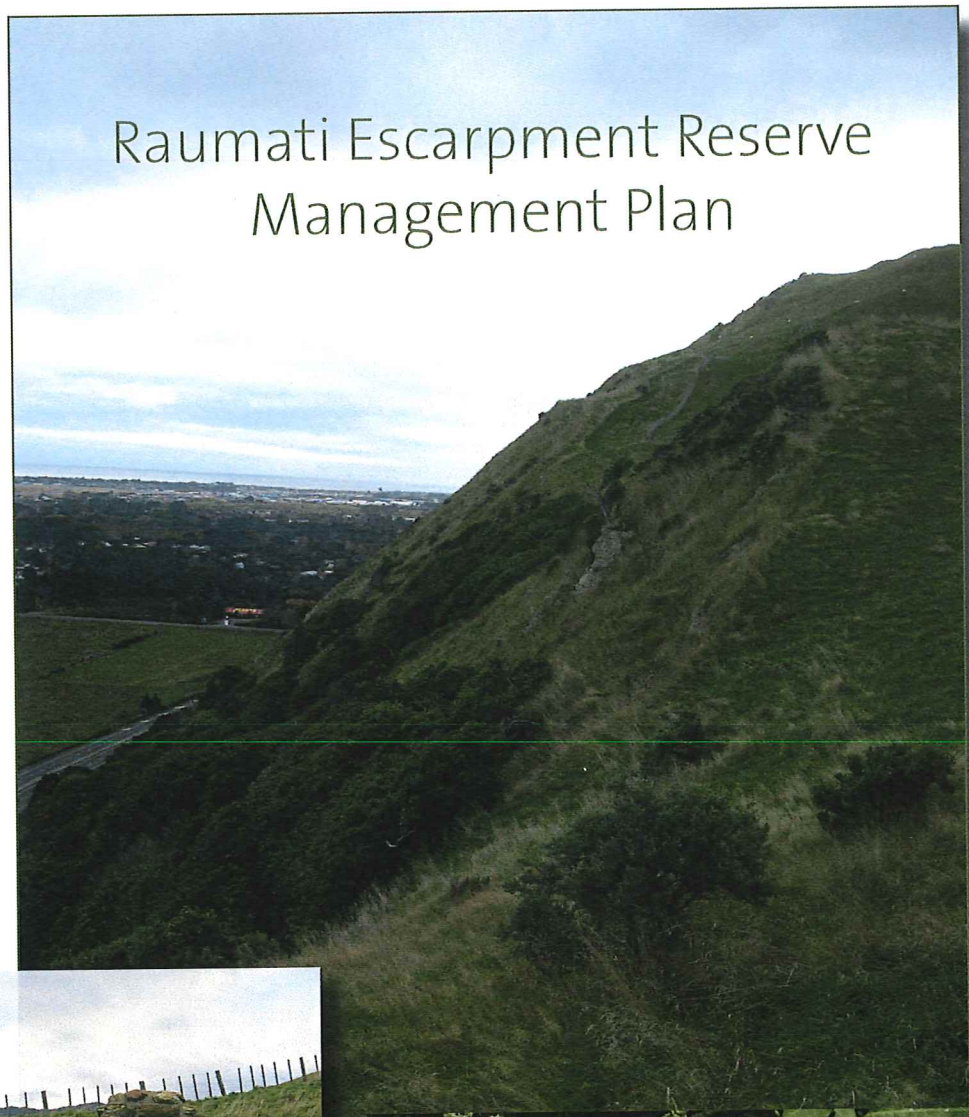
Raumati Escarpment Reserve Management Plan



By Kapiti Coast District Council and Boffa Miskell
December 2006

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KAPITI COAST DISTRICT COUNCIL

RAUMATI ESCARPMENT RESERVE
MANAGEMENT PLAN

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Photographs of the reserve

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Appendix 1	Raumati Escarpment Reserve Restoration and Pest Management Plan, 2005.
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PREFACE

Kapiti Coast District Council (the Council or KCDC) reviewed the Raumati Escarpment Reserve Management Plan, which was originally adopted in 1997. The review is undertaken as required by the Reserves Act 1977 (The Act) because new issues have arisen and circumstances changed over the intervening years. The key issues to be addressed in the review are:

- Public concerns over herbicide application required for blackberry control in the Reserve.
- The need for a revegetation plan to guide the process of vegetation, management and enhancement.
- Changed circumstances regarding public access to the Reserve, across private land, at the northern end.

PUBLIC CONSULTATION

The council undertook a review of the specific issues, rather than a comprehensive review of the entire plan. The Council prepared a Discussion Draft Management Plan and consulted directly with the key stakeholders who had raised issues with the Council previously. Five written submissions were received and many of the suggested changes have been incorporated in this Draft Plan which will be notified for public submissions.

ACKNOWLEDGEMENTS

Kapiti District Council would like to acknowledge and extend thanks to Kapiti Coast Action Inc (KEA) for their support and commitment to establish the Reserve and their on-going involvement in its development and management.

INTRODUCTION

MANAGEMENT PLANS

A Management Plan is a working document that sets out the objectives and policies of management and how these should be achieved. It also records changes and relevant additional information as it becomes available.

Management Plans provide a framework within which all future management will be carried out subject only to review at defined intervals, usually five years. A Management Plan sets out the principles governing the management of an area in a way that will be readily understood by those whose actions or interests will be affected by the plan; if the plan is not understood it will be set aside and ignored.

Management Plans should be the foundation on which all future management practices are based. Simply to record what is currently being done would be to evade the challenge of re-examining current practices.

A Management Plan has several requirements:

(i) It must be comprehensive. Omission of some aspects may give rise to ambiguity and misinterpretation.

(ii) It must be practical and it must permit some flexibility within prescribed limits. Rigid prescriptions may be self-defeating.

(iii) It must be clear, concise and easy to understand, conveying its message in the simplest and most effective way.

(iv) To remain appropriate, it must provide for review so that changed or changing circumstances may be taken into account.

A comprehensive Management Plan is a means of ensuring continuity of management. It is also a means of explaining to the general public the reasons behind the decisions made by the Kapiti Coast District Council.

While a Management Plan provides the overall direction for ongoing management there is generally a need for a programme of works to be drawn up and priorities assigned.

MANAGEMENT PLAN FORMAT

A management plan is a working document that sets out the objectives and policies for managing an area and how these will be achieved. As well as being a reference for consistent everyday management it sets out the strategy for on going development and planning. It is also a public statement that explains the governing principles and reasons for decisions to interested parties.

The management plan contains three parts;

Part 1 Background and Description
Describes the site, its past and intended development and the issues that need to be addressed by the objectives and policies in the Management Plan.

Part 2 Management Aim and Objectives
Sets out the aim and long and short-term objectives for the management of the area.

Part 3 Policies.
The policies identify how the objectives will be achieved, and are grouped under three headings:

- Administration and Management;
- Management of the Resource;
- Public Access and Use.

The Management Plan also incorporates a Restoration and Pest Management Plan[1] (RPMP) for the reserve (See Appendix 1).

Restoration and Pest Management Plan (RPMP)

The objective of the RPMP is to assist the natural processes achieve a self-sustaining ecosystem on the escarpment. It identifies the issues that are working against this objective and outlines the methods to remedy the situation. The RPMP includes actions, timeframes and budgets for the revegetation, pest plant and animal control and monitoring of the reserve for a five year period to 2009/10. Although the RPMP proposes actions and time frames it also needs to be flexible to account for changing environmental factors. Therefore, the plan is based on an adaptive management approach that will reassess priorities on a yearly basis in order to achieve the desired end result.

[1] *Raumati Escarpment Reserve Restoration and Pest Management Plan,* 2005. Prepared by GWRC and KCDC.

PART ONE: BACKGROUND AND DESCRIPTION

1.1 LEGAL DESCRIPTION AND LOCATION

The Escarpment Reserve contains 64.1770 Ha of land within Lot 15 DP 75918,Certificate of Title 42C/686 A copy of the Certificate of Title is appended to this document.

The Reserve is situated on the east side of the North Island Main Trunk Railway and State Highway One and covers the steep escarpment face generally between Lynch's Crossing and a point approximately halfway between Leinster Avenue and Raumati Road. The northern boundary is presently defined by a row of pine trees which separate the gorse covered escarpment to the north (currently in private ownership) with the grassland and native bush remnant cover of the Escarpment Reserve. See Figure 1

1.2 PHYSICAL AND NATURAL FEATURES

Figure 2 and photographs 1- 8 assist in describing the features of the site.

Coastal Escarpment

The steep west facing escarpment runs in a north-south direction and provides a backdrop to Queen Elizabeth Park and the Raumati area. The NIMT railway and SH1 run along the foot of the escarpment. Residential properties occupy the land on the west side of SH1 (from Poplar Road north) opposite the reserve.

The escarpment rises from 20m als to 202m at a steep gradient of approximately 45 deg.

The coastal escarpment is an important geological feature and has been identified as one of the Kapiti Coast's significant landscape resources. Particular features of the escarpment reserve are:

- the dramatic contrast been the flatness of the coastal plain and the steepness of the escarpment;
- the backdrop the escarpment provides to the coastal plain and the district settlements;
- the presence and distribution of coastal forest remnants;
- the contribution the escarpment makes to the scenic qualities of the Railway and State Highway corridor;
- the panoramic views available from the escarpment walkway.

Vegetation

While the pattern and composition of the escarpment vegetation between Paekakariki and Waikanae varies considerably the landscape character and the vegetation within the Escarpment Reserve generally appears to be in a relatively stable condition.

The escarpment is comprised of five remnant stands of coastal forest vegetation that extend from the toe to various elevations up the escarpment

face. The balance land is grassland and scrub. See Photographs 1-2

An assessment of the vegetation on the escarpment[2] was carried out in 1995 as part of the original management plan and this is included in Appendix 2.

Grazing stock has been excluded from the reserve since 1995 and the native vegetation is regenerating in the under-storey of the forest remnants as well a in the open grassland. Photographs 3 and 4 show part of the site in 1995 and today after several years without grazing stock. Pest plant species occur throughout the site with the greatest concentration on the flatter areas between the railway and the toe of the escarpment. The range and extent of pest plants in the Reserve is shown on a plan in the RPMP. At the toe of the escarpment there are areas of flat land with raupo swamp remnants. Now the land is no longer grazed, invasive pest plants, in particular blackberry, have become a problem and threaten to smother out the raupo and other wetland species in these areas.

KCDC and GWRC have used herbicide sprays to control the blackberry. However, this has created some concerns for the residents nearby and across SH1.

Access and Recreation

The steepness and exposed nature of the escarpment make it unsuitable for recreational purposes other than use of the formed walkways. However, the scenic attributes of the escarpment and the panoramic views obtained from it are exceptional and are a highly valued community resource.

The only public access point to the reserve is at the southern end, from Waterfall Road, across a 2.7ha block of KCDC land, that is currently being leased and grazed as a means to manage pest plants. Additional signage at the Waterfall Road would make it easier for visitors to identify. Photographs 5 – 6.

The Mataihuka walkway follows the top of the escarpment and runs parallel with the reserve's east boundary.

A walkway links Waterfall Road entrance to the top of the escarpment and the southern end of the Mataihuka Walkway. The southern access route passes through a damp gully and up a steep grass slope. The first part of the track at the Waterfall Road entrance has recently been upgraded and graveled and the remainder of the southern access is generally unformed and slippery in wet conditions.

KEA prepared a proposal in 2004 to upgrade and enhance the southern access track. The proposal included upgrading the walking track and a lookout at the top of the escarpment. See Appendix 3 and Section 3.12.

[2] *Vegetation Assessment of Raumati Escarpment*, prepared by Maggie Wassilieff for Boffa Miskell, 1995

A memorial cairn is located on a high point along the Mataihuka walkway. This commemorates the contributions of Bill Moxon and others who have worked to protect local natural places. The family of the late Bill Moxon, Kapiti Branch of Forest and Bird and KEA donated funds to assist with the development of the walkway. KEA have suggested that seating would be appropriate at the Cairn.

1.3 HISTORY AND PRESENT USE

The Escarpment Reserve was acquired by the Kapiti Coast District Council in 1993 following the consent to subdivide the 258 hectare Norwood farm on Valley Road. It is acknowledged that the Norwood Trust has made a generous donation to the Kapiti Coast as the donated land was in excess of any requirement of the subdivision. Conservation covenants in favour of the Kapiti Coast District Council over areas of remnant native forest on the steep west facing slopes of the property were in place before the land was acquired. Prior to Council taking over the escarpment Reserve the area was grazed, it is now retired.

There is a NZAA site (R26/265) on the land near the end of Poplar Avenue. This site was partly destroyed by construction of the NIMT Railway and SH1. Whare sites (building platforms) have been recorded near the trig on the ridge. The track along the ridge from the trig north has an exposed layer of charcoal and burnt stone. In the main gully, what appears to be a hearth, has been uncovered by recent fluvial erosion. This site is should be considered a significant archaeological site. [3]

The escarpment contains a significant area of remnant coastal forest with the balance of the land in grassland and scrub. Grazing was ceased around 1995 and natural regeneration is occurring slowly throughout the site.

The predominant use of the reserve is the recreational use of the Mataihuka walkway that follows the escarpment ridge. It is zoned as Open Space within the District Plan.

Carkeek *(The Kapiti Coast, Maori History and Place Names)* describes the Maori History of the escarpment as follows:

There was a pa site on the escarpment in the 1850's. This extended from the swamp edge to the crest of the hill. The steepness of the face would have greatly strengthened the defenses of the upper part which was sited where the trig station is now situated.

North of the stream along the foot of the hillside a defensive wall was built from rocks on the site and a canoe landing established.

[3] Tim Park, KCDC.

PART TWO: AIM AND OBJECTIVES

2.1 AIMS

Protect the historical and cultural features of the Raumati Escarpment Reserve.

Provide for safe, informal recreational use[4].

Protect and enhance the landscape character, and indigenous flora and fauna of the coastal escarpment, and implement revegetation and pest control in the reserve.

