing" (Smith 1991).
Figure 3 Land Tenure at Castle Hill.
2.4 History of Rock Climbing at Castle Hill

Rock climbing, in New Zealand, as a pursuit in its own right has really only begun in the last 20 years. Previously, rock climbing tended to be practised by alpine climbers to develop skills necessary to climb rock on mixed alpine routes (Atkinson 1980:44). Today thousands of climbers enjoy rock climbing on crags throughout the country.

First visits to Castle Hill occurred during 1975-78 (Wethey 1989:12). A majority of potential climbs had no means of protection, and this restricted climbing to mainly bouldering. A few routes were put up on the protectable climbs, with 'Big Chimney' being the first of the conventional routes. Most of these routes followed cracks. In 1981, John Allen who had been the prime instigator of such routes, left the area, after putting up the first route with bolts, 'Nether Edge'. The period 1981 - 1985 saw mainly bouldering occurring. 1986 heralded a new era in Castle Hill climbing with an explosion of new route activity occurring, using bolts. The majority of routes have been established since then, and more continue to be added every year.

There are now approximately 140 routes detailed in Tim Wethey's guide, "Canterbury Rock" (1989). The area now contains some of the country's hardest routes, including the only climb over grade 30, 'Angle of Pain'. Wethey (1989:12) considers Castle Hill to be "Canterbury's finest crag".

There are five main areas of limestone where climbing occurs. These are the Quantum Field, Spittle Hill, Dark Castle, the Lime Quarry Scarp and Wuthering Heights (See Figure 4). The main access route is along an informal track which runs along a fenceline beside a row of pine trees. Access to the Lime Quarry Scarp and Wuthering heights is possible via the entrance to the Lime Quarry.

---

2 Each climbing route is named by the first ascensionist
At present there are no guidelines or a code of conduct for climbers at Castle Hill (Smith 1991), although some informal communication has occurred between clubs and the Department of Conservation (For example C.M.C News April/May 1990 and N.Z.A.C Bulletin Sept 1987). Wethey (1989:15) in "Canterbury Rock", encourages climbers to be "...as inconspicuous with your new routing as possible". The interpretation sign will emphasize the need for minimal scrubbing, bolting, and will discourage manufacturing holds.

Figure 4 Climbing Areas at Castle Hill (From Wethey 1989).
3.0 ROCK CLIMBING IMPACTS

Rock climbing impacts at Castle Hill can broadly be categorised into social and biophysical impacts. Biophysical impacts refer to direct impacts on the vegetation, soils or rock by means of the climbing itself or the devices that climbers use. Social impacts refer to the presence of the climbers themselves on the experience of other users. This can also include the presence of the biophysical impacts that result from climbing.

Little research has been conducted on the impacts of rock climbers in New Zealand. Recently, a Cambridge University Geography student studied vegetation impacts from rock climbing in the Mangetepopo valley, Tongariro National Park. The results have not yet been documented. Research in the United States of America has indicated that rock climbers have substantial impacts at popular climbing areas. In some areas (such as Joshua Tree National Monument) there is considerable controversy over climbing practise both between climbers and managers of climbing areas, as well as within the climbing community itself. Some of the issues of impacts in overseas climbing areas are discussed later. These examples serve to illustrate the potential for increased impact from rock climbing should it’s popularity continue to grow at Castle Hill.

3.1 Biophysical Impacts

The biophysical impacts of rock climbing at Castle Hill include damage to vegetation from trampling while accessing climbs, bolting on the rock face, scrubbing rock faces, use of chalk, manufacturing holds, wear on the rock, litter, wastes and increasing erosion from tracking.
Vegetation damage

As already mentioned, many rare and unique plants exist on the limestone soils and screes of the Castle Hill basin. Some of these plants are affected by climbers trampling over them while accessing climbs. In particular, the limestone screes on slopes between Dark Castle and the Lime Quarry Scarp are vulnerable to trampling (Gooch et al 1990:19). In most areas, it is difficult to separate climbers' impacts from that of grazing animals. However, climbers access cracks or ledges on the tors when climbing where grazing animals cannot reach. These refuges may contain plants that can be trampled by the climber or destroyed while cleaning the climb.

Wilson (in Wethey 1989:150) emphasizes the special habitats for plants that are provided by rock outcrops, crags and cliffs.

"Often they support a greater diversity of species than on the valley slopes and floor below...partly because of the wide range of niches available...and partly because they provide a refuge for species that have not withstood the burning and grazing inflicted on gentler terrain."

Some areas where the threatened Carex inopinata and Castle Hill forget-me-not exist are protected from trampling, in the form of fenced areas. However, it is highly possible unidentified sites exist where the plants are still in jeopardy of trampling.

The base of climbs is likely to be an area where there is substantial damage to native plants where they exist. Areas in the United States such as Joshua Tree National Monument (Swain and Garret 1990) have substantial impacts from climbers on natural vegetation, particularly at the base of climbs, and climbers themselves have proposed minimum impact procedures to protect native vegetation.
Some form of interpretation will help increase climbers' awareness and hopefully their sensitivity toward those native plants that exist at Castle Hill. The interpretation panel designed by the Department of Conservation will have information on the unique flora and geology of the basin. In addition, board walks could be provided between major climbing areas to minimise vegetation and soil damage. Gooch et al (1990:19) suggest such a management action is appropriate on the delicate limestone talus slopes between the Quantum Field, Dark Castle and Lime Quarry Scarp.

It may be necessary to restrict climbers’ access to the base of climbs where native plants are being seriously damaged. Some of these plants exist under the 'drip line' of overhung boulders, where there is just sufficient rainfall for them to exist without competition from introduced plants (Smith pers. comm. 1991). This area is exactly the base of many climbs.

**Bolting**

Bolting is a common practice at Castle Hill, with a majority of the 140 climbing routes having one or more bolts in place for protection. As already emphasized, bolting is necessary if climbs are to be protectable, as most of the routes suitable for climbing have no suitable cracks or pocks for natural protection. Use of natural protection where possible, is itself questionable, because of the weak nature of limestone. Natural protection may pull out, damaging the rock, and causing safety concerns for climbers.

The bolts used at Castle Hill are predominantly 12-inch metal expansion bolts, that are placed into pre-drilled holes in the rock (Wethey 1989:14). Because bolts are strong and can be safely loaded from almost any direction, they are one of the most secure anchors available to climbers (Gerrard 1990:99). They are permanent and hence provide a visual and physical impact.

A majority of the bolts used at Castle Hill are galvanised steel, which are coloured very similarly to the limestone itself, making them difficult to see (even for the climber sometimes). However, bolts placed on earlier routes were not galvanised, and their dark colour makes them more clearly visible (See Figure 5).
Climbers use power drills to drill the hole, then hammer or twist the bolt in. The bolts anchor by expanding against the side of the hole (Gerrard 1990:99).

Bolts impact on the rock in several ways. Firstly, there is the visual impact of the bolt itself. Secondly, there is the discolouration that is caused by altered water run-off patterns over the rock. This results often in a yellowish streak beneath the bolt (See Figure 6). This may be due also to rusting. Finally there are physical impacts on the rock itself.