2.2 OBJECTIVES

- To protect and enhance the landscape character, and the physical resources of the Escarpment Reserve.
- To maintain the Escarpment Reserve as an undeveloped visual backdrop to the Raumati and Queen Elizabeth Park areas.
- To protect, restore and manage the existing stands of remnant native vegetation.
- To implement revegetation of parts of the reserve with locally sourced native species, as set out the Restoration and Pest Management Plan Appendix 1 of this document.
- To actively manage pest plants and animals to ensure survival of native species.
- To encourage the active involvement and participation of local communities in the implementation of the Management Plan.
- To extend the escarpment Reserve to the north whenever opportunities arise .
- To re- establish public access to the northern end of the reserve if possible.
- To provide for future linkages to other walking routes eg Whareroa Farm
- To enhance the southern access route between Waterfall Road and the top of the escarpment.
- To protect the Escarpment from all visual intrusions, encroachments, utility installations, structures and other developments which are out of character with the Escarpment Reserve.
- To promote an awareness and appreciation of the landscape and historical and cultural values associated with the Escarpment Reserve.

[4] Informal recreation includes walking, running and activities that do not require specialist facilities.

PART THREE: POLICIES

ADMINISTRATION AND MANAGEMENT

3.1 Interpretation of Policies

The Policies section of this Management Plan (Part Three) sets out the Policies required to achieve the Aims and Objectives identified in Part Two. Each policy area contains descriptive paragraphs followed by specific policy statements. The policy statements are to be read and applied in the context of the preceding related descriptive paragraphs.

Throughout the text of the Management Plan "the Council" or "Council" refers to the Kapiti Coast District Council and the Reserve or Escarpment Reserve refers to the Raumati Escarpment Scenic Reserve.

Policies

(i) No activity or action that is contrary to the descriptive paragraphs shall be undertaken without the written permission of the Kapiti Coast District Council or the Parks Manager.

3.2 Administration

The Escarpment Reserve is administered by the Parks and RecreationDepartment of the Kapiti Coast District Council. Administration includes not only organising day to day management but also reserve funding and long term development and management planning. Specialist expertise may be sought on occasion to provide advice or specialist service on specific management issues such as regeneration and revegetation techniques and procedures.

The Kapiti Coast District Council recognise that liaison with Tangata Whenua and the local community is an integral part of its management, enabling Council to be responsive to local concerns and issues. Tangata Whenua, community and school groups may also be interested in participating in special projects such as planting programmes. This can be of benefit, not only by extending Council resources, but by fostering community involvement and pride in the Reserve.

Policies

i) The Reserve shall be classified as a Scenic Reserve. Under Reserves Act 1977

ii) The Reserve shall be known as the Raumati Escarpment Scenic Reserve.

iii) The Reserve shall be managed by the Parks and Recreation Department of the Kapiti Coast District Council.

iv) Specialist expertise shall be sought when required to ensure a high standard of management, particularly vegetation management, is maintained.

v) Interested community groups, such as KEA and the local branch of the Forest and Bird Protection Society, iwi and individuals shall be consulted on management issues and their participation in special projects encourage and supported.

vi) The Management Plan shall be reviewed regularly and amended where necessary in accordance with the requirement of the Reserves Act 1977.

vii) The walkway shall be known as the Mataihuka Track (point to a higher place).

3.3 Adjacent Land Use

The Escarpment Reserve adjoins several rural lifestyle blocks all of which are accessed from Valley Road or Waterfall Road. Potential conflicts between residents and reserve users is likely to be minimal. The control of pest species will require the cooperation of adjoining land owners.

The adjoining property to the north, off Riwai Street, is currently being developed as a residential subdivision. Part of the escarpment face in this area has been vested with Council as public open space and should be incorporated into the Reserve.

Public access to the reserve is no longer available at the northern end, leaving just one access point to the reserve, off Waterfall Road in the south.

Policies

i) The Parks and Recreation Department shall maintain regular communication with adjoining residents over issues that impact on their mutual interest, particularly with respect to possum and rabbit control.

ii) The Council shall negotiate fencing requirements with adjoining land owners, as required to ensure the privacy of adjacent land and for protection of the cairn and of vegetation within the reserve.

iii) The Council shall seek to provide a suitable public access to the northern end of the Escarpment Reserve as and when opportunities purchase land and funding allows.

3.4 Leases

The 2.7 hectare access lot on Waterfall Road currently provides the only public access to the escarpment and has been leased out for grazing to control pest plants. The walkway through this block is planned to be upgraded and some of this work has been implemented. Heavy grazing stock such as cattle damage the up-graded track.

KCDC intends to end the leasing and grazing of this block to avoid stock damaging the recently upgraded tracks and to allow regeneration of native vegetation. As a consequence implementation of plant pest control will also need to include this area.

Policies

i) Cease leasing the Waterfall Road access block and permanently retire the area from grazing.

3.5 Public Safety

The alignment, formation and maintenance of the walkways, lookouts, fence stiles shall comply with all relevant building and safety standards, and be upgraded or maintained as required.

Policies

i) Council shall monitor and periodically review safety issues and measures within the Reserve and undertake maintenance as required

ii) Council shall upgrade/ realign the access track from the Waterfall Road to the ridge.

3.6 Environmental Controls

The extent and type of public use along with the condition of the Reserve, needs to be monitored and appropriate action taken to ensure user enjoyment and safety and the protection of the landscape resource. Reserves inevitably attract activities that are incompatible with management activities and the resource. While Council seeks to promote the use of its parks and open spaces it must impose controls to protect them from damage and misuse.

The control of pest plants, pest animals is essential to the protection and enhancement of the reserve's existing native flora and fauna as well as the establishment of the proposed revegetation plantings. Methods and timing for the control of pest species is addressed in the RPMP and will be implemented with regard to the safety and protection of people and the vegetation, particularly the use of herbicides and, pesticides..

In exceptional circumstances it may be necessary to close the Reserve for public safety or to protect the environment.

Policies

i) The Reserve shall be regularly inspected with damage or environmental problems being attended to promptly.

ii) Activities that are damaging to the Reserve shall be restricted or prohibited.

iii) In exceptional circumstances, the Reserve shall be closed to the public, at the discretion of the Parks Manager.

iv) Control of pest plants and species shall be implemented as set out in the RPMP

v) The use of herbicides and pesticides shall be used as little as possible and shall be strictly controlled. Where particular safety concerns may arise, local residents shall be consulted prior to use.

vi) Littering and rubbish dumping shall be prohibited and offenders may be prosecuted under the Litter Act 1979.

vii) The lighting of open fires shall not be permitted within the Reserve.

viii) Measures to reduce and avoid anti-social behaviour and vandalism shall be investigated and, where appropriate, actioned.

3.7 Signs

Signs are necessary in public parks to:

- identify places and routes;
- inform the public about use and safety;
- provide information of interest about the site or locality.

The design, placement and maintenance of signs are the responsibility of the Council.

Well designed signs, used sparingly in well chosen locations, can be inviting and complement a reserves image and intended use. Proliferation of different signs can, on the other hand, be obtrusive and off-putting.

Currently there is no signage to indicate the entrance point on Waterfall Road, an no information regarding the recreational routes and opportunities within the reserve.

Policies

i) A standard Kapiti-District Council sign indicating the name of the Reserve, the Mataihuka walkway, time necessary for the walk and any other relevant information shall be erected at the Waterfall Road entry point.

ii) At appropriate locations within the Reserve information/interpretation signs shall be placed to explain aspects and features of the area and/or the view.

iii) Advertising hoardings shall not be permitted within the Reserve,

iv) A descriptive brochure shall be designed.

MANAGEMENT OF THE RESOURCE

3.8 Landscape Character

The Escarpment Reserve makes an important contribution to the landscape character of the area and it forms an important recreational link within the District. Unlike many other recreation areas, the Reserve has a particular character due to its steeply rising contour in dramatic contrast with the coastal sand plain, and the distinctive vegetation pattern of the remnant coastal forest along the escarpment face.

The Escarpment Reserve is an important backdrop to the Coastal Plain area and Queen Elizabeth Park. The area is also a significant visual feature to traveler's on the North Island Main Trunk Railway and on State Highway One.

While the walkway along the top of the Escarpment Reserve provides expansive views out over the Kapiti Coast possibly the Reserves greatest asset is the view of the Reserve from the surrounding coastal plains area.

The management of the appearance of the reserve and the sustainability of the remnant and indigenous flora and fauna is the principal resource management objective.

Policies

i) The landscape quality and scenic value of the Reserve shall be protected and as appropriate enhanced.

ii) The informal and unstructured nature of the Reserve and its public use shall be maintained.

iii) Council shall use its best endeavors to ensure that land management practices on adjoining parcels of land are compatible with the management of the Escarpment Reserve.

iv) Development and management practices not in keeping with or appropriate to, the landscape character of the Reserve shall not be permitted.

3.9 Vegetation Management

Coastal forest dominated by kohekohe, titoki and karaka occurs in small areas on the escarpment. This type of coastal forest is also found on the Reserves 3-10 km north of the study area (Nikau Walkway Reserve, Muaupoko Scenic Reserve, Hemi Matenga Memorial Park and Waikanae Scenic Reserve) and on the lower slopes of Kapiti Island some 10 km northwest of the site. Although the escarpment forest stands are poorer in species composition and structure than the nearby stands of reserved coastal forest, it does provide an important part of the 'bird corridor' with the other forest remnants within the local area.

A Vegetation Assessment prepared in 1995 by Plant Ecologist, Maggy Wassilieff (Appendix 2) has provided relevant information on the composition of the escarpment vegetation.

Five separate stands of kohekohe-titoki forest are distributed on the escarpment. The stands are quite simple in structure, having a canopy some 6- 10m tall dominated by kohekohe with some titoki present on midslopes and with karaka near the foot of the escarpment. The kohekohe trunks are of moderate dimensions (around 60 cm diameter at breast height). Some of kohekohe have epiphytes growing on the wide-spreading limbs, but not large heavy specimens such as are present in the Waikanae Scenic Reserve.

Prior to Council's control of the reserve, there was very little understorey development in the interior of the forest stand with only a few small ferns growing in the shelter of the tree roots. Trees on the edge of the stands are generally in poor condition. Dying and decrepit titoki and kohekohe are also apparent. There was considerable evidence of possum damage in the forests with kohekohe fruits that had fallen to the forest floor being chewed and there were no seedlings regenerating in the forest interior as would have been expected in possum-free stands of kohekohe. Since possum control measures have been introduced, there has been considerable evidence of regeneration through the reserve.

All stands of coastal forest containing kohekohe and karaka are important as examples of a formerly more extensive vegetation type that has been lost from the coastal plains and hills. Although the escarpment stands are rather inadequate examples of the richness and structural complexity of coastal forests of the District they have value in a regional and national context as being an example of a vegetation type on a landform (interglacial cliff) that is only present on the Kapiti Coast area.

There have been two major impediments to natural regeneration within the forest stands since Council stewardship of the reserve, both of which are presently being controlled.

Fruits failed to mature. This applied especially to kohekohe, whereby all flowers and immature fruits were eaten by possums before the fruits fell to the ground.

Seedlings were being eaten. This applied to all species of the forest and margins. Possums and rabbits are responsible for browsing and killing seedlings that managed to germinate in and beyond the forest.

Regeneration of understorey of vegetation in the forest remnants is occurring as a result of removing grazing stock. However, continued possum and rabbit control will be necessary to ensure establishment and survival of seedlings. Tauhinu is colonising open grassland areas now the grazing pressure has reduced.

Removal of grazing pressure since 1995 combined with pest control has seen significant regeneration of the understorey as well as some species colonizing parts of the open grassland. Continued management of regeneration and revegetation of the escarpment will include:

- Implementation of the RPMP
- Continued exclusion from stock grazing.
- Co-operation with adjacent landowners regarding implementation of pest management operations.

Policies

i) Council shall manage and implement the Restoration and Pest Management Plan as outlined in Appendix 1

ii) All plant material use for revegetation shall be locally sourced, preferably from plants growing on the escarpment.

iii) Species shall be planted in similar proportions to that occurring naturally on the escarpment.

iv) Accurate records of the plants and the revegetation changes occurring on the escarpment shall be maintained.

v) Initial revegetation work shall concentrate on canopy species replacement and consolidation of the forest remnants.

vi) The grassland areas, particularly along the escarpment ridge in the vicinity of the walking track shall be managed to minimise the risk of fire.

vii) Adjacent to the railway line all scrub and weed growth that is likely to create a fire hazard shall be controlled.

viii) The pine trees on the escarpment face shall be removed.

PUBLIC ACCESS AND USE

3.10 Public Use

Due to the steep nature of the escarpment, the main recreational opportunities the reserve has to offer are passive with walking and environmental appreciation being the main recreational values. Use of the Mataihuka walkway is popular, particularly during weekends and public holidays. Mountain biking is becoming a more common pursuit within the reserve, and some conflicts with pedestrians have occurred. Mountain biking will be prohibited within the reserve.

While there are several areas of relatively flat land at the toe of the escarpment, adjacent to the NIMT railway, access to these areas is difficult and the opportunities for safe and enjoyable recreation in an attractive and pleasant setting is very limited.

The main recreational focus for the Escarpment Reserve is best confined to the established walkways and along the escarpment ridge. Additional access routes

down, up and/or across the escarpment are not planned, as they would be steep, require benching of the escarpment face would generally be visible and would not provide additional recreational benefit. Safety issues would create considerable difficulties with the management of the Reserve.

Other than informal recreation uses such as walking, running, picnicking and environmental interpretation the main attraction of the Reserve is its appearance when viewed from the coastal plain to the west. As a backdrop to the Coastal Plain and Queen Elizabeth Park, the Escarpment Reserve is an important and distinctive feature of the District. The Reserves location and setting mean that it only receives use as an informal recreational open space, however, it is and will continue to be much valued as a visual resource by the community and traveler's and visitors to the District.

Often the true value of reserves such as the Escarpment Reserve are only realised when their intrinsic and often hard to define values have been compromised by inappropriate development and/or management. Areas such as the Escarpment Reserve are not simply left over space to be used for as much or whatever one can conceivably incorporate within the area. These areas must be respected and vigorously protected from inappropriate development or management practices that could compromise their intrinsic qualities.

Policies

i) To provide and encourage informal recreational activities for the use, benefit and enjoyment of the public, taking into account the ecological and environmental sensitivity of the escarpment and its ability to sustain recreational activity.

ii) Walkway routes shall be confined, generally to the escarpment ridge to ensure easy and safe access with an emphasis on a well defined ridge top walkway.

iii) The impact of public use on the Reserve shall be monitored to ensure that recreational activities do not cause damage to the resource.

iv) Trail bikes, mountain bikes, horse riding and dogs shall not be permitted within the Reserve including the Mataihuka walkway.

v) Picnicking shall be allowed within the Reserve, but the lighting of fires or camping shall not be permitted in any circumstance.

3.11 Access and Parking

The access point to the Reserve is on Waterfall Road via a block of KCDC land.

The wet nature of the valley floor in this location and grazing activity has created unpleasant and difficult conditions around the reserve entrance and on the route up

to the escarpment ridge in the past. The council intends to cease the leasing and grazing of this area to allow revegetation to occur and to avoid stock damaging the walking tracks.

In the past access to the reserve's northern end from was available from Panorama Drive across private farmland. Provision of access over this private land has relied on the goodwill of various landowners. However, conflicts between public access and private land uses have resulted in the landowner withdrawing permission for the public to across the land.

Access from the bottom of the escarpment on both the east and west sides are not practicable and present both legal, safety and physical access difficulties.

Management of the Reserve and regenerating vegetation will be enhanced by confining public access to the escarpment ridgeline.

Policies

i) Council shall continue to investigate permanent public access to the north end of the Escarpment Reserve.

ii) Council shall implement and maintain improvements to existing public access from Waterfall Road to the escarpment ridge.

iii) Adequate off street parking for Reserve users shall be provided at Waterfall Road

3.12 Walkways

The Council in association with KEA developed the Mataihuka walking track along the top of the escarpment. The family of the late Bill Moxon, Kapiti Branch of Forest and Bird and KEA donated funds to assist with the development of the track.

The escarpment face is extremely steep and access on the escarpment face should not be encouraged in the interests of public safety and the protection of regenerating vegetation.

KEA prepared a proposal in 2004 for the upgrade and enhancement of the southern access route that included upgrading the walking track to the top of the escarpment with an alternative alignment and easier gradient. This proposal was submitted by KEA in their submission on the Draft Management Plan and is included as Appendix 3. Any upgrade of the track at the southern end of the reserve should consider KEA's proposal and KEA should be involved in the design and implementation process.

The establishment of additional walking routes through the Reserve are not currently envisaged, but may be considered by Council in the future if the need arises.

Policies

i) Council shall regularly maintain the Mataihuka walkway, including the section to Waterfall Road to comply with all relevant building and safety standards,..

ii) Additional walking tracks through the Reserve, may be considered by Council at their discretion .

iii) The Council shall upgrade/ realign the southern entrance walking track from the Waterfall Road to the ridge to comply with all relevant building and safety standards.

3.13 Structures

In order to retain the natural and inbuilt character of the escarpment the addition of new structures is not generally encouraged. . However, a lookout with seating and a table as well as new seating near the cairn and upgrades fence stiles have been proposed by KEA (See Appendix 3).

All structures must be sited and designed to avoid being visible on the escarpment when viewed from beyond the Reserve. Structures should not be a prominent element on the top of the escarpment.

i) As appropriate, fence stiles shall be provided, designed and constructed so they are safe and user friendly for a wide range of physical abilities.

ii) Lookouts and structures such as stiles shall only be constructed if there is a specific need and/or it enhances the informal recreational use and safety of the Reserve.

iii) All structures shall be sensitively sited and designed and shall fully conform to the relevant Building and Safety Codes and consent requirements.

iv) Additional seating, picnic tables and the like may be installed at the Council's discretion.

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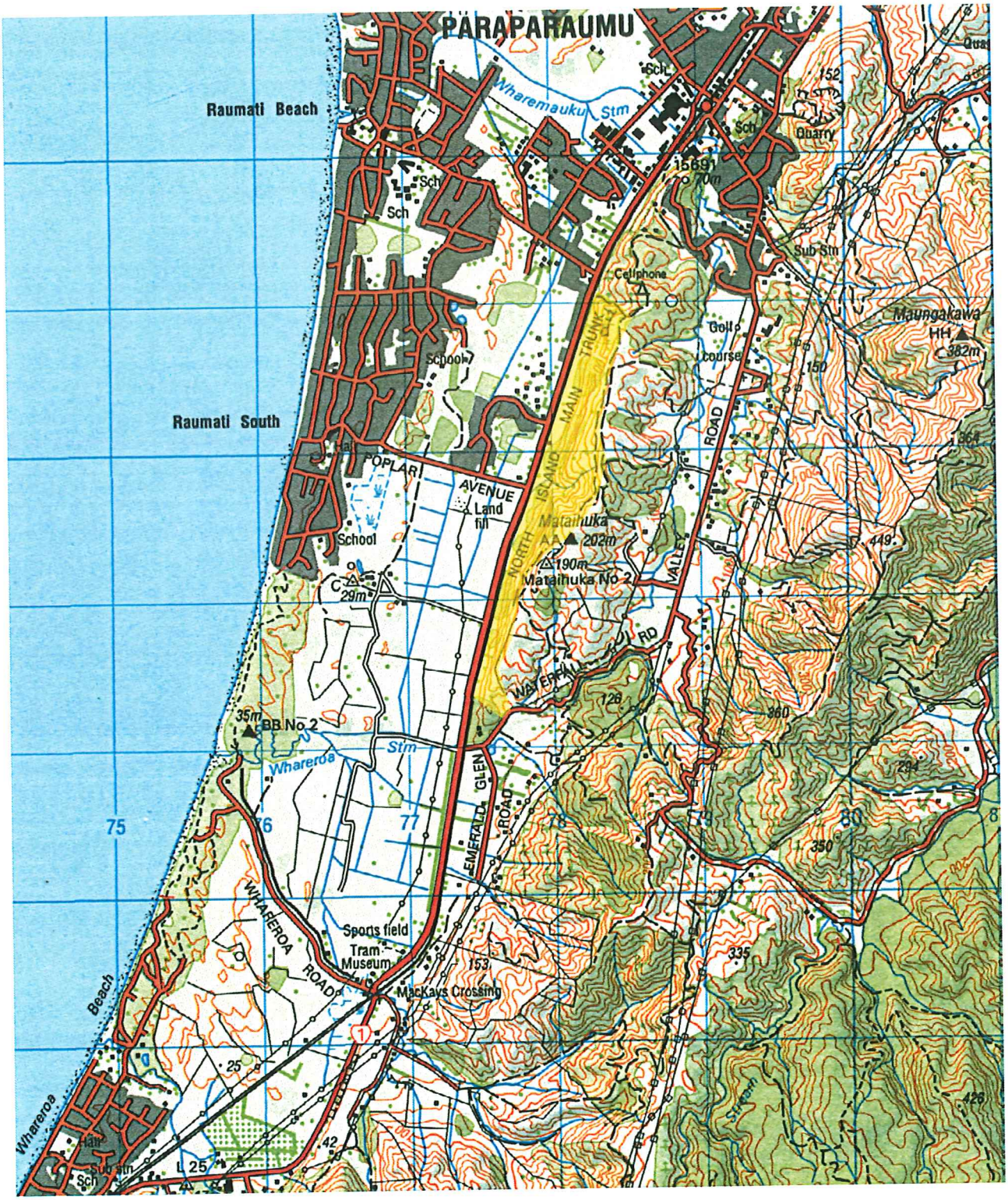


Approximate area of Reserve

Figure 1
Location Plan

RAUMATI ESCARPMENT RESERVE MANAGEMENT PLAN May 2006

Prepared By: Boffa Miskell Ltd
Prepared For: Kapiti Coast District Council

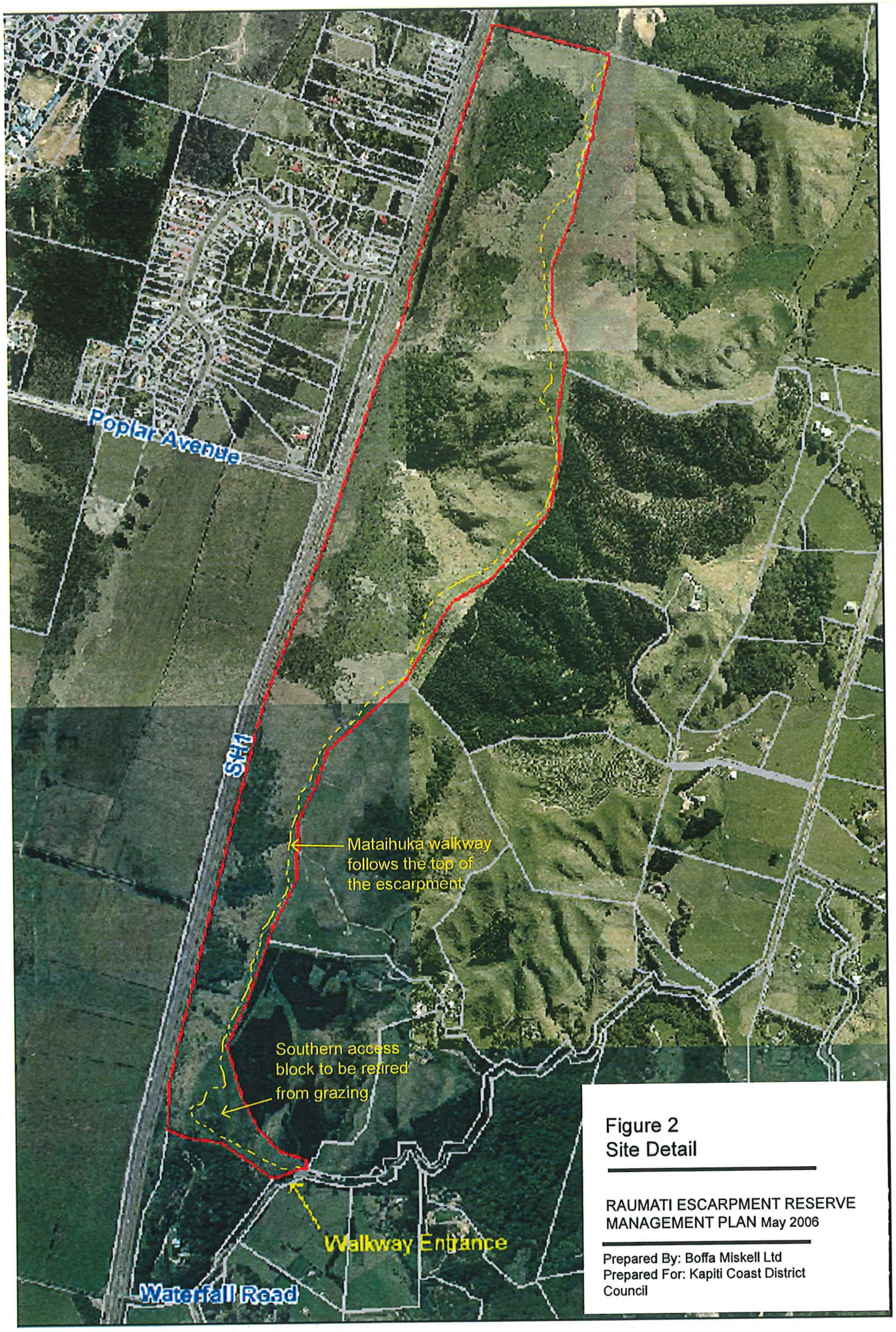
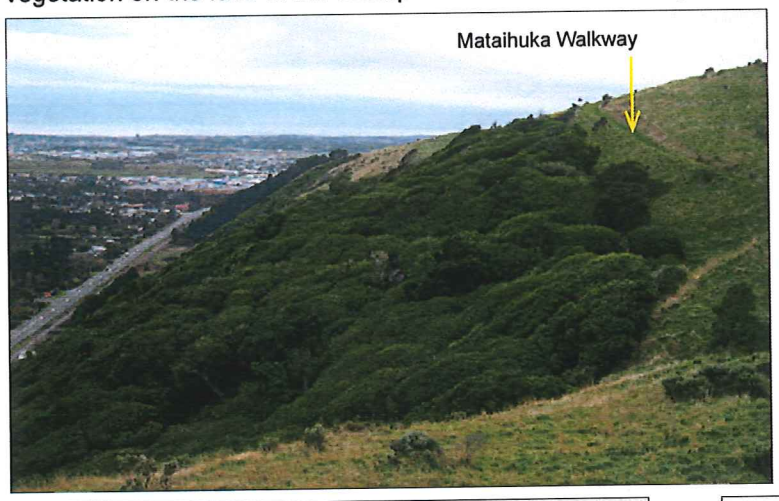


Figure 2
Site Detail

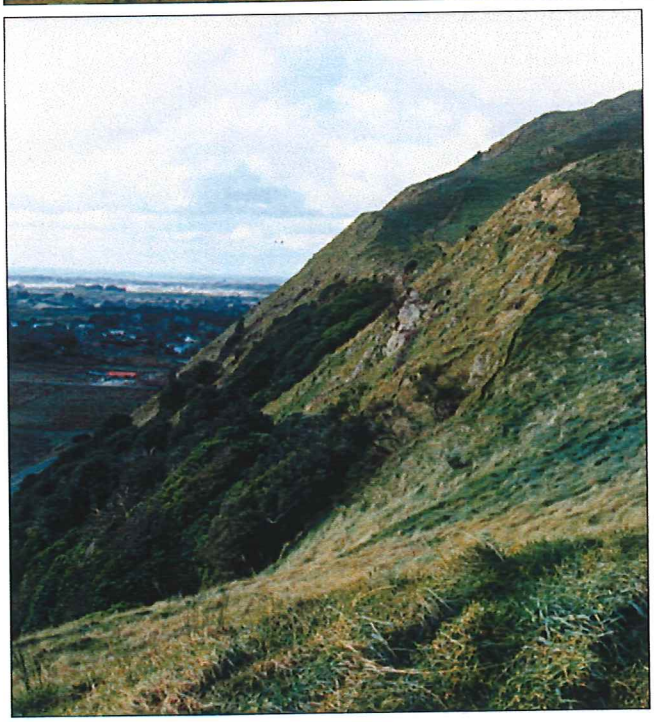
RAUMATI ESCARPMENT RESERVE MANAGEMENT PLAN May 2006

Prepared By: Boffa Miskell Ltd
Prepared For: Kapiti Coast District Council

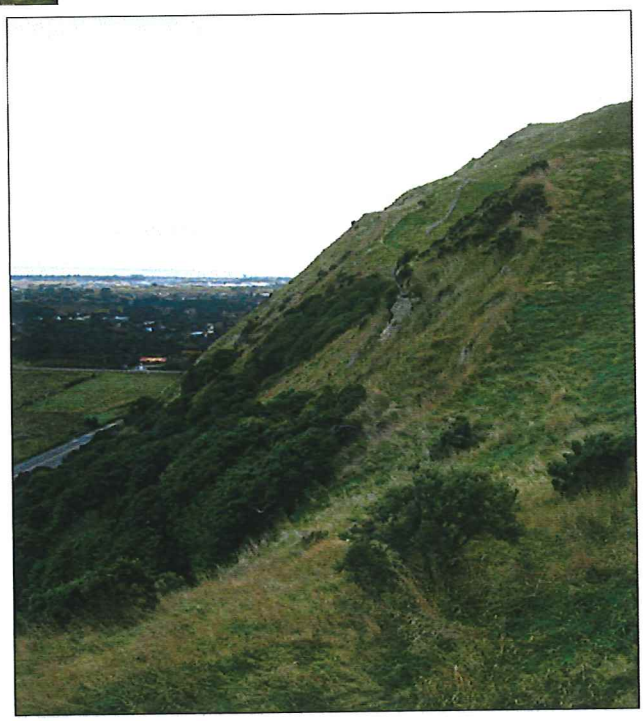
Photograph 1:
View of the escarpment from Poplar Avenue shows the distinctive remnant stands of coastal forest vegetation on the face of the escarpment. Matihuka walkway follows the top of the escarpment



Photograph 2:
View north with SH1 visible to left of photograph. Showing the vegetation in the foreground that extends to various elevations from the toe of the escarpment.