No research that I am aware of has been conducted into the physical impacts of the bolts. However, I have speculated that water may possibly seep in around the hole and may aid erosion by allowing frost-thaw expansion around the bolt. This may result in the loosening of the bolt, which has occurred on a number of climbs (For example 'Slip Up', Quantum Field).

A possible solution to this, if research indicated it was significant, would be for climbers to use some sort of sealant around the bolt such as a silica gel. Some climbers do actually use such methods (pers. comm.).

There is considerable controversy over the use of bolts, both at Castle Hill, and at overseas climbing areas. In Britain and the United States this controversy is hotly debated between climbers themselves, because of varying points of view over climbing ethics. There is one school of thought that opposes the use of bolts because they believe the traditional values of climbing are abandoned by such use. They maintain that placing bolts steals the challenge from climbers that "...would approach these climbs with the time honoured characteristics of skill, courage, self discipline and keen judgement..." (Newman 1991(a):31). Some go as far to say that bolting is no more than a form of manufacturing holds, or graffiti.
Figure 5  Non-galvanised bolt on 'That Obscure Object of Desire', Spittle Hill.

Figure 6  A climber clips a bolt while leading on 'Sea of Nipples', Dark Castle. Note yellow streak beneath bolt.
There is no doubt that bolts provide safe, reliable anchors which minimise the danger to climbers - allowing them to push their limits. The other school of thought believes that bolting is acceptable on those rock types (like limestone) where there is no opportunity for natural protection. They believe that a new age of climbing ('sport climbing') has come about, where the emphasis is on physically and technically demanding, but safe, climbing (Newman 1991(a):28).

A majority of climbs at Castle Hill do not have 'hangers' attached to the bolts. Hangers are metal plates or chains that allow climbers to clip in directly with a karabiner, rather than necessitating the use of wires. Hangers are safer than wires, which can be flicked off the bolt. Hangers are prohibited on the Department of Conservation land (Wethey 1989:15). Climbers have been sensitive with regard to the use of hangers, because they recognise the greater visual impact that hangers do provide. Climbs such as 'Tales from the Riverbank' on Spittle Hill are among the few climbs with hangers.

Recently, at climbing areas in Boulder, Colorado in the United States, park managers have called for bans on any further bolting and making the possession of power drills in the park a criminal offense (Newman 1991(b):11).

There are alternatives to bolting routes, such as top-roping, where only a bolt anchor at the top of the climb is necessary. However, this requires that the climb is accessible by walking to the top so that the top rope can be set up. For many of the climbs at Castle Hill, this is not a possibility. In addition, top roping, as already mentioned, does not provide the climbing challenge of leading a route (Wethey 1989:246).

One possible solution to this can be provided for climbs that have an accessible top-rope anchor. A separate climbing rope can be hung down beside the climb, with loops tied at appropriate intervals, to enable a lead climber to clip onto the rope. However, this method is inadequate for climbs with routes that do not ascend straight up, meaning climbers would be unable to reach the 'protection rope' to clip in where the route deviates from it. Furthermore, the climber is likely to 'pendulum' in the event of a fall.
The issue of bolting at Castle Hill is complex. Climbers are almost unanimously in support of bolted routes, because of the opportunities for climbing they provide in relative safety. Castle Hill limestone provides opportunities for climbers that are not available elsewhere on Canterbury Crags. The visual impact bolts impose is limited, particularly, where galvanised bolts have been used. The majority of bolts are difficult to see, unless specifically being looked for (Smith 1991).

The options for bolting are (1) To remove all bolts on routes; (2) to ban any further bolting; or (3) to restrict bolting to particular areas. Removal of bolts would eliminate the important recreational opportunities available to climbers, and possibly cause more damage to the limestone on removal than leaving them in place. A decision to ban further bolting would need to consider environmental degradation in relation to recreationists' needs. The decision would need to address the climbing opportunities currently available and assess if there are adequate routes of varying grades to meet climbers' needs. Similarly the environmental degradation caused by bolting would need to be assessed. Some maximum standard of degradation may need to be imposed. However, Smith (pers. comm. 1991) points to the difficulty of policing such a rule. The majority of use occurs over the weekend or on public holidays when D.o.C staff are not usually working. Furthermore, the distance of the nearest Field Centre (60 km away at Arthur's Pass) is a barrier.

If further bolting is to be allowed to continue, it may be necessary for D.o.C. and climbers to meet and decide on a code of practice for putting up routes. Once a route was considered acceptable for bolting, the code would provide information on what bolts to use, how many to use, how and where they are to be placed, and use of sealant around the bolt.
Scrubbing
Scrubbing is the practice by which a climb is cleaned of all plant material and dirt that would inhibit the friction necessary to climb. Traditionally, wire brushes were used to accomplish this. However, climbers recognised the damage that this can cause to the rock. Today, climbers generally use nylon brushes (such as dishwash brushes) to scrub routes (Thompson and McCallum 1987:34), which remove only the vegetation.

Brushing has several impacts. There is a high visual impact from scrubbing which leaves the rock discoloured. This is particularly noticeable on routes where the limestone is a darker colour, such as on the large boulders on the East of the Quantum Field. There is, however, a high degree of natural variation in the colour of the limestone and not all scrubbed routes look unnatural.

Scrubbing removes all the lichens and plant life that exists on the rock face. No research, of which I am aware, has considered the ecology of lichens and other plant life that exists on the limestone itself. Obviously, some research is needed to establish the degree to which scrubbing has impacts on the plantlife.

Currently, there is no code of practise established for climbers regarding scrubbing at Castle Hill, other than the use of nylon brushes. If more routes are allowed to become established in the future, guidelines will have to be decided between D.o.C and climbers relating to scrubbing practise.

Some climbers have minimised their scrubbing by only removing lichen on those holds that are needed. A good example of such climbs are ‘Little Ling’ and ‘Big Ling’ in the Quantum field (See Figure 7). This has the advantage of minimising impact on lichens, but is visually more obvious, and marks the moves for climbers.
Chalk

Chalk (powdered magnesium carbonate) was first used by a climber in the United States who had used it as a gymnast (Bracksieck 1991:5). The use of chalk has become widespread amongst climbers, with the overwhelming majority using chalk on at least the more challenging climbs. Chalk is kept in a small bag (a chalk bag) that hangs around the climber’s waist. Climbers ‘chalk up’ (dipping their fingers and palms in the chalk) usually before a climb, and at various stages during the climb. This serves to absorb sweat and provide added friction to a slippery hold (Gerrard 1990:143).
Many climbers freely admit the psychological advantage the chalk affords. Often, just before a difficult move on a climb, the climber will ‘chalk up’. Chalk has become a focus for relaxing nerves, and giving a ‘psychological boost’. Some climbers claim the psychological boost is more important than any physical property of the chalk to better enable them to climb (pers. comm.).

Chalk has obvious visual impacts on rock, particularly on well used climbs. Chalk remaining on rocks (where it accumulates from climbers hands) may be there for months before it is washed off by rain. This is a big problem in areas such as Eldorado Canyon, Colorado, where years of climbing have left holds in the rock covered in chalk, particularly where the holds were sheltered from rain. Climbers in this area recently became involved in a clean-up operation, removing chalk residue from climbs (Bracksieck 1991:5).