Photograph 3:
Photograph of the escarpment taken in 1995, just before grazing stock were excluded from the escarpment part of the reserve.



Photograph 4:
From the same position 10 years on (2005) there is a greater abundance of native vegetation evident suach as the tauhinu in foreground and on knoll in top right corner of photograph. The understory vegetation in the in the forest remnants is also regenerating.

Photograph 5:
The only public access to the reserve is at the southern end, from Waterfall Road across KCDC land.
The first part of the access track has recently been upgraded, and is visible in the middle ground of the photograph. The remainder of the access path to the top of the escarpment is unformed and slippery in wet conditions.

Photograph 7:
The entrance at Waterfall Road has been upgraded and the path gravelled.

Photograph 8. The memorial cairn located at a high point along the Mataihuka walkway, commemorates Bill Moxon and others who contributed to the protection and developement of the reserve and walkway.

Photograph by Tim Park

Photograph 9:
Blackberry and other pest plant species are established in the area between the railway and the toe of the escarpment and is being controlled through spraying by KCDC and GWRC.

National Archives

Photograph 10:
View of Poplar Avenue (1950), toward the northern end of the escarpment reserve.

APPENDIX 1

Raumati Escarpment Reserve

Restoration and Pest Management Plan

KAPITI COAST DISTRICT COUNCIL

Introduction : The escarpment environment

Owned and administered by Kapiti Coast District Council (KCDC) the Raumati Escarpment Reserve covers an area of approximately 64 hectares. Adjacent to State Highway 1 it runs from a point 200 metres north of Waterfall Rd, to opposite a point lying approximately 1 kilometre north of Poplar Avenue.

With a steep 45° gradient the Escarpment rises from only 20m above sea level to a height of 202m , providing spectacular views across the Kapiti plain, and out to sea to Kapiti Island.

Geology / soils

The escarpment has been described as an interglacial cliff (Stevens 1998) and is predominantly composed of unstable greywacke and scree.

Soils are well drained gravels and colluvium, silt loams on the upper slopes and peat at

the toe of the escarpment. On the well drained slopes coastal forest and grassland are found, and in the peat swamps raupo, flax and associated wetland plants.

History

The reserve has also been known as Paraparaumu Coastal Scarp, Raumati Reserve and Norwood Escarpment Reserve. Since a recent update on the reserve the name has settled on Raumati Escarpment Reserve. A local historian, Carkeek (1996), noted that there was a pa on the escarpment in 1850. It ran from the swamp at the base of the escarpment to the crest, providing a strong defense to invasion.

There is a NZAA site (R26/265) on the land near the end of Poplar Avenue. This site was partly destroyed by construction of the NIMT Railway and SH1. Whare (buildings) sites have been recorded near the trig on the ridge. The track along the ridge from the trig north has an exposed layer of charcoal and burnt stone. In the main gully, what appears to be a hearth, has been uncovered by erosion.

The land was partially covenanted with DoC when in 1993 the KCDC obtained the large part of the escarpment as part of a donation and contribution toward a land subdivision. The given land was then retired from grazing in 1995.

In the past environmental groups Kapiti Environmental Action (KEA) and the local branch of Royal Forest and Bird Protection Society have been involved in the reserve.

Landscape Value and ecological significance

The landscape value of the escarpment is recognised as one of Kapiti's significant resources due to its dramatic contrast between coastal plain and the steepness of the escarpment. It provides a stunning physical and environmental backdrop to the plain. From the walkway at the top of the escarpment it also provides commanding views across the Kapiti plain towards Kapiti Island. It is one of the escarpments in the district which is still heavily influenced by coastal processes.

The reserve is mainly composed of grassland and pockets of regenerating coastal scrub and forest with small ephemeral wetland areas lying at the base of the escarpment. The blocks of more mature forest are dominated by kohekohe and karaka. In 2000 the Wellington Botanical Society compiled a vascular native species lists of two bush blocks within the reserve (see appendices 1A and 1B), which gives an indication of the forest

type. 23 ferns and 36 trees and shrub species were recorded along with several grasses, sedges and lianes. One epiphytic native orchid (*Drymoanthus adversus*) was also found on the survey.

Raumati Escarpment was ranked as a regionally significant site in KCDC's 2001 ecological inventory of the Kapiti District. It provides an important ecological link between Kapiti Island and the Tararua Ranges.

Raumati escarpment has been given a silver rating under Greater Wellington's (GW's) Key Native Ecosystems (KNE) programme due to the reserve's *'native forest with high biodiversity value'.* The Biosecurity Department of GW devised the KNE concept as part of its commitment to turning the tide of biodiversity decline in our region. The KNE concept is an ecosystem approach to reducing pest threats to high value remnants of indigenous biodiversity. Raumati Escarpment Reserve is seen as another important link in the regions biodiversity. The ultimate goal is that KNE's are self perpetuating, predominantly indigenous ecosystems, requiring small management inputs to function. The escarpment is rated highly ecologically on a local and regional basis. Coastal forest such as kohekohe forest is also nationally under-represented.

Restoration ecology

An integral part of ecological restoration is an understanding of the natural ecosystem and the patterns and processes by which it has been damaged, lost or fragmented by human activity. Ecological restoration relates to the ecological integrity of an ecosystem, and to its rehabilitation and repair using local plants and animal species to replace exotic species that have degraded its integrity.

Native plants and animals maintain the natural processes operating throughout the ecosystem e.g. by dispersing seeds, pollination, providing habitat and food etc. The main pressures on these natural processes that have degraded the ecosystem at Raumati Escarpment Reserve include past stocking, pest plants, pest animals, and erosion. Along with periodic fire risk, pests and erosion continue to exert pressures on the ecosystem. To achieve the goal of a self-sustaining ecosystem requiring a minimum of management input the pressures negatively affecting the ecological integrity need to be addressed.

Adaptive management

Adaptive management is the technique of reassessing priorities on a yearly basis. Adaptive management requires a degree of flexibility in terms of delaying or bringing

forward weed control in tune with seasonal or climatic perturbations. This means a more fluid approach may need to be taken in terms of budgeting i.e. given the dynamism of processes over such a large area we must be prepared to adapt our management techniques as the ecological restoration unfolds. This ensures that the most effective use of time and funds are made.

To achieve the desired end result of a self sustaining ecosystem the specific pressures on the site have been identified and the methods to remove these pressures outlined.

Pressures on the forest

Pest animals

For decades the greatest animal threat to the survival of the indigenous ecosystems of Raumati Escarpment Reserve was livestock. The retirement of the land from grazing in 1995 eliminated the devastating effects of browsing and seedling trampling by stock. Since the cessation of sheep grazing the pest animals perceived to be having the greatest adverse impact on the health of the reserve are possums, rats, and stoats. Rabbits were a major threat in the past but now that the reserve is no longer grazed the pasture is rank and no longer affords a suitable habitat for rabbits. Hares may be present, and if so, would be a likely threat to any re-vegetation programme.

Possums

Although no formal possum density monitoring has been carried out, a site inspection by GW staff in October 2002 disclosed a considerable amount of possum sign. This included many well used pad runs (possum tracks) running between the top of the reserve and the pine forest on the eastern side of Mataihuka Track. This indicated a reasonably large possum population which would have been adversely effecting forest health and slowing regeneration. Possums browse on the foliage, flowers and fruit of many indigenous plant species. They also raid the nests of native birds, preying on both eggs and chicks.

Rats

It is reasonable to presume that the reserve would harbour a population of rats, possibly both Ship and Norway rats. Ship rats are agile climbers and, like possums, frequently raid the nests of native birds. Rats also prey on native lizards and invertebrates such as snails and weta.

Stoats

The reserve may also be frequented by stoats, with the forest/pasture margin ecosystem being a perfect habitat for stoats. Stoats adversely impact on indigenous flora by preying

on eggs, chicks and adult native birds.

Pest plants

Weeds are identified as the greatest threat to the health of the ecosystem. It is proposed that through weed control and strategic native plantings that a healthy functioning, self-sustaining native forest eco-system will be achieved. The most widespread weeds and the most potentially threatening to the ecological processes operating across the ecosystem are to be targeted initially. KCDC and GW operatives had surveyed the reserve for pest plants in late 2004 (see appendix 2 for pest plant list).

Huge belts of blackberry originally infesting the base of the escarpment had moved well up into the gully systems. These plants were helicopter sprayed in May 2005 and it is hoped to remove this menace from the escarpment over the next few years. The railway and SH1 is an effective weed corridor into the reserve. Many weeds have used the wind currents that trains provide as a vector for invasion and expansion into the reserve area. The escarpment reserve is bordered to the north by a private large land block full of Japanese honeysuckle. This will provide a continual source of invasion into the reserve. Most pest plants are concentrated along a narrow strip at the base of the escarpment but many bird spread woody weeds have made it to all parts of the reserve (for full weed maps see appendices 3A to 3D). The steep slopes make access for contractors difficult. There are three main types of weeds impacting in the reserve;

- **Climbers/ramblers:** banana passionfruit, old man's beard, blackberry and japanese honeysuckle. Climbers have the ability to smother mature forest and regenerating bush, collapsing the canopy and creating forest decline. They may also suppress seedling regeneration.
- **Woody weeds:** wilding pines, boneseed, buckthorn and cotoneaster. In regenerating scrub these aggressive colonisers have the ability to out-compete native plants, preventing the establishment of canopy species and the natural progression towards mature native forest.
- **Ground covers:** periwinkle and montbretia. These ground covers prevent seedling regeneration, and in the long term, the process of seedling recruitment and replacement of canopy species.

Pest Animal Action Plan for Raumati Escarpment Reserve

The three animal species that are identified as posing the greatest threat to the health of Raumati Escarpment Reserve and therefore priorities for control are possums, ship rats and stoats. Although rabbits and hares may only be present in low numbers it would be wise to carry out some control before any re-vegetation takes place. The most

appropriate method of control would be night-shooting using a motorbike, helmet mounted spotlight and silenced .22 calibre rifle.

Possums

Officially, possum control at Raumati Escarpment Reserve was first carried out in August 1995 when at the request of KCDC, Greater Wellington carried out a single application of 1080 paste. Previous to this, and possibly subsequently, private possum trapping operations have taken place for the purposes of pelt recovery.

An ongoing possum control programme was initiated in November 2002 by Greater Wellington. A network of bait stations spaced at 150 metre intervals was set out in the reserve. Cereal pellets containing the toxins brodifacoum and cholecalciferol were dispensed to possums from the bait stations. The stations were refilled with bait at monthly intervals until the programme was halted in April 2004. The programme was restarted again in November 2005 with the stations being refilled with brodifacoum pellets at three monthly intervals. It is planned that this regime will be continued indefinitely. This work is being carried out by a contractor employed by Greater Wellington, with the cost shared by Greater Wellington and KCDC.

Rats

Greater Wellington Biosecurity Department has proven that the above possum control regime is also effective at reducing rat numbers to low levels. Rat monitoring in areas where this regime is being used has shown results of below a 10% tracking rate.

An unfortunate consequence of reduced rat numbers can often be an increase in mouse numbers. Mice are an important food source for stoats. Therefore an increase in stoat numbers may result. Mouse populations fluctuate in size markedly due to food availability, and when mouse numbers drop abruptly, stoats may change the main component of their diet from mice to birds.

Stoats

Possum and rat control may result in a by-kill of stoats through secondary poisoning. Stoats can consume toxins by scavenging poisoned possums or rats. However this will become less likely to happen as control continues, as there will be fewer poisoned carcasses and more non-toxic mice available for stoats to consume. Therefore it will be appropriate to install a stoat trap network in the future. This would require four traps which could be cleared and re-baited at the same time as the bait stations are serviced.

Possum, rat and stoat control in Raumati Escarpment Reserve will increase native bird fledgling survival due to reduced egg and chick predation and reduced competition for food resources (fruits and flowers). Increased bird life in the reserve will result in a greater amount of seed dispersal and therefore healthier regeneration of the forest.

Fire risk

Due to rapid drainage many areas of the escarpment dry out over summer. Of most risk are the long swards of dry grass, bracken, broom and gorse. There is little to be done to alleviate this problem and this area will remain susceptible to fire until, when in another 20 years, if regeneration is relatively fire free, the succeeding vegetation provides for a more fire resistant cover. In the medium term large infestations of fire prone gorse and broom will be targeted for weed control.

Pest Plant Action Plan for Raumati Escarpment Reserve

Weed work completed by end of 2004/2005 financial year:

- In May 2005 an estimated 8 hectares of blackberry, widely dispersed throughout the reserve, was controlled via helicopter. Results at December 2005 look promising although a greater period of time is needed to assess the full extent of the control. This means that aerial spray forecast for early 2006 will be delayed until December of 2006.
- In 4WD accessible areas a contractor with gun and hose unit knocked out most of the large blackberry infestations at the foot of the escarpment in December 2004. Willows and Japanese Honeysuckle at the northern end of the escarpment were also sprayed.
- In early 2005 the community environmental group Nga Ururoa were commissioned to control bird spread species throughout the reserve. Banana Passionfruit, boneseed, boxthorn, cotoneaster, elder and evergreen buckthorn were the main species targeted.

Weed work to be completed in 2005/2006 financial year:

- Follow-up on 4WD accessible treatment site for blackberry and Japanese honeysuckle. A large remaining area of blackberry, pampas and gorse also remains at the foot of the escarpment. This was too close to the road to be aerial sprayed and just out of the railways land jurisdiction. This strip of weeds

represents a continuing threat to reinvasion of controlled areas. In late December 2005 these infestations were sprayed.

- In early 2006 the Nga Ururoa group will travel throughout the reserve and re-sweep for bird spread species, most of which (boneseed, boxthorn, cotoneaster, elder and evergreen buckthorn) are woody species. All plants will be stump treated.

Weed work to be completed in 2006/2007 financial year:

- Follow up aerial spray on blackberry in December 2006. Initial knock down of other difficult to access environmental weed infestations will also be part of this operation. In particular remote and isolated infestations of pampas, willow, gorse, broom and Japanese honeysuckle.
- Follow-up woody weed sweep throughout the escarpment by Nga Ururoa group.
- Follow-up gun and hose spray work with ground crew on 4WD accessible infestations.

Revegetation

An integral part of the management plan for the Raumati Escarpment Reserve is to plant pockets of native plants in strategic places to augment and facilitate the processes of natural regeneration. It is proposed that a number of nodes or 'islands' of native plantings are sited along the foot of the escarpment. Yet to be specifically sited, these islands will be located strategically; providing links between other pockets of bush, and amongst large grassland blocks or weed infested areas. This will promote greater numbers of bird flights over bare areas and thus will increase the rate of seed deposition and regeneration through the largely un-forested and weedy components of the reserve.

Planting will take place on the flats at the base or toe of the escarpment only. The rocky, dry and relatively inaccessible slopes are very difficult in which to establish native plants. Instead, plantings at the base of the slopes can provide a seed reservoir for bird dispersal up the slopes. These 'toe' plantings will also act as a filter on wind action, protecting vegetation further up the slopes and creating micro-sites that favour seedling growth.

Plantings will also need to be targeted amongst the large patches of blackberry on the flats at the bottom of the escarpment. If areas are not planted then there is a risk of the area being re-infested by blackberry, or other weeds. Originally earmarked for winter of 2006 planting will be delayed until the following year to ensure blackberry regrowth has been controlled. It is imperative to create a clean slate for the native plantings in 2007, and minimise weed maintenance work in the future.

In the first years plantings, pioneer or early successional species should be used. These species grow and reach maturity quickly and will colonise bare areas over the short to medium term. Species that would be suitable are *coastal tree daisy, five finger, kanuka, karamu, kohuhu, lemonwood, mahoe, ngaio, taupata* and *tawhinau*. Climax species can be introduced in later years, if necessary, and may include rare or threatened species such as large leafed milk tree. Other canopy species that would be suitable include *grislinea, kowhai, kohekohe, nikau, pigeonwood,* and *titoki.*

It is important that where possible all seeds and plants are eco-sourced. This is particularly important for kanuka, lemonwood, kohuhu and kowhai as these species have local varieties which are quite different than the types usually found at commercial nurseries.

Restoration budgeting

As part of a memorandum of understanding between Greater Wellington and KCDC both agencies are willing to commit firm funding for the next 3 years for weed control and pest animal control. Below are suggested budgets for KCDC and GW to June 2009:

Pest plant budget

Agency	2005/6	2006/7	2007/8	2008/9	2009/10
GW	$2000	$5000	$3000	$3000	$3000
KCDC	$2000	$5000	$3000	$3000	$3000

Note: It is estimated that from 2006/7 less of the KCDC budget will be spent on weed control and progressively more on replanting costs. On each contract there will be follow-up work required, hence the maintenance of high input for the first several years. After 5 years the weed input costs should drop substantially. Note the discrepancy in the amount of funding for the 05/06 and 06/07 years. Insufficient regrowth of blackberry infestations prevented a follow up spray in 05/06. This follow up control is expected to be carried out in the following financial year.

Pest animal budget

Agency	2005/6	2006/7	2007/8	2008/9	2009/10
GW	$450	$450	$450	$450	$450
KCDC	$450	$450	$450	$450	$450

Appendix 1A

SOME INDIGENOUS VASCULAR PLANTS OF UPPER PARTS TWO REMNANTS ON THE RAUMATI ESCARPMENT, CENTRED ON NZMS 260 R26 AND Pt R25 MAP PARAPARAUMU, G.R.s 783285 AND 782281; LIST COMPILED ON 27-4-97 BY B.J. MITCALFE AND J. CHRIS HORNE.

BOTANICAL NAME	MAAORI NAME	COMMON NAME
GYMNOSPERMS		
Dacrycarpus dacrydioides	kahikatea	kahikatea
MONOCOT TREES		
Cordyline australis	tii koouka	cabbage tree
Rhopalostylis sapida	niikau	nikau
DICOT TREES AND SHRUBS		
Alectryon excelsus	tiitoki	titoki
Aristotelia serrata makomako wineberry		
Brachyglottis repanda	rangiora	rangiora
Carmichaelia australis	maakaka	broom
Coprosma repens	taupata	taupata
Coprosdma rhamnoides		
Coprosma robusta	karamu	karamu
Corynocarpus laevigatus	karaka	karaka
Dysoxylum spectabile	kohekohe	kohekohe
Geniostoma rupestre ssp ligustrifolium	hangehange	hangehange
Griselinia lucida	puka	broadleaf
Hebe stricta	koromiko	koromiko
Hedycarya arborea	porokaiwhiri	pidgeonwood
Knightia excelsa	rewarewa	rewarewa
Kunzea ericoides	kaanuka	kanuka
Leptospermum scoparium	maanuka	manuka
Leucopogon fasciculatus	mingimingi	
Macropiper excelsum	kawakawa	kawakawa
Melicope ternata	wharangi	wharangi
Melicytus ramiflorus	maahoe	whiteywood
Myoporum laetum	ngaio	ngaio
Myrsine australis	maapou	mapou
Olearia paniculata	akiraho	akiraho
Olearia solandri	mingimingi	
Ozothamnus leptophyllus	tauhinu	tauhinu
Pennantia corymbosa	kaikoomako	kaikomako
Pittosporum tenuifolium	kohuhu	kohuhu
Pseudopanax anomalus		
Pseudopanax arboreus	whauwhaupaku	five-finger
Pseudopanax crassifolius	horoeka	lancewood
Solanum laciniatum	poroporo	poroporo
Sophora microphylla	koowhai	kowhai
Streblus banksii	ewekuri	large-leaved milk tree
MONOCOT LIANES		
Ripogonum scandens	kareao	supplejack
DICOT LIANES		
Metrosideros diffusa	raataa white	climbing rata
Metrosideros fulgens	aka kura	scarlet rata
Metrosideros perforata	aka tea	clinging rata
Muehlenbeckia complexa	poohuehue	pohuehue
Parsonsia heterophylla	kaihua	parsonsia

Appendix 1B

BOTANICAL NAME	MAAORI NAME	COMMON NAME
FERNS		
Adiantum cunninghamii	huruhuru tapairu	maiden hair
Asplenium flaccidum	makawe a Raukatauri	hanging spleenwort
Asplenium hookerianum		
Asplenium oblongifolium	huruhuru whenua	shining spleenwort
Asplenium polyodon	petako sickle	spleenwort
Blechnum chambersii	nini	lance fern
Blechnum filiforme	paanako	threadfern
Blechnum membranaceum		
Blechnum minus	kiokio	swamp kiokio
Blechnum "lowland"	kiokio	kiokio
Cyathea dealbata	ponga	silver fern
Cyathea medullaris	mamaku	mamaku
Hypolepis ambigua		
Lastreopsis microsora		
Lastreopsis velutina		velvet fern
Pellaea rotundifolia	tarawera	button fern
Phymatosorus pustulatus	koowaowao	hound's tongue
Phymatosorus scandens	mokimoki	fragrant fern
Pneumatopteris pennigera	paakau	gully fern
Polystichum richardii	pikopiko	shield fern
Pteridium esculentum	raarahu	bracken
Pteris macilenta	titipo	brake
Pyrrosia eleagnifolia	ota	leather-leaf fern
ORCHIDS		
Drymoanthus adversus		
GRASSES		
Echinopogon ovatus		hedgehog grass
Microlaena stipoides		
Poa anceps		broad-leaved poa
SEDGES		
Carex dissita		
Carex lessoniana		rautahi Carex sp.
Uncinia uncinata	matau a Maaui	hooked sedge
RUSHES		
Juncus sarophorus	wii	leafless rush
MONOCOT HERBS		
Arthropodium candidum	repehina papa	
Astelia solandri	koowharawhara	
Collospermum hastatum	kahakaha	
Libertia ixioides	miikoikoi	
Typha orientalis	raupoo	raupo
DICOT HERBS		
Dichondra repens		Mercury Bay weed
Epilobium sp.		willow herb
Hydrocotyle elongata		
Hydrocotyle novae-zeelandiae		
Oxalis exilis		oxalis
Parietaria debilis		
Wahlenbergia sp.	rimuroa	

Appendix 2 : Pest plants of Raumati Escarpment

Agapanthus	*Agapanthus praecox*
Banana passionfruit	*Passiflora sp.*
Blackberry	*Rubus fruticosus*
Boneseed	*Chrysanthenemoides monilifera*
Boxthorn	*Lycium ferocissimum*
Brier	*Rosa rubinigosa*
Broom	*Cytisus scoparius*
Climbing asparagus	*Asparagus scandens*
Convolvulus	*Convolvulus arvense*
Cotoneaster	*Cotoneaster franchettii*
Elder	*Sambucus nigra*
Evergreen Buckthorn	*Rhamnus alaternus*
Gorse	*Ulex europaeus*
Japanese honeysuckle	*Lonicera japonica*
Karo	*Pittosporum crassifolium*
Montpellier broom	*Genista monspessulana*
Pampas	*Cortaderia selloana*
Periwinkle	*Vinca major*
Wilding pine	*Pinus radiata*
Willow	*Salix sp.*

APPENDIX 2

Raumati Escarpment Vegetation Assessment

VEGETATION ASSESSMENT OF RAUMATI ESCARPMENT

September 1995

Prepared by Maggy Wassilieff

Prepared for Boffa Miskell Ltd

MARGARET WASSILIEFF ---------- ENVIRONMENTAL CONSULTANT

INTRODUCTION

The following report provides an assessment of the condition of the native forest and associated plant communities growing on the coastal escarpment at Raumati. Recommendations have been made as to the most practical ways whereby the existing plant communities can be maintained in a healthy condition or restored towards a self-sustaining state.

The report has been prepared for Boffa Miskell Ltd as part of the environmental information required for the preparation of a Management plan for the Raumati Escarpment.

OBJECTIVES

The objectives of this report are:

* *To describe the original vegetation of the site*

* *To describe the present composition and condition of the vegetation*

* *To determine the significance of the vegetation to the local area and the Wellington region*

* *To describe the conditions required for natural forest regeneration*

* *To recommend procedures for restoration and recovery of the native plant cover*

* *To outline management principles and policies that will ensure the long-term wellbeing of the escarpment vegetation.*

MARGARET WASSILIEFF ---------- ENVIRONMENTAL CONSULTANT

METHODS

The area was visited on Saturday, September 2 1995 and notes were made on the composition and condition of each patch of forest cover in the study area. Brief descriptions were also made of other plant communities adjacent to the forest

patches. A vascular plant species list was compiled for the area, although because of the limited time spent at each patch it is not an exhaustive list

Information on nearby stands of vegetation is from Wassilieff 1985 and Wassilieff, Clark & Gabites 1986.

THE STUDY AREA

The area under consideration is a portion of the coastal escarpment that forms the western boundary of the greywacke hill country of the Kapiti Coast The study area extends from Lynch's Crossing in the south (NZMS 260 R26, 774260) to a point opposite Coastlands Shopping Centre (NZMS 260 R26, 789300) in the north.

The escarpment is an interglacial coastal cliff mantled with scree and solifluxion materials (Stevens 1988). It rises from a height of 20m asl to 202m at trig point Mataihuka in the centre of the study area but only reaches around 70m at the northern and southern ends of the study area. The coastal escarpment is composed of stable and unstable greywacke bedrock and colluvium.

Soils include well drained gravels, bouldery colluvium and silt loams on the steep slopes and peats at the foot of the escarpment. Coastal forest and exotic grasslands dominate on the well-drained soils of the escarpment; there are also smaller areas of open native shrublands, gorse scrub and pine forest Grasslands, rush and flaxlands dominate on the poorly drained peaty soils.

ORIGINAL VEGETATION

Coastal forest dominated by kohekohe, titoki and karaka occurs in small areas on the escarpment This type of coastal forest is also found in the reserves 3-10km north of the study area (Nikau Walkway Reserve, Muaupoko Scenic Reserve, Hemi Matenga Memorial Park and Waikanae Scenic Reserve) and on the lower slopes of Kapiti Island some 10km northwest of the study area. The escarpment forest stands however are much poorer in species composition and structure than the nearby stands of reserved c'oastal forest.