Magnesium carbonate is a fine dry powder, that is white in its natural form. Some U.S.A manufacturers, in recognition of the visual impact of white chalk, produced coloured varieties to enable climbers to use a colour that was less obvious with the rock. However, these coloured forms proved to be less absorbent, and stained the rock (Bracksieck 1991:5).

At Castle Hill, the number of climbers has limited the visual impact of chalk. Only the more popular climbs show visual evidence of chalk. However, the growing popularity of climbing at Castle Hill will inevitably increase the visual impact.

There has been some evidence to suggest that chalk may geochemically erode rock (Gerrard 1990:143). This research suggests sweat from climbers hands erodes the rock more readily than chalk alone, but that a combination is the most damaging.
Manufacturing Holds

Manufacturing holds refers to the artificial process of chipping out or gluing on rock to make holds. This practise has occurred on a number of climbs at Castle Hill, where a difficult section is not presently climbable. The first ascensionist modifies the rock by manufacturing a hold. Sometimes, an existing hold is modified, by chipping, or filing, to make it more 'user friendly'. Other times, a blank section of the rock may be chipped or additional rock glued on. Some climbs such as ‘Kissing the Dream House' in the Quantum Field have multiple manufactured holds.

There are strong norms within the climbing fraternity against such practises for a variety of reasons (For example C.M.C News June/July 1989). Many climbers believe that the rock should be climbed in it’s 'natural state'. To them, manufacturing holds is 'cheating' and proves the first ascensionist cannot meet the challenge that the rock provides. Inherent in this idea, is the notion of denial of rights to future climbers.

At present, a particular conceivable route may not be able to be climbed by even the best climbers. However, climbers are continually ascending harder grades. By manufacturing holds, the opportunity for future climbers for hard, challenging routes is denied. Wethey does not recognise climbs with manufactured holds in "Canterbury Rock".

Other climbers are also against manufacturing holds because it is deliberate environmental degradation. This is perceived as different to placing a bolt, because bolting is a safety practice.

Manufacturing holds has potential to be a highly visible impact, where such holds look unnatural. Furthermore, such practice will substantially alter the natural erosion of the rock. A chipped hold will remove the hardened shell of the limestone and increase erosion. As with bolting and scrubbing, there is no formal code of practise amongst climbers prohibiting manufacturing of holds, although the interpretation panel will discourage altering holds.
Wear on Rock Surfaces

Climbers cause impacts simply by climbing on the limestone at Castle Hill. Climbers are agents of erosion (Gerrard 1990:143). Well used climbs become smooth (See Figure 8). In addition, climbers do, inadvertently, pull ‘flakes’ of rock off climbs in certain areas. This is a natural process at Castle Hill, with much weathering occurring when flakes fall off. Climbers do contribute to this natural process. There is potential for climbing to substantially hasten erosion where climbing is very popular. Abseiling over areas where there is no established route can have an impact on the rock and lichens. One popular abseiling boulder in the Quantum Field has the appearance of being scrubbed even though it has not been. The impact of climbers’ feet on the rock has removed the lichen.

Figure 8 Top roping ‘On Some Faraway Beach’, Quantum Field - one of the most popular climbs and well worn.
Litter
Litter is a problem generated by all recreationists. Climbers are no exception, and as the major users of Castle Hill, they have potential to contribute most to the problem. Litter is visually offensive to many people. Although there are no rubbish bins provided, litter is not a major problem, with perhaps the exception of the entranceway.

Wastes
Human waste was a large concern at Castle Hill up until, approximately 18 months ago, the Department of Conservation constructed two ‘long drop’ toilets. These are situated in visually unobtrusive places within the Quantum Field. Before this occurred, human wastes were very apparent over the summer months. As camping in the Castle Hill basin is discouraged by D.o.C. (Smith 1991), impacts of human wastes are minimal. However, not all climbers, particularly those new to the area, are aware of the toilets. The information at the entranceway will remedy this problem.

Tracking
Climbers increase erosion and compaction of soils through tracking. The impacts of climbers in this regard are impossible to distinguish from that of sheep (Smith 1991), which have had almost continual access to most areas in the Basin, with the exception of the Nature Reserve (Gooch et al 1990:7).
### 3.2 Social Impacts

#### Presence of Climbers

The presence of climbers has substantial impacts on the experience of other users at Castle Hill. The impact has the potential to enhance or degrade their experience. Many walkers at Castle Hill enjoy watching climbers. Climbing is often spectacular to watch, particularly for those without experience of rock climbing themselves. However, the presence of climbers can degrade other users' experiences. This is the notion of recreational conflict (Schreyer 1990:150) the manifestation of which is dependent on the nature of the experience which the visitor is seeking. If visitors are seeking a walk in solitude or quiet, the presence of climbers may detract from their experience. Similarly, the photographers experience may be enhanced by the presence of climbers (by providing a subject) or degrade it (by obscuring a subject).

Castle Hill is a large area, where, at present levels of use, visitors should be able to find an area where there are no climbers. However, the increasing popularity of climbing may reduce these areas. It may be necessary to have areas where users can have experiences without the presence of climbers.

#### Presence of Climbers Impacts

The 'trademarks' of climbing such as bolts, scrubbed routes and manufactured holds have the potential to degrade other users’ experiences. Scrubbed routes, in areas, are visually very obvious. However, as already noted, there is a high degree of natural variation in the colouration of the limestone. It is not uncommon for non-climber visitors to be unaware of what is unnatural and what is not.

Bolts are, in the majority of places, visually unobtrusive, particularly when they are galvanised. However, bolts can be an obvious eye-sore to other users. Chain hangers are much more visually obvious, and often create yellow streaks beneath them from altered water run off patterns. The majority of visitors (without some geology or climbing background) would be unaware of the difference between artificial and natural holds.
Some research is needed to establish the needs and aspirations of other user groups at Castle Hill to establish if climbers' actions are a significant factor in limiting opportunities for them. If research indicates so, then it may be necessary to restrict climbers from certain areas to provide opportunities for other users. This could be achieved by informally zoning areas, providing some areas where there are to be no climbing routes. At least some areas of this kind would be important to provide opportunities for future non-climber visitors.
4.0 ROCK CLIMBING SURVEY

4.1 Methodology

A survey of 52 rock climbers was conducted at Castle Hill during five weekends over September and October 1991. The survey consisted of 28 questions administered to climbers by interview. The questions are grouped into three major categories; (1) Demographic characteristics; (2) General rock climbing experience and climbing at Castle Hill; and (3) Perceptions of the impacts of rock climbing at Castle Hill. The survey is contained in Appendix B.

Originally I intended to interview climbers as they came through the entranceway and to interview only one member of a group. However, pre-testing the survey revealed that most climbers were not willing to be interviewed here - they preferred to go and climb if they had arrived or to get home if they were leaving. Instead climbers were interviewed on site between climbs. Furthermore, the number of climbers and the time restrictions imposed upon me necessitated that all willing climbers were interviewed, not just one per group. It became evident, however, that climbers experience and opinions within groups varied widely. Only four climbers declined to be interviewed; two had very limited time and two were not interested. Most climbers were more than willing to be interviewed and showed considerable interest.

The majority of the questions were open ended to allow climbers to express exactly what they wanted to. A minority of the questions had fixed response categories where there was little room for opinion (these are designated as SHOWCARD in the questionnaire). All questions were administered verbally. The response categories were shown to the interviewee only where there were fixed response categories.
I hoped to identify a number of issues in the survey. First, I wished to know what the sample of climbers valued about Castle Hill as both a climbing area and a general recreational area. It was important to establish whether climbers viewed rock climbing opportunities at Castle Hill as unique or whether such opportunities could be found elsewhere, such as on Banks Peninsula. If climbers felt Castle Hill provided opportunities unable to be met elsewhere, then it is vital that climbers' needs are recognised along with the other social and biophysical values of the area. This embraces the concept of 'substitutability' (Manning 1986:88) which suggests that recreational areas can be 'traded' if one area provides similar opportunities to that of another. If an ecologically robust recreational area could provide similar opportunities to those of a sensitive area, it would be possible to restrict the particular recreation to the robust area without eliminating recreationist opportunities.

Second, I wished to know the perceptions of these rock climbers of rock climbing impacts. Their responses to these questions would indicate which impacts climbers were least knowledgeable about and what measures would be necessary to increase awareness. Climbers membership in clubs or conservation organisations was questioned in an attempt to establish the best avenue for informing climbers.

4.2 Demographic Characteristics of Castle Hill Rock Climbers

Age All climbers interviewed fell within the age category of 15-39 years, the majority being 20-29. See Table 1 below.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>10 (19%)</td>
</tr>
<tr>
<td>20-29</td>
<td>36 (69%)</td>
</tr>
<tr>
<td>30-39</td>
<td>6 (12%)</td>
</tr>
</tbody>
</table>

Table 1 Age of Climbing Sample
Sex  A majority of the sample of climbers were male (41 or 79%), with 11 female climbers (21%).

Residence  The majority of the sample were from Christchurch (45 or 86%), with four climbers (8%) living elsewhere in the South Island (Methven, Ashburton(2) and Dunedin), two (4%) from overseas (United States and Australia), and one (2%) from the North Island (Rotorua).

Occupation  A significant proportion of the sample were students (50%), with the other climbers falling into a variety of occupations (See Table 2).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>26 (50%)</td>
</tr>
<tr>
<td>Technical/Research</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>Service</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4 (7.5%)</td>
</tr>
<tr>
<td>Retail</td>
<td>4 (7.5%)</td>
</tr>
<tr>
<td>Management</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Tradesperson</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Labourer</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Table 2  Occupation of Climbing Sample

Membership of Conservation Organisations  The majority of climbers (36 or 69%) did not belong to any conservation organisations. Of those that did belong to an organisation (16 climbers or 31%), 11 (21%) were affiliated to Greenpeace; and the others spread amongst the Canterbury University Environment Group, the Maruia Society and the Royal Forest and Bird Protection Society. Clearly, these organisations do not provide the means to informing the majority of rock climbers about impacts.
Other Interests  A large majority of climbers (46 or 88.5%) engaged in other active outdoor pursuits ranging from tramping to parapenting. A significant proportion were also interested in other sports (24 or 46%).

Membership of Clubs  22 (42%) of the climbing sample belong to a club that was active in rock climbing. Nine (17%) belonged to the Canterbury University Tramping Club; Five (10%) belonged to the New Zealand Alpine Club; Four (8%) belonged to the Canterbury Mountaineering Club and the remainder belonged to various clubs including Rangiora Tramping Club, Ashburton Tramping Club, Lincoln University Alpine Sports Club and Otago University Tramping Club. Clubs are a useful means of getting across information to climbers, however, the majority do not belong to clubs. There is certainly no one club that a significant proportion of the sample were affiliated to.

4.3 Climbers General Experience and Climbing at Castle Hill

Frequency of Visiting Castle Hill  A range of frequencies occurred with a significant proportion of the sample (24 or 46%) indicating they visited Castle Hill more than ten times per year (See Table 3).

<table>
<thead>
<tr>
<th>Frequency of Visits</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Time</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>1-2 Times/year</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>3-5 Times/year</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>6-10 Times/year</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>11-20 Times/year</td>
<td>11 (21%)</td>
</tr>
<tr>
<td>20+ Times/year</td>
<td>13 (25%)</td>
</tr>
</tbody>
</table>

Table 3  Castle Hill Visitation Frequency of Climbing Sample
Type of Climbing at Castle Hill  A majority of sample climbers (43 or 83%) were involved with some lead climbing at Castle Hill (See Table 4).

<table>
<thead>
<tr>
<th>Type of Climbing</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-roping</td>
<td>42 (81%)</td>
</tr>
<tr>
<td>Lead Climbing</td>
<td>43 (83%)</td>
</tr>
<tr>
<td>Seconding</td>
<td>27 (52%)</td>
</tr>
<tr>
<td>Soloing</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>Bouldering</td>
<td>38 (73%)</td>
</tr>
</tbody>
</table>

Table 4 Type of Climbing at Castle Hill

Of those climbers involved with lead climbing a number (11) were only involved with lead climbing on bolted routes. Of these, two preferred the safety of bolted routes and did not anticipate lead climbing with natural protection in the future. The other nine hoped to lead natural protection in the future, but considered lack of confidence/experience and lack of equipment were limiting factors at present. Lead climbing on bolted routes at Castle Hill obviously provides climbers with opportunities that are not available at most crags such as those on the Banks Peninsula. There are some bolted routes on Banks Peninsular Crags, notably Lyttleton Rock and the Jane Fonda Workout Wall. For most of the climbers in the sample currently not leading with natural protection, Castle Hill provides an intermediate step in their climbing where they can gain confidence and experience before attempting natural protection.
Climbers Experience  A significant number of the sample of climbers had been involved with climbing for one year or less (18 or 35%) (See Table 5).

<table>
<thead>
<tr>
<th>Years of Involvement</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 months</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>7-12 months</td>
<td>15 (29%)</td>
</tr>
<tr>
<td>13 months - 2 years</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>2+ - 4 years</td>
<td>11 (21%)</td>
</tr>
<tr>
<td>4+ - 8 years</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>8+ years</td>
<td>3 (6%)</td>
</tr>
</tbody>
</table>

Table 5  Years of Involvement in Rock Climbing

This is an indication of the growing popularity of the pursuit. If large numbers of people are becoming involved with climbing, the magnitude of impacts at Castle Hill will certainly increase. The length of time people have been climbing will also affect their perception of impacts. As climbing at Castle Hill has really only become popular in the last five years, those climbers who have been climbing at Castle Hill for more than five years are more likely to have observed impacts occurring. Only 10 climbers (19%) have been climbing more than four years. Unfortunately the survey did not explicitly question how long climbers had been visiting Castle Hill.

Climbing over a Weekend  Most of the climbers interviewed usually climb at Castle Hill for the day only. However the majority of climbers (33 or 63%) sometimes stay in the area over a weekend. The most popular place to stay was at the Cave Stream campsite in Craigieburn Forest Park (25 or 48%). A small proportion of climbers admitted to staying at Castle Hill (4 or 8%). Other places for overnight stays included Arthur’s Pass Village, Castle Hill Village, St Andrews Lodge, Flock Hill Lodge, and Lake Lyndon.
Climbing Elsewhere A majority of climbers in the sample also climb on the Port Hills or at other South Island Crags (See Table 6).