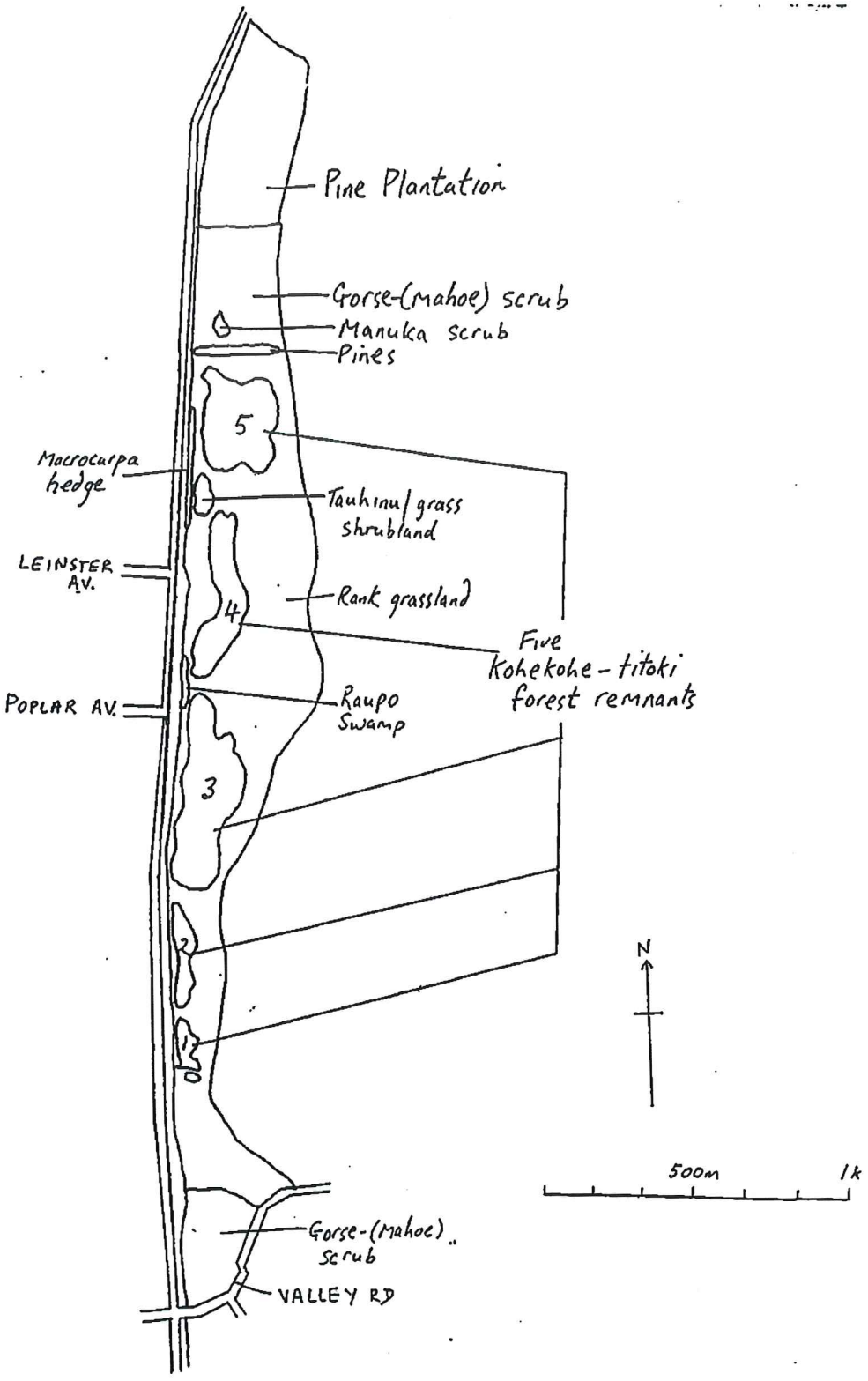
The original forests of the Kapiti Coast were never accurately described by the early European botanists but Elder who lived at Waimahoe, immediately south of Waikanae township at the turn of the century recorded that the forests of the Kapiti coast once contained emergent podocarps and northern rata above the kohekohe-titoiki canopy (Elder 1967). Today northern rata has disappeared from these forests and only a couple of surviving rimu and dead emergent trunks at Hemi Matenga are testimony that these forests of the Kapiti Coast were once much taller and complex than they are today.

There has been a long occupational history of the Kapiti Coast by humans and when Europeans arrived there was a settlement of some 35 Maori on the slopes below the Mataihuka trig (Carkeek 1966). It is probable therefore that the forests of the escarpment were already in a modified state in the middle of last century. Carkeek records that the larger kohekohe trees on the escarpment were felled for fence posts in the 1920s (Carkeek 1966).

PRESENT VEGETATION

Five separate stands of kohekohe-titoki forest are distributed on the escarpment between Lynch's Crossing and a point opposite Raumati Road (Fig. 1, Photo 1). The distribution of these stands corresponds with the distribution of forest cover - depicted in Map 7 by Carkeek. The three northern stands are the largest, each being approximately 5ha in area.

The stands are quite simple in structure, having a canopy some 6-10m tall dominated by kohekohe with some titoki present on midslopes and with karaka near the foot of the escarpment (Photos 2 & 3). The kohekohe trunks are of moderate dimensions (around 60cm diameter at breast height). A couple of kohekohe have epiphytes growing on the wide-spreading limbs, but no large hoary specimens (such as are present in the Waikanae Scenic Reserve) were present.


Pine Plantation
Gorse-(mahoe) scrub
Manuka scrub
Pines
5
Macrocarpa hedge
Tauhinu/grass shrubland
LEINSTER AV.
Rank grassland
4
Five Kohekohe-titoki forest remnants
POPLAR AV.
Raupo Swamp
3
2
1
N
500m
1k
Gorse-(mahoe) scrub
VALLEY RD

There is very little understorey development in the interior of the forest stands. A few small ferns grow in the shelter of the tree roots. Trees on the edge of the stands are often in poor condition; dying and decrepit titoki and kohekohe were observed (Photos 5, 6, & 7). There is plenty of evidence of possum in the forests. All kohekohe fruits that had fallen to the forest floor had been chewed and there were no seedlings regenerating in the forest interior as would be expected in possum-free stands of kohekohe.

A full botanical survey of the stands was not undertaken, but over 40 native species were recorded here. Shrub and small tree species like akiraho, manuka, kawakawa, rangiora, fivefinger, kaikomako, hangehange and wharangi grow on the margins of the remnants, typically as isolated specimens. The divaricating shrub *Coprosma rhamnoides* was by contrast more common on the bush edge (Photo 8).

The species composition of the forest stands is poorer than that in the nearby reserves.

An old quarry site has been colonised by small-leaved native shrubs like manuka, Solander's tree daisy and tauhinu along with exotic grasses (Photo 4). It is located just beyond the Electric Traction Rectifier Substation.

Gorse scrub grows at the southern and northern ends of the study area. A few mahoe shrubs, black tree ferns and manuka are also present (Photos 10 & 11).

A pine forest has been established at the northern end of the study area just beyond the regenerating gorse. The pines are about 18 years old and contain an understorey of gorse.

Grasslands and swamp vegetation are found at the toe of the escarpment These sites were not investigated in depth. The wet peaty soils support raupo and flax along with rushes sedges and margins of blackberry (Photo 9). At the northern end of the study

area weeds like Japanese honeysuckle, blackberry and Cape Ivy form dense thickets along with willows and poplars at the foot of the escarpment

ASSESSMENT OF VEGETATION CONDITION

Although the extent of the forest cover appears to be similar to that which grew on the escarpment 30 years ago it is apparent that all the stands of kohekohe-titoki forest are in a declining state. There is no adequate regeneration of the canopy trees. A few small areas containing karaka, kohekohe and titoki seedlings may be seen at the foot slope of the escarpment, but no saplings are present and there is no regeneration of these or any other species in the interior of the stands.

The canopy trees, especially kohekohe, are being browsed by possums. Some trees on the margins of the stands are in a decrepit state, exhibiting dead limbs, fallen branches, damaged trunks and sparse canopy development.

There is no marginal advance of the forest into the adjacent grasslands.

Some specieslike kowhai, kaikomako, puka and fivefinger occurring in low numbers or present as single individuals are in danger of being lost altogether from the forest if lack of recruitment continues.

Sheep have been prevented from grazing on the escarpment for 2 years, but would have been responsible for eating out much of the forest interior. The lack of regeneration of any understorey species is surprising in the light of the removal of the sheep. It indicates that the other two pest species, possums and rabbits, are in high numbers in the area as they are effectively preventing forest recovery.

Rabbit burrows are present inside the forests as well as being present in the adjacent grasslands. Rabbits were seen within the forest during my brief visit.

MARGARET WASSILIEFF ---------- ENVIRONMENTAL CONSULTANT

ECOLOGICAL SIGNIFICANCE OF THE VEGETATION

Coastal forests are underrepresented in the reserve system and few extensive stands of Kohekohe-dominant forest are reserved on the mainland. For this reason all stands of coastal forest containing kohekohe and karaka are of importance as being examples of a formerly more extensive vegetation type that has been lost from the coastal plains and hills.

Although the escarpment stands are rather inadequate examples of the richness and structural complexity of coastal forests of the district they have value in a regional and national context as being an example of a vegetation type on a landform (interglacial cliff) that is only present in the Paraparaumu-Waikanae area.

CONDITIONS REQUIRED FOR NATURAL FOREST REGENERATION

There are 2 major impediments to natural regeneration regeneration in the forest stands.

(1) Fruits are failing to mature.
This applies especially to kohekohe, whereby all flowers and immature fruits are eaten by possums before the fruits fall to the ground.

(2) Seedlings are eaten.

This applies to all species of the forest and margins. Sheep, possums and rabbits are responsible for browsing and killing all seedlings that manage to germinate in and beyond the forest The only exception noted was at a few sites on the toeslope of the escarpment where animals are frequently disturbed and little groves of karaka, kohekohe and titoki seedlings may be found.

-To counter these two factors it will be necessary to:

(1) continue to prevent stock from grazing on the escarpment

(2) eliminate or reduce the possum population and
(3) eliminate or reduce the rabbit population.

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Stands of forest that have been fenced in the Wellington Region show spectacular understorey regeneration within a couple of years of fencing. Kohekohe regeneration would probably be limited with fencing alone as possums are the major reason that this species is not regenerating. Poisoning programmes in the Wellington Botanic Gardens and Otari Gardens have resulted in good flowering and germination of kohekohe. The eradication of possum from Kapiti Island has lead to the development of dense kohekohe and nikau growth in the forest undertones (Stephen Fuller, pers. comm.)-

REVEGETATION OPTIONS

Revegetation of the escarpment could be undertaken to:

- *enhance the structure of the forest interior*

- *extend the forest vegetation into the grassland*

- *hasten forest succession in the shrublands*

(1) Revegetation of forest interior

The aim here would be to provide species that were formerly common in the understorey, e.g., mahoe, kawakawa, hangehange, rangiora, wharangi; as well as to provide species that could ultimately be canopy dominants, e.g., karaka, titoki and kohekohe.

As the soils of the forest interior are very variable, ranging from deep silt loams to fine gravels and boulders, it will be important to match species requirements with site conditions. Much of the slope on which the forest grows is very steep, so revegetation work will be fairly demanding.

(2) Extension of forest margins

If destocking of the study area is undertaken a dense sward of exotic grass will grow up which will prevent the natural marginal advance of the forest In summer dry rank grass will be a fire hazard so it would be sensible to undertake revegetation work on the forest margin in an effort to buffer the forest from the grasslands as well as to extend the area of forest Hardy, light-tolerant species such as cabbage tree, mahoe, ngaio, manuka, akiraho, karaka, kowhai, taupata, kaikomako, *Coprosma rhamnoides,* native broom and rangiora would be suitable for such sites.

Releasing of the margin plantings would be required for a couple of years until the plantings exceed the height of the rank grass.

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(3) Enhancement of shrublands

The gorse shrublands at the northern and southern ends of the study area are beginning to regenerate toward a mahoe-dominant scrub, it may be another 20-30 years however before the gorse is finally overtopped by mahoe. The mahoe scrub will not be as species-rich as the forest stands as shade-tolerant species will be favoured initially in this vegetation. Regeneration to a kohekohe-titoki forest could be hastened by introducing the longer-lived canopy species into the gorse stands.

SPECIES SUITABLE FOR REGENERATION WORK

All native tree and shrub species known to be present in the forest stands are suitable for revegetation work and all species should be utilised to ensure a representative species mix.

The following native tree and shrub species were recorded on the escarpment: *Aleciryon excelsus,* titoki *Drachyglotiis repanda,* rangiora *Carmichaelia arborea,* native broom *Cassinia leptophylla,* tauhinu *Coprosma repens,* taupata *Copras ma rhamnoides Coprosma robusta,* karamu *Cordyline australis,* cabbage tree *Corynocarpus laevigatus,* karaka *Dysoxylum spectabile,* kohekohe *Geniostoma rupestre,* hangehange *Griselinea lucida,* puka *Lepiospermum scoparium,* manuka *Macropiper excelsum,* kawakawa .*Melicope ternata,* wharangi *Melicytus ramiflorus,* mahoe *Myoporum laetum,* ngaio *Olearia paniculata,* akiraho *Olearia solandri,* Solander's tree daisy *Pennantia corymbosa,* kaikomako *Pseudopanax arboreus,* fivefinger *Solarium aviculare,* poroporo *Sophora mi'crophylla,* kowhai

Species that are known to grow in the kohekohe forests of the Paraparaumu-Waikanae region but were not sited during this brief survey could also be suitable for introduction to the escarpment. Such species are: nikau palm, matai, kahikatca, heketara, kanuka, kanono, pigconwood, pukatea, red matipo, black matipo.

REVEGETATION AND MANAGEMENT PRINCIPLES

* Revegetation work should only be undertaken when the browsing pressure on the escarpment is reduced.

* All plant material used for revegetation work should be locally sourced, preferably from plants growing on the escarpment.

* Species should be planted in similar proportions to that occurring naturally on the escarpment. In particular, karaka and ngaio should not be overplanted.

* Accurate records of the plantings should be kept.

* Initial revegetation work should concentrate on canopy species replacement (kohekohe and titoki) and consolidation of forest margins.

REFERENCES

Carkeek, W.C. 1966: The Kapiti Coast A.H. & A. W. Reed.

Elder, N.L. 1967: Waimahoe bush. *Bulletin of the Wellington Botanical Society 34:29-31*

Stevens, Graeme 1988: The making of the land, *in* The Celebration History of the Kapiti District Kapiti Borough Council.

Wassilieff, M.C. 1985: Vegetation of the Waikanae Scenic Reserve. *Bulletin of the Wellington Botanical Society 42: 36-40.*

Wassilieff, M.C; Clark, D.J.; Gabites, I. 1986: Scenic Reserves of the Lower North Island: *Biological Survey of Reserves Series no 14.* Dept Lands & Survey.