<table>
<thead>
<tr>
<th>Climbing Venue</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Hills</td>
<td>46 (86%)</td>
</tr>
<tr>
<td>Banks Peninsula</td>
<td>12 (23%)</td>
</tr>
<tr>
<td>Other South Island Crags</td>
<td>33 (63%)</td>
</tr>
<tr>
<td>North Island Crags</td>
<td>21 (40%)</td>
</tr>
<tr>
<td>Overseas</td>
<td>12 (23%)</td>
</tr>
<tr>
<td>Y.M.C.A Wall</td>
<td>44 (85%)</td>
</tr>
</tbody>
</table>

Table 6 Other Climbing Venues

A large number of the sample climb at the Y.M.C.A artificial rock climbing wall in Christchurch. This would seem to be the most effective avenue for getting information to those climbers that use Castle Hill as a venue. There is a noticeboard outside the training room available for posting information.

Figure 9 Climbing Venues in Canterbury (From Wethey 1989).
Values of Climbing at Castle Hill  Table 7 illustrates the range of values climbers in the sample attributed to climbing at Castle Hill.

<table>
<thead>
<tr>
<th>Values of Castle Hill Climbing</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of friction climbing</td>
<td>16 (31%)</td>
</tr>
<tr>
<td>Different/Unique climbing</td>
<td>15 (29%)</td>
</tr>
<tr>
<td>Variety/Range of climbs</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>Opportunity of bolted routes</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>Balance/Technique climbing</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>Non-strenuous climbing</td>
<td>12 (23%)</td>
</tr>
<tr>
<td>Number of climbs</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Availability of bouldering</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Weather</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Availability of harder climbs</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Proximity to Christchurch</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Absorbs climbers</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Good for beginners</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Accessibility of climbs</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

Significant proportions of the sample valued the friction climbing available, and emphasised the value of balance and/or technique climbing. A number of climbers thought the climbing at Castle Hill was "different" or "unique". These values point to the importance of limestone areas for climbers, which provide opportunities for such climbing. A number of climbers also indicated they liked the opportunity for climbing on bolted routes.
These values point to the significance of Castle Hill as a climbing areas within the spectrum of opportunities available to rock climbers. Castle Hill provides opportunities, particularly to Christchurch climbers that cannot be substituted by crags on Banks Peninsula. Other limestone climbing areas such as Hanging Rock, Beautiful valley, Raincliff and Paynes Ford, provide steeper limestone climbing mostly of harder grades. Hanging Rock, Beautiful Valley and Raincliff are limestone crags outside the Castle Hill basin within reach over a weekend for Christchurch climbers.

Value of Limestone Climbing 37 (71%) of the sample responded that limestone climbing had some special value to them. These values were mostly concerning the type of climbing available, such as friction climbing. Nine (17%) did not attribute any special value to limestone climbing and six (12%) were unsure. It is interesting to note that few climbers in the sample use Flock Hill or Prebble Hill as climbing venues. Both of these crags are in the Broken River Catchment close to Castle Hill. At present there are few established climbing routes. These areas may provide opportunities for walkers and photographers. However they do not provide the ease of access that is an attraction at Castle Hill - a considerable walk is required to reach the boulders in both areas.

Other Activities at Castle Hill About half (27 or 52%) of climbers in the sample participated in other activities at Castle Hill. These included photography (13 or 25%), walking (12 or 23%), picnicking (5 or 10%), parapenting (5 or 10%), geology (2 or 4%), and botanizing (1 or 2%).
Climbing on Other Limestone Crags 30 (58%) of climbers had climbed on limestone crags elsewhere (See Table 8). Of these 21 preferred a particular crag, seven did not and two were unsure. Castle Hill was the most popular limestone crag (12 out of 21), followed by Hanging Rock (4), Paynes Ford (3), Island Valley (1) and Raincliff (1). Reasons cited for the preference of Castle Hill included its proximity to Christchurch, the variety of and number of routes, and the scenery. Interestingly, those that preferred Hanging Rock mentioned the more positive holds, and the "freshness" of the rock from not as much use. These responses suggest that experienced climbers may be displaced from Castle Hill by overuse and large numbers of climbers.

<table>
<thead>
<tr>
<th>Other Limestone Crags</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging Rock</td>
<td>23 (44%)</td>
</tr>
<tr>
<td>Raincliff</td>
<td>8 (15%)</td>
</tr>
<tr>
<td>Paynes Ford</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>Beautiful Valley</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>Elephant Rock</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Flock Hill</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Island Valley</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Wharepapa</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Long Beach</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Moa Valley</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Prebble Hill</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Table 8 Other Limestone Crags used by Climbing Sample
Major Appeal of Castle Hill other than Climbing  Almost all climbers in the sample valued some appeal of Castle Hill other than climbing (See Table 9). Importantly, the scenic/aesthetic appeal of the place was a major value to climbers. A number of climbers valued Castle Hill as a place to get away from Christchurch, which they did not feel they could achieve climbing on the Port Hills.

<table>
<thead>
<tr>
<th>Major Appeal(s)</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenic/Aesthetic value</td>
<td>35 (67%)</td>
</tr>
<tr>
<td>Away from City (Christchurch)</td>
<td>15 (29%)</td>
</tr>
<tr>
<td>View/Surroundings</td>
<td>14 (27%)</td>
</tr>
<tr>
<td>Weather</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>Close to Christchurch</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Unique/Special Place</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Absorbs People</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Fun to Explore</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Photographic opportunities</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

Table 9  Non-climbing values of Castle Hill to climbers
Use of Chalk at Castle Hill

Almost all climbers in the sample use chalk at Castle Hill (See Table 10). A significant proportion use chalk on all climbs at Castle Hill. Some interpretation of climbing impacts has potential to reduce the amount of chalk used by climbers. Climbers need to be made aware of the possible negative impact of chalk on the rock. Climbers could be encouraged to use chalk only on those climbs that were challenging to them, and to only 'chalk-up' when necessary. Use of chalk has become habitual by climbers, and there is potential for climbers to use chalk unnecessarily.

<table>
<thead>
<tr>
<th>Proportion of Climbs</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>On all climbs</td>
<td>30 (58%)</td>
</tr>
<tr>
<td>On more than half of climbs</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>About half</td>
<td>4 (7.5%)</td>
</tr>
<tr>
<td>On less than half of climbs</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Never</td>
<td>4 (7.5%)</td>
</tr>
</tbody>
</table>

Table 10  Proportion of Climbs using Chalk

The primary reason for using chalk was when the climber was hot or sweaty (22 or 42%). Other reasons included: at times of difficult moves (10), scary moves (11) and where the holds were smooth or 'smeary' (6).
Putting up Routes  Only three climbers in the sample had put up any routes at Castle Hill. Of these climbers, each had put up one route. All three used galvanised coach bolts, and had scrubbed the route using nylon brushes. One had used sealant around the coach bolts. One climber had enhanced an existing hold. Of these climbers one would like to put up more routes, and the other two thought they would probably not.

Climbers who put up routes are potentially those causing most impacts at Castle Hill. Rock climbing is unlike other outdoor pursuits where managers can, to some degree, direct recreationists onto hardened sites (such as tracks) and thereby minimise impacts to certain areas. Rock climbers themselves establish where the climbing occurs.

By putting up a route the climber is not only adding to the impact of bolts, scrubbing, wear and tear, but also ‘opening up’ new areas to climbers and further restricting those areas free from climbers for other users. The potential for impacts on native vegetation are also increased by the number of areas with new climbing routes. Increasingly are new routes being put up in the least popular climbing areas, as the most accessible lower grade routes have already been climbed.

The majority of climbers thought they would definitely not or probably not put up any routes at Castle Hill (See Table 11).

<table>
<thead>
<tr>
<th>Probability of Putting up Routes in the Future</th>
<th>Number of Climbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely will</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Probably will</td>
<td>8 (15%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Probably Not</td>
<td>21 (40%)</td>
</tr>
<tr>
<td>Definitely Not</td>
<td>13 (25%)</td>
</tr>
</tbody>
</table>

Table 11  Probability of Putting Up Routes in the Future
4.4 Climbers Perceptions of Rock Climbing Impacts at Castle Hill

Awareness of Nature Reserve and Native Plants A large majority of climbers knew of the Nature Reserve at Castle Hill (48 or 92%). However, the majority of climbers could not name any native plants growing at Castle Hill other than tussock or matagouri (33 or 63%) (See Table 12).

<table>
<thead>
<tr>
<th>Native Plant</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buttercup</td>
<td>17 (32%)</td>
</tr>
<tr>
<td>Hebe spp.</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Calciphilic mosses</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Sedge</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Harebell</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Forget-me-not</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Table 12 Climbers Awareness of Native Plant Species

Very few climbers in the sample knew of any endemic or specialised plants excepting the buttercup (See Table 12). Of those that could name at least one native plant (19 or 37%), word-of-mouth was the most common source of information (5 or 10%). University courses or some sort of formal education was the next most common source of information (4 or 8%), followed by "Canterbury Rock" (2 or 4%) and newspaper articles (2 or 4%). Other sources of information included climbing club publications, general reading and observation at the reserve itself. Clearly, climbers are ill informed about the unique and endemic plant life of the Castle Hill basin.
The D.o.C interpretation at the entranceway may serve to increase climbers awareness about the existence of these plants. Some interpretation in the form of a brochure or article in climbing newsletters/journals may be necessary to identify where the plants exist, what threats face them, and how rock climbers can avoid adding to these threats. Identification of the fenced sites where the Carex and Myosotis populations exist is needed. Climbers may try to avoid trampling or even boycott these areas if they know about the botanical values.

**Impacts of Rock Climbing at Castle Hill**  Few climbers in the sample considered that climbing had no impacts at Castle Hill (5 or 10%). Most climbers considered that climbing at Castle Hill had at least some impact. Climbers were asked what impacts they considered climbing to have and what they knew about the impact. Table 13 illustrates the number of climbers recognising each impact. Each climbers' response has been divided into a biophysical or visual aspect for the particular impact. For example, if the climber said bolts were obvious to other recreationists, they are categorised to be aware of the visual impact of bolts. If they said bolting damages the limestone, they have been categorised as being aware of the biophysical impacts of bolting. The categories of Trails/Erosion, Vegetation Damage, Litter and Human Wastes have been classified as either biophysical or visual because they do not have clearly identifiable components of both.
<table>
<thead>
<tr>
<th>Rock Climbing Impact</th>
<th>Visual</th>
<th>Biophysical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrubbing (28)</td>
<td>27 (52%)</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>Bolts (26)</td>
<td>26 (50%)</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Trails/Erosion (23)</td>
<td>-</td>
<td>23 (44%)</td>
</tr>
<tr>
<td>Human Wastes (17)</td>
<td>-</td>
<td>17 (33%)</td>
</tr>
<tr>
<td>Wear on Rock (16)</td>
<td>12 (23%)</td>
<td>13 (25%)</td>
</tr>
<tr>
<td>Litter (14)</td>
<td>14 (27%)</td>
<td>-</td>
</tr>
<tr>
<td>Vegetation Damage (12)</td>
<td>-</td>
<td>12 (23%)</td>
</tr>
<tr>
<td>Manufacturing Holds (7)</td>
<td>3 (6%)</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Chalk (3)</td>
<td>3 (6%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Table 13 Climbers Awareness of Rock Climbing Impacts

Scrubbing and bolting were the main impacts climbers cited. Other impacts such as Litter, Human Wastes, and Trails/Erosion were also cited by approximately a quarter of the sample. It is interesting to note that for Bolting, Scrubbing, and Chalk climbers tended to cite only the visual aspect of the impact. This suggests, as may be expected, that climbers perceive impacts to be mostly visual, and their knowledge of the more subtle biophysical impacts is limited.
Climbers' Views on Bolting  Climbers almost unanimously agreed that bolting should be allowed at Castle Hill (51 or 98%). Their views varied as to which circumstances climbers should be allowed to bolt routes (See Table 14).

<table>
<thead>
<tr>
<th>Circumstances for Bolting</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>All circumstances</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Most circumstances</td>
<td>27 (52%)</td>
</tr>
<tr>
<td>Restricted circumstances</td>
<td>18 (34%)</td>
</tr>
<tr>
<td>Never</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>3 (6%)</td>
</tr>
</tbody>
</table>

Table 14  Circumstances Acceptable for Bolting at Castle Hill

The categories of 'most circumstances' and 'restricted circumstances' although seemingly separate, do not seem to correspond to distinct categories in the views of the climbers in the sample. This became evident when they gave reasons for their response. The majority of climbers indicating either of these categories clearly thought 'most' or 'restricted' meant areas where there was no opportunity for natural protection.

Of those that considered bolting should be allowed in most circumstances (27), 19 felt it was unacceptable where there was opportunity for natural protection, four considered a code of practice to be necessary, and three felt it should be restricted in sensitive areas.

Of those that considered bolting should be allowed in restricted circumstances (18), seven felt it was acceptable where there was no opportunity for natural protection, five considered a code of practice to be necessary, three felt there should be some unbolted areas, and two felt no more bolting was necessary.

The climber that felt bolting should not be allowed considered there were adequate climbs already existing.
Climbers' Views On Manufacturing Holds  Climbers in the sample were almost unanimously against manufacturing holds (50 or 96%). Their reasons for this view were divided, including responses of interference with future climbers' rights (21 or 40%); interference with other users' rights (8 or 15%); interference with the environment (21 or 40%); and making rock climbing artificial (27 or 52%). Of the two climbers that considered such practises were acceptable, one thought it was acceptable when starting a climb, and the other thought the situation must be considered first. It is interesting to note that the most commonly cited response (making rock climbing artificial) is clearly concerned with the activity rather than the environment or other recreationists.

It is evident that most rock climbers are against the practise of chipping or gluing on holds, for whatever reason. This is testimony to the strength of climbing norms. Tim Wethey has probably been a major force in establishing this ethic through "Canterbury Rock". The guide discourages manufacturing holds by neglecting to include climbs with manufactured holds.