Site Photographs

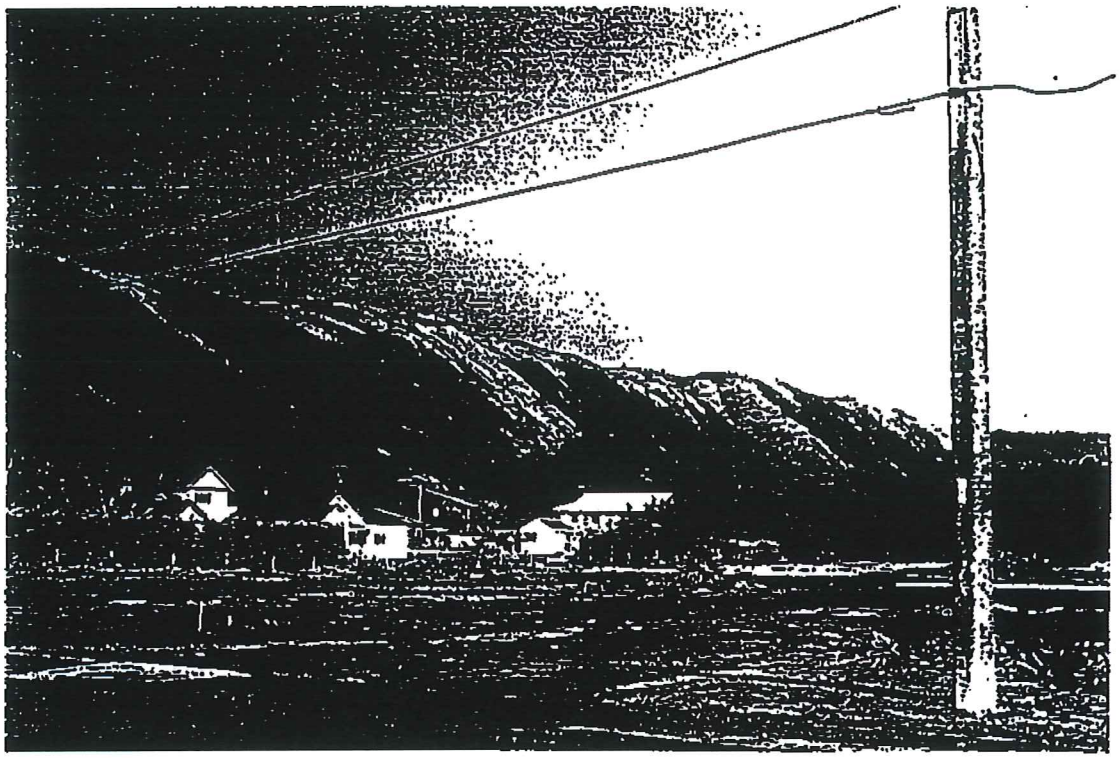

Photo 1: View of escarpment from Raumati Road.

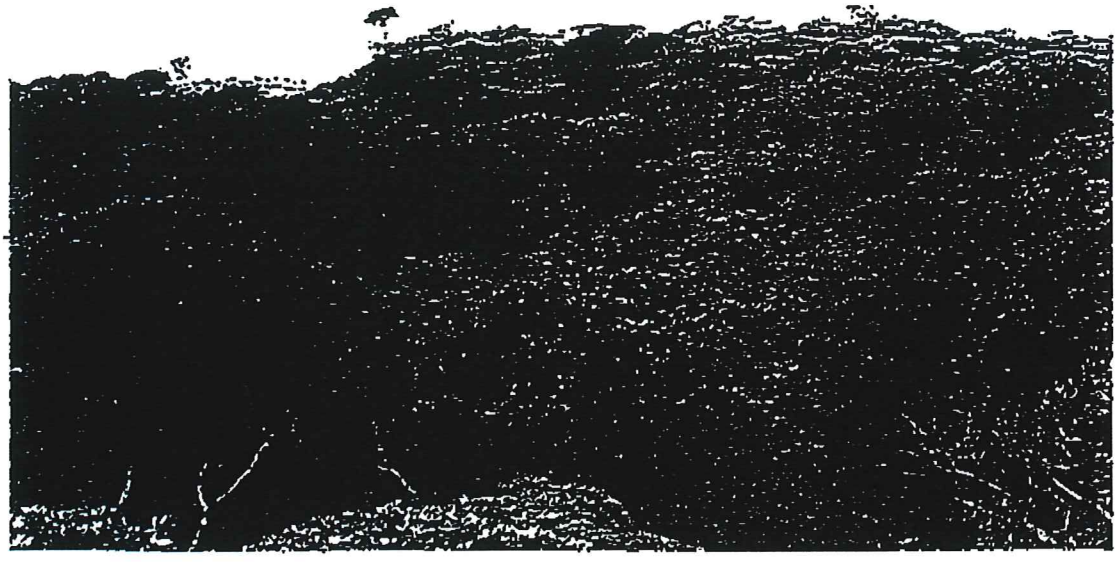

Photo 2: Kohekohe-titoki canopy of escarpment forests.

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Photo 3: Kanaka grove located on toe slope of escarpmenL

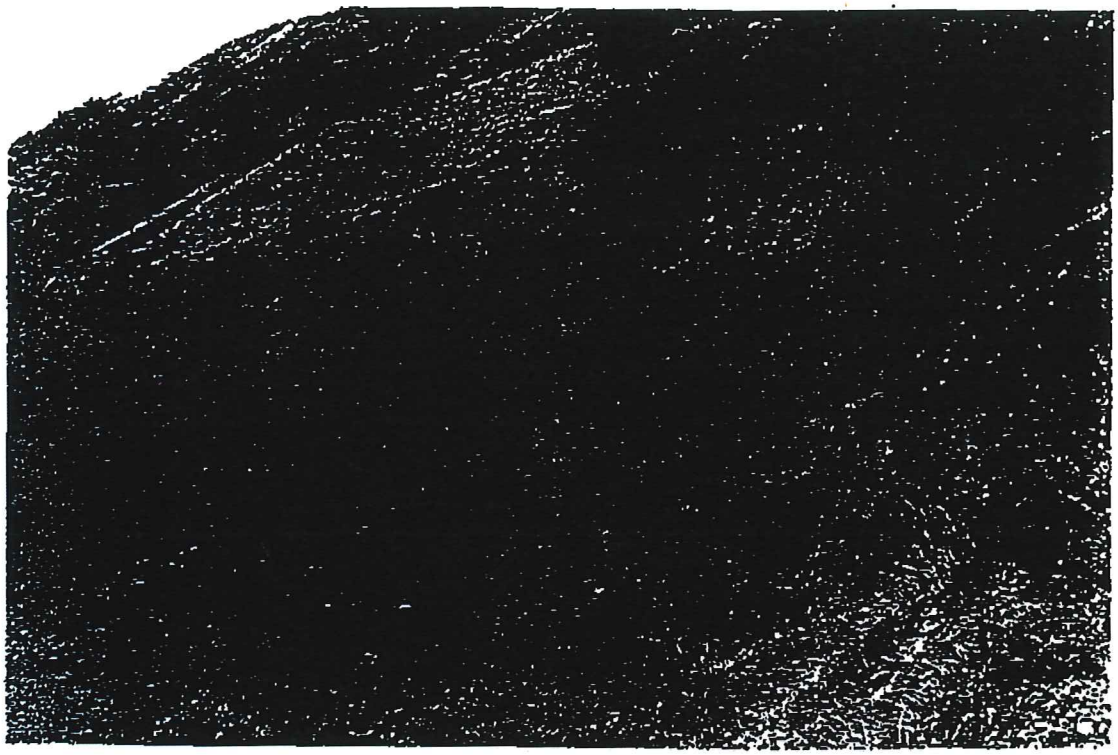

Photo 4: Tauhinu / grassland on old quarry site.

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Photo 6: Marginal kohekohe with sparse canopy.

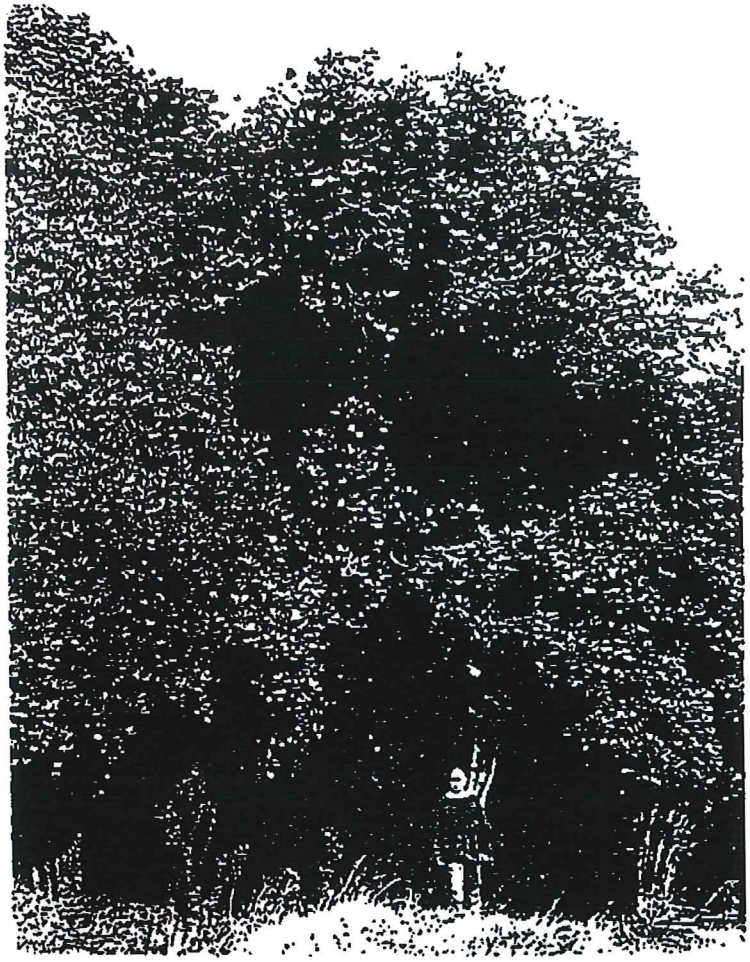

Photo 5: Kohekohe and karaka on bush edge margin.

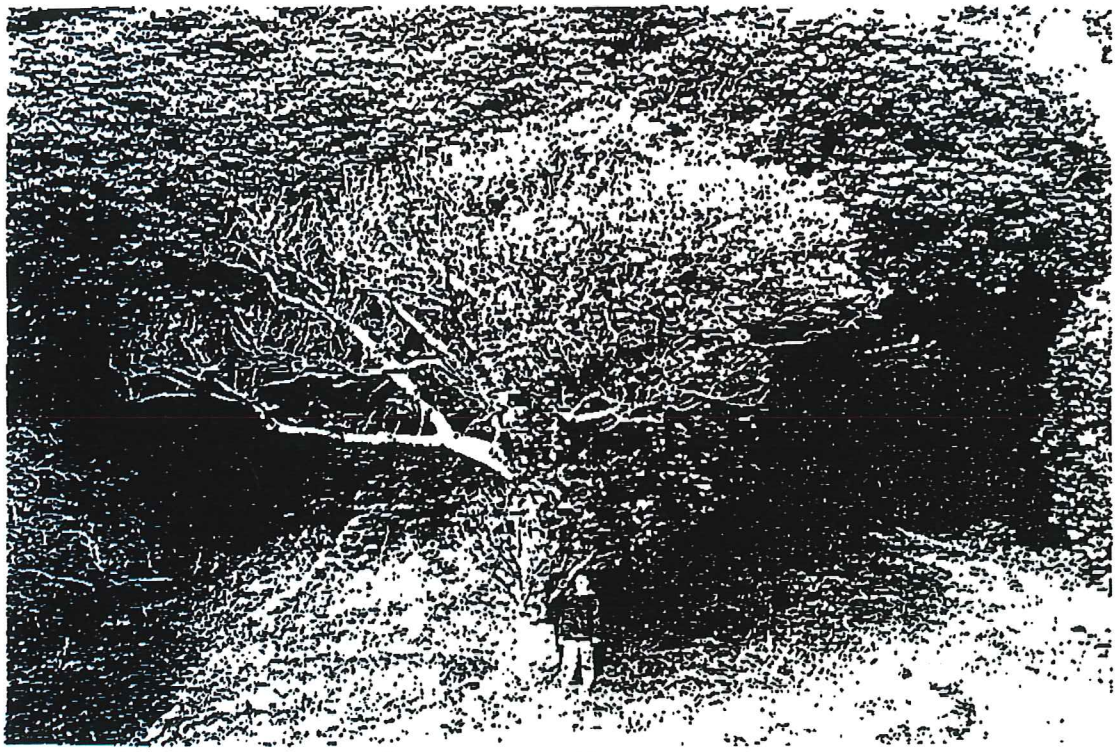

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Photo 7: Marginal titoki with damaged trunk and branches.

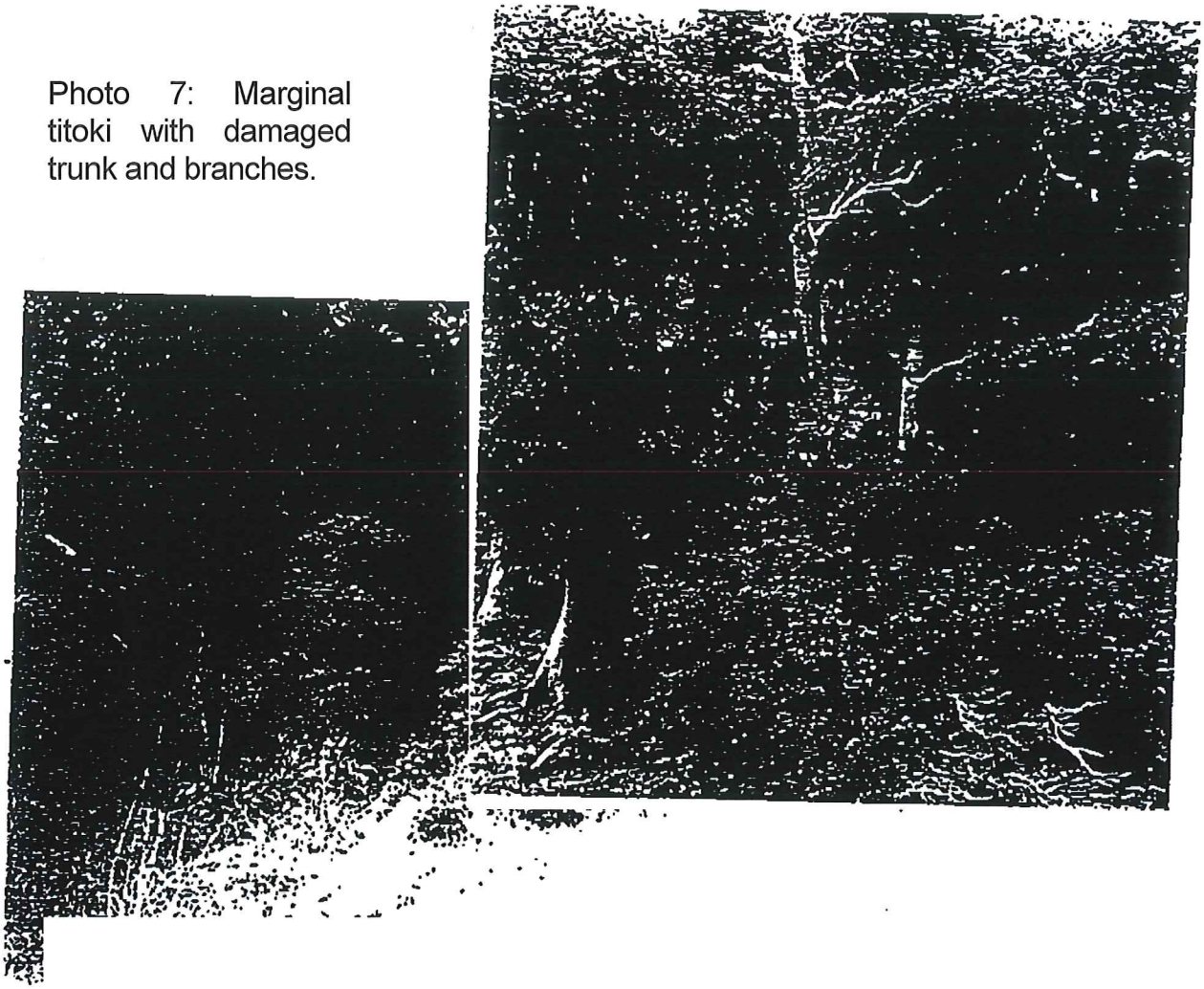

Photo 8: *Coprosma rhamnoides* shrubs at forest edge.