Climbing ethics are potentially the most effective way of encouraging or discouraging certain practices. However, this norm has not prevented climbs with manufactured holds being put up, and it is those climbers which are active in putting up routes which need to be discouraged from such practices.

Climbers' Views on Restrictions at Castle Hill  Climbers' views to being restricted from areas at Castle Hill varied from totally opposed to accepting. 19 (37%) of climbers felt opposed to being restricted. Two (4%) said they would accept restrictions. One climber was unsure.

The majority (30 or 57%) were conditionally accepting. Their reasons for accepting restrictions included; "for a good reason" (19) (This frequently involved reasons such as unacceptable damage to the rock or vegetation); "where no climbs exist currently" (8); "if large numbers of climbers were in the area" (2); and "if restrictions were on a seasonal basis" (1).
4.5 Summary

The majority of rock climbers in the sample were from Christchurch, and climbed in other areas - with a majority also using the Port Hills.

A large proportion of the sample had begun climbing in the last 12 months, indicating the increasingly popularity of rock climbing. About half of the sample were high use climbers at Castle Hill visiting more than 10 times per year.

Climbers in the sample valued the type of climbing available on limestone at Castle Hill, such as the friction climbing and non-strenuous climbs. The range and variety of climbs at Castle Hill was also an important value to sample climbers. The opportunities for climbing on bolted routes was important, especially to those climbers in the sample not involved in lead climbing.

Climbers in the sample also valued the scenic/aesthetic value of Castle Hill, the views and surroundings of the basin and the opportunity to get away from the city.

The awareness of climbers in the sample to the unique and endemic plant life at Castle Hill was very limited. Only a minority of sample climbers knew of any endemic or specialised plants growing in the basin.

The awareness of climbers in the sample to rock climbing impacts at Castle Hill varied considerably. Many climbers were not aware of the biophysical aspect of impacts. Most climbers only emphasized the visual aspect of impacts such as bolting and scrubbing. Bolting and scrubbing were the two impacts climbers cited most frequently.

The majority of climbers in the sample did not belong to clubs or conservation organisations. The most effective avenue for getting information to climbers is at the Y.M.C.A artificial rock climbing wall. The majority of climbers in the sample use this venue.
Climbers in the sample were almost unanimously in support of bolting at Castle Hill, excepting where natural protection can be placed. A small number considered a code of practice for bolting to be necessary.

Climbers in the sample were opposed almost unanimously to manufacturing holds.

Climbers views on restrictions to them at Castle Hill varied considerably. The majority were conditionally accepting of restrictions for a good reason or where few climbs currently exist.
5.0 RECOMMENDATIONS

Castle Hill has unique biological, geological, cultural and aesthetic values that are not paralleled elsewhere in New Zealand. Rock climbing has the potential to jeopardise some of these values if current practices continue to occur and the number of climbers increases. Substantial impacts already occur.

Castle Hill provides opportunities for climbers that are unique, and not to be found on crags such as the Port Hills. These include climbing techniques such as friction and balance climbing, as well as non-climbing values involving the scenery and location.

Climbers' knowledge of the biological values of Castle Hill is very limited. Their knowledge and awareness of rock climbing impacts is also limited, with most climbers in the sample considering mainly visual impacts.

The recommendations I have made are practical management options which I feel would be a step towards resolving the recreation/preservation conflict at Castle Hill. In doing so, I recognise the limited resources and funding available to the Department of Conservation for achieving such tasks. Ideally, scientific and social research is necessary to ascertain the magnitude of impacts on both the biophysical and social values of Castle Hill. D.o.C has neither the resources or time to conduct such research and as a result simple practical suggestions are of more value than complex monitoring programs such as implementing a Limits of Acceptable Change programme. I have also made some suggestions for future studies.

**Recommendation** Inform climbers of natural and cultural values of Castle Hill through interpretation at the entranceway (this is already in progress) and through an educational pamphlet distributed through the Y.M.C.A rock wall in Christchurch. In particular information should include reference to the need for care or avoidance of sensitive areas where endemic populations of *Myosotis, Carex*, Harebell and mosses exist. Interpretation on impacts should be included on such an educational pamphlet.
Recommendation Prohibit further bolting at Castle Hill. This would halt any further damage to the limestone and associated lichens. There are numerous routes of varying grades already available - enough to meet all climbers' needs. Areas where there are few routes or are little used would sustain minimal impacts from climbers. Prohibiting further bolting would limit damage from establishing routes in the important Maori Cultural sites. Furthermore, prohibiting further bolting would ensure that areas with few or no routes enable non-climbers to experience areas where climbers are not present.

The difficulty of policing such a prohibition by D.o.C staff is due to lack of resources, and the distance of the nearest field centre from Castle Hill. For this reason, it is important to get the support of the climbing community so prohibition becomes self-policing. I believe this is possible if climbers are informed of the unique values of Castle Hill, and realise that climbing jeopardises these values. This could be achieved through the avenue of prominent climbers in the community who have concern for maintaining the integrity of the area.

Recommendation Identify further sites where Myosotis, Carex, Poa and harebell populations exist and, where appropriate, provide adequate protection from trampling and/or grazing in the form of fencing. Signs indicating these sensitive sites may also be appropriate.

Recommendation Introduce a formal code of practice including information on minimising use of chalk, prohibiting manufacturing holds and further bolting, and avoiding recognised 'sensitive sites'. Again, liaison with the climbing community, particularly prominent, respected climbers could yield positive results in establishing such a code.

Further Research Suggestions
Some limitations of my study which could be addressed include: (1) Establish the extent of conflict between climbing and other recreational and cultural groups; and (2) Establish the extent and magnitude of rock climbing impacts at Castle Hill.
REFERENCES


PERSONAL COMMUNICATIONS

APPENDIX A GLOSSARY OF ROCK CLIMBING TERMINOLOGY USED

Protection This is a term referring to the use of technical equipment or bolts to enable a climber to clip their rope onto the rock face as they climb. In the event of a fall, this fixed attachment prevents the climber from falling further than twice the distance they are above their protection. Natural protection refers to the use of various metal devices that can be wedged into cracks or holes in the rock. Where natural protection cannot be used (where there are no cracks or suitable holes) fixed anchor devices such as bolts are sometimes driven into the rock, enabling climbers to clip onto the bolt with attachment wires.

Pock Pulling This refers to a style of climbing using holes or ledges on the rock as ‘holds’ on which to climb. Holes are often referred to as pocks (short for pockets). This type of climbing is generally on steeper crags and is more reliant on arm strength, hence the term ‘pock pulling’.

Friction or Smear Climbing This refers to a style of climbing relying on the friction provided by rubber climbing boots on a blank rock face, rather than using ‘holds’. Smearing is only possible on less steep crags, and is not so reliant on arm strength but more on balance and placing your weight over your feet. Limestone provides opportunities for this type of climbing.

Lead Climbing This is a type of climbing where the climber protects themselves as they climb, either by placing natural protection or clipping onto bolts (See Figure 6). A series of attachment points are made on the ascent. In the event of a fall, the climber will fall twice the distance they are above their last piece of protection because of the length of rope that separates them from the protection. For this reason, lead climbing on bolted routes is generally safer than on naturally protected routes. Natural protection placed by the climber has to be placed properly or it may pull out from the force of a fall. Bolts are unlikely to be pulled out.
Top-roping This is a type of climbing done with the rope attached to a fixed anchor point at the top of a climb. As the climber ascends, the belayer takes in rope. In the event of a fall, the climber will not fall further than the rope stretch. For this reason, top roping does not provide the challenge that does lead climbing on the same route (See Figure 8).