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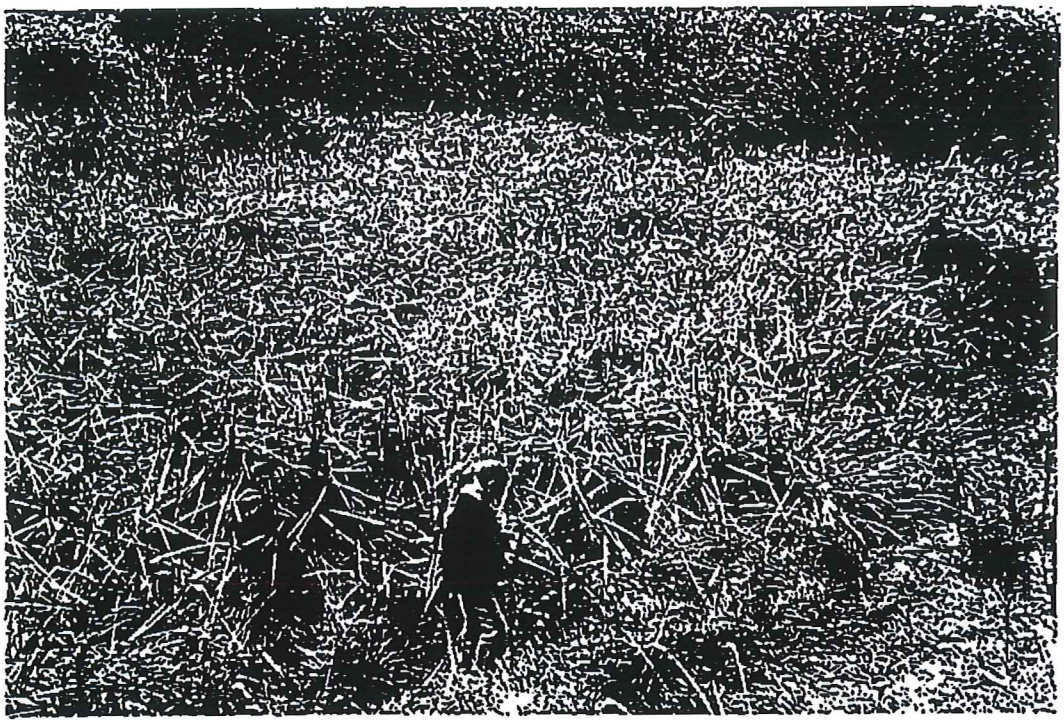

Photo 9: Raupo swamp at foot of escarpment

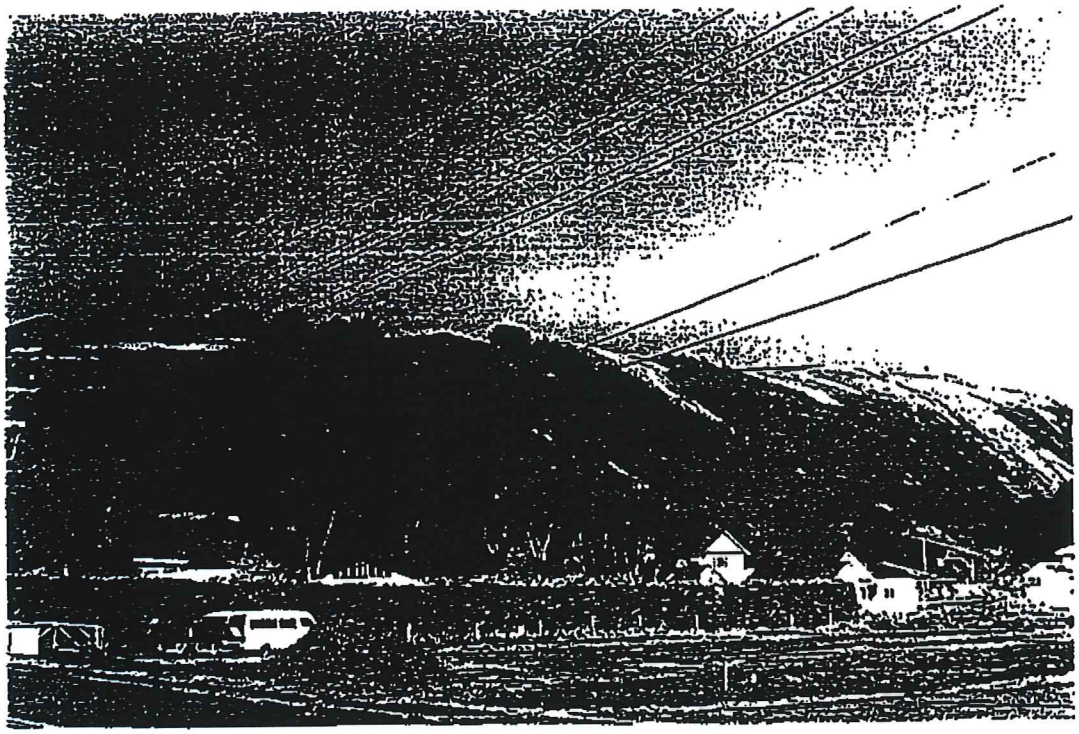

Photo 10: Northern end of Raumati escarpment. Gorse scrub dominant on slopes.

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Photo 11: Northern end of escarpment: gorse, mahoe and manuka evident on slope. Willows and poplars in foreground.

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Species that are known to grow in the kohekohe forests of the Paraparauimi-Waikanae region but were not sited during this brief survey could also be suitable for introduction to the escarpment. Such species are: m'kau palm, matai, kahikatea, heketara, kanuka, kanono, pigeonwood, pukatea, red matipo, black matipo, kohuhu and karaka.

It should also be noted that there are other plant species such as climbers and ferns that are common to the western coast area between Tawa and Paekakariki. These could also be considered for introduction to the escarpment.

Climbers
Metrosideros perforata
Parsonsia heterophylla
Ripogonum scandens

Ferns -
Arthropteris tenella Asplenium
oblongifolium Asplenium
hookerianuni Asplenium
flaccidum Blechnum filiforme
Pellaea rotundifolia Phymalosorus
diversifolius Phymatosorus
scandens Polystichum richardii
Pyrrosia eleagnifolia

REVEGETATION AND MANAGEMENT PRINCIPLES

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* All plant material used for revegetation work should be locally sourced, preferably from plants growing on the escarpment.
* Species should be planted in similar proportions to that occurring naturally on the escarpment. In particular, karaka and ngaio should not be overplanted.
* Accurate records of the plantings should be kept.
* Initial revegetation work should concentrate on canopy species replacement (kohekohe and titoki) and consolidation of forest margins.

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APPENDIX 3

KEA PROPOSAL FOR SOUTHERN ENTRY TO THE MATAIHUKA WALKWAY

Appendix 3: KEA Proposal for enhancement of the southern access route.

Kapiti Environmental Action Inc.

c/o 10 Miro Road
Raumati Beach
2998685

Enclosed with Submission to the Draft Revised Raumati Escarpment Reserve Management Plan.
31/3/06

23/11/04

Parks Manager
Kapiti Coast District Council
Paraparaumu

RAUMATI ESCARPMENT RESERVE
MATAIHUKA WALKWAY

Enclosed is a plan of the southern entry to the Mataihuka Walkway from Waterfall Road.

1. The existing formed track which follows the fenceline and crosses the wetland.

2. The preferred route with the easiest gradient and is a more natural walk which follows the landform.

3. This is the only area which KEA considers suitable for fencing off for stock grazing due to preference for location of walking routes.

4. This is the gully route often used as a fun downhill shortcut.

5. This location KEA proposes be levelled and developed as a Lookout to Queen Elizabeth Park and the wider coast, also providing a destination point for a short loop walk.

6. The existing zig-zag that needs further work to reduce the gradient.

7. This is the existing stile.

KEA proposes that track (2) on the map be formed as the main track, that area (5) be developed as a lookout with table and seats, that area(6) be reformed to create an easier gradient

KEA recommends that grazing be discontinued on this reserve but in the event that it be approved, it be confined to the area outlined on the map.

At the time of subdivision this southern section of land would have been surveyed to provide access to the Raumati Escarpment Reserve. Access from the north is over private land and subject to negotiation later.

This walkway was opened in 1996 and has proven to be extremely popular with local people and those in the wider district. In time it will be part of a wide network of walking tracks throughout the southern part of our district.

Appendix 3: KEA Proposal for enhancement of the southern access route.

As part of this network this portion should have quality signage and facilities.

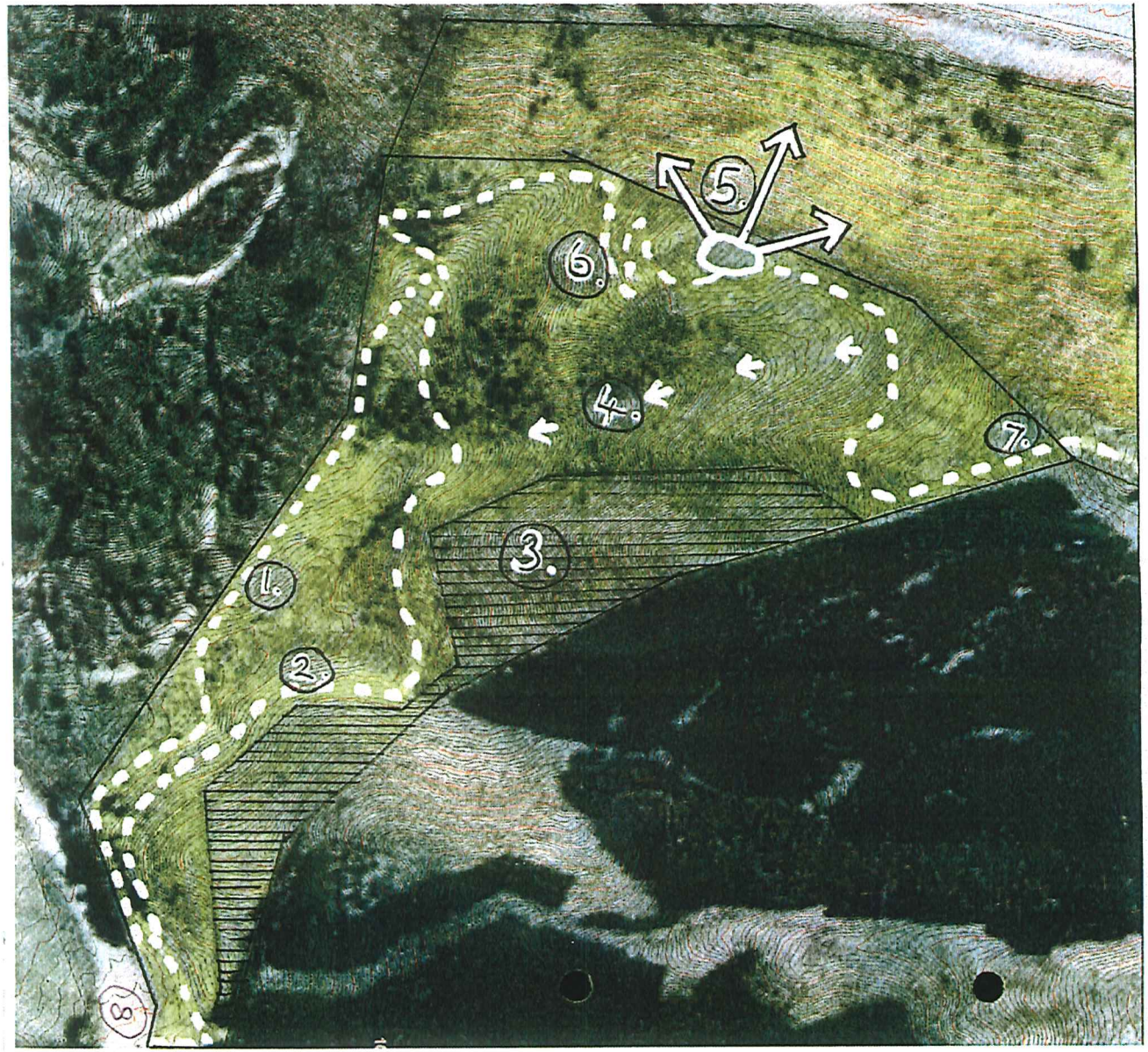
Natural regeneration is happening quite rapidly and could be a venue for assisted community planting. The main escarpment lies to the west, but this area facing south-east with shelter from the higher end of the escarpment will provide for different species. In time it will be a very pleasant destination for visitors with easy access from Waterfall Road.

Carpark design can be addressed at a later date.

Thank you for your consideration of KEA's vision to further improve our lovely district for future generations.

June Rowland
Convenor
Forests, Reserves and Wetland Group
KEA.

Appendix 3: KEA Proposal for enhancement of the southern access route. Planning map.



KEY

1. **Existing Track**
2. **Proposed Track**
3. **Grazing Area**
4. **Valley Route**
5. **Proposed Look-out**
6. **Zig-zag to Modify**
7. **Existing Stile**

8 Delayfield Rd

K. E. A.

Enclosed with Le Submission to the Draft Revised Raumati Escarpment Reserve Management Plan

31/3/06