Bouldering This is a type of climbing involving no ropes. It is usually conducted on small climbs or on boulders. It is distinguished from soloing where the climber climbs a conventional route without use of a rope, by the chance of injury or death. Climbers sustaining a boulder fall are unlikely to hurt themselves badly, whereas a fall from a solo climb is likely to result in death or injury.

Putting Up a Route This refers to the first lead ascent of a particular climb. On naturally unprotectable climbs this can be achieved by two means. Firstly, by soloing the climb, which the majority of climbers are unlikely to do; and secondly, by placing bolts at appropriate intervals for protection. In order to place the bolts, it is usual for the first ascensionist to abseil down from the top and place the bolts first. The first ascensionist has the privilege of naming the climb.
APPENDIX B

CASTLE HILL ROCK CLIMBING SURVEY

I am a student at Lincoln University studying Parks and Recreation. My interests include rock climbing and conservation. I am doing a survey on rock climbing at Castle Hill. I hope the results will be of value to enable both climbers and managers to decide about the use of Castle Hill. Are you a rock climber? (If so) Are you over the age of 15? (If so) Would you mind answering a few questions in the next quarter of an hour or so?

Castle Hill

The following are a few questions about Castle Hill and what you value about the area.

1. How often do you visit Castle Hill for rock climbing? (SHOWCARD #1)
   - First Time
   - 1-2 times/yr
   - 3-5 times/yr
   - 6-10 times/yr
   - 11-20 times/yr
   - 20+ times/yr

2. How long do you spend climbing on an average days climb? (specify in hours)

3. What do you like about the climbing at Castle Hill?
   - Friction climbing
   - Bolted routes
   - Bouldering
   - Variety of grades
   - Other (specify)

4. Does climbing on limestone have any special value to you? yes/no (If yes) What do you value about limestone climbing?

5. Do you climb on limestone crags elsewhere? yes/no (If yes) Where else do you climb on limestone?
   - Paynes Ford
   - Flock Hill
   - Hanging Rock
   - West Coast
   - Beautiful Valley
   - Other (specify)
Do you prefer to climb at any particular limestone climbing area? yes/no (If yes) Which limestone climbing area do you prefer to climb at?
Why do you prefer to climb there?

6. Do you participate in other activities at Castle Hill? yes/no (If yes) What activities?
   Photography   Picnicking   Botanizing
   Geology       Walking    Other (specify)

7. Aside from rock climbing, is there any major appeal of Castle Hill for you? yes/no (If yes) What is the major appeal?

8. What type of climbing are you involved with at Castle Hill? (SHOWCARD #2)
   Soloing    Lead climbing    Top Roping
   Bouldering Seconding

9. Do you ever climb at Castle Hill over a weekend and stay in the area? yes/no (If yes) Where do you stay?
   Castle Hill village  Craigeburn Forest Cave Stream
   Arthurs Pass village  Flock Hill  Other (specify)
   Castle Hill

Experience
The following are a few questions about your involvement in rock climbing.

10. How long have you been involved in rock climbing? (specify in years)

11. Do you climb anywhere other than Castle Hill? yes/no (If yes) Where else do you climb?
   Banks Peninsula (specify)
   Elsewhere in S.I (specify)
   North Island (specify)
   Overseas (specify)
Do you climb at the Y.M.C.A wall in Christchurch? yes/no

.12. Which type of climbing do you spend most time doing? (SHOWCARD #3)

Soloing
Lead climbing (natural protection) & soloing
Lead Climbing (Natural Protection)
Lead Climbing (Bolted Routes)
Lead Climbing & Top Roping (Natural Protection)
Lead Climbing & Top roping (Bolted Routes)
Top Roping
Bouldering

If involved in lead climbing using natural protection go to question .14.

.13. Do you plan on lead climbing using natural protection in the future? yes/no (If no) If yes What would stop you from lead climbing using natural protection in the future?

.14. Do you use chalk at Castle Hill? yes/no (If yes) On an average days climbing at Castle Hill what proportion of climbs would you use chalk on? (SHOWCARD #4)

On all climbs On more than half of climbs About half On less than half of climb Never

When do you use chalk most?

.15. Have you put up any routes at Castle Hill? yes/no (If so) How many?

Did you use bolts? (specify)
Did you use any sealant around the bolts? yes/no (specify)
Did you scrub the route? (If yes) What type of brush did you use? Wire Nylon
Did you manufacture any holds? (specify)
.16. Do you intend to put up any routes at Castle Hill in the future? (SHOWCARD #5)

Definitely  Probably  Unsure  Probably not

Definitely not

.17. Do you belong to a tramping or climbing club that is active in rock climbing? yes/no (specify)

Impacts
The following are a few questions on the impacts of rock climbing at Castle Hill.

.18. Are you aware that there is a Nature Reserve at Castle Hill? yes/no Can you name any native plants growing in the area? (specify)

- Buttercup  \((Ranunculus)\)
- Sedge  \((Carex)\)
- Calciphilic Mosses
- Limestone scree grass  \((Poa)\)
- Other (specify)

How did you know about these plants?

.19. Do you think that rock climbing has impacts at Castle Hill? yes/no (If yes) What can you tell me about the impacts of rock climbing at Castle Hill?

- Bolts (specify)
- Vegetation damage (specify)
- Chalk (specify)
- Scrubbing (specify)
- Manufacturing holds (specify)
- Other (specify)
.20. Do you consider that climbers should be able to put up bolted routes at Castle Hill? yes/no (If yes) Under what circumstances do you consider climbers should be able to put up bolted routes at Castle Hill? (SHOWCARD #6)
   In all circumstances  In most circumstances
   Unsure  In restricted circumstances  Never
   (specify reasons for response)

.21. Do you consider it acceptable for climbers to manufacture holds at Castle Hill? yes/no (If no) On what grounds do you consider it unacceptable to manufactured holds?
   Interference with future climbers rights
   Interference with other users rights
   Interference with the environment
   Other (specify)
   (If yes) When do you consider climbers should be able to use manufactured holds?

.22. How would you feel about climbers being restricted to some areas at Castle Hill?

Demographic Information
The following are a few questions about yourself and where you live.

.23. Which age category do you fall into? (SHOWCARD #7)
   0-14  15-19  20-29  30-39  40-49  50-59  60+

.24. Where do you live?
   Christchurch    South Island (specify)
   North Island (specify)   Overseas (specify)

.25. What is your occupation?
26. Sex?  Male  Female

27. What other interests do you have?

29. Do you belong to any Conservation Organisations? (specify)

Thank you very much for your co-operation. If you care to give me your name and address, I will send you a brief summary of the results as a way of saying thanks for your help. Otherwise if you wish to see the results of this survey you will be able to find them at Lincoln University under the thesis collection or at the Department of Conservation in Wellington or Christchurch in 1992.

Name of Respondent ________________________________________

Address ____________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________