GAME CHANGE PROPOSAL FOR CONSERVATION IN NEW ZEALAND

Eight outstanding sites for consideration

Department of Conservation
Te Papa Atawhai

Cover: Whio *Photo: Herb Christophers*

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Introduction

A partnership to transform biodiversity across selected sites in New Zealand

This paper presents eight high value potential sites for transformational conservation investment.

Background

In October 2013 trustee's presented a substantial proposal to the Director-General of Conservation to transform conservation in New Zealand. This proposal included direct long term investment in approximately six large sites that meet the following criteria:

- The primary focus for the sites is a measurable biodiversity gain over the agreed timeframe in large high value conservation sites (weighting 50%). Community engagement and opportunity for education, particularly to young people, is also important (weighting 30%). The site must also be a model for inspiring other philanthropic trusts/benefactors to do similar work (weighting 20%). The trustees appreciate that this may not be possible for all sites such as remote areas but must be a component for the majority of sites.
- The sites will represent a mix of risk. From lower risk management where the tools and techniques to address threats are readily known (and able to be utilised now with high likelihood of success in biodiversity gain), through to higher risk gaps where tools and/or techniques need development but there is a high return on investment in terms of potential biodiversity gains once development has occurred.
- The investment is for 'new' work, transforming the work the Department is already doing rather than replacing it.
- The sites must be terrestrial unless a marine or freshwater component directly links to the site, such as marine protection around Great Barrier Island. Clusters of sites will be of particular interest.
- The sites must be active management projects, not legal protection projects (trustees are not looking to purchase land).
- The Department must enter into legally binding agreements to sustain the biodiversity gains for each of the selected sites for an agreed timeframe (specific to each site).
- The Department should be the land manager for each site (or certainly for the majority of each site) so the trustees have certainty of decision making.

Takahe *Photo: James Reardon*

Banded rail *Photo: Andris Apse*

Rock wren *Photo: rockrogue.com*

Gecko *Photo: DOC*

Selection Process

The Department initially identified some 30 sites that best met these criteria. These sites were then prioritised to identify the best representative set of sites covering New Zealand's biodiversity. These 12 outstanding sites were presented to Devon McLean and a Department Advisory Group at a short-listing workshop. Following these presentations eight sites were selected by Devon, with advice from the Department's Advisory Group, for presenting to trustees. These selected sites are presented in this document. A summary of the estimated project costs for these eight sites have been included in Appendix 1. A summary of the four sites not making this shortlist are included in Appendix 2.

Why invest in these sites?

An assessment of the overall gains delivered by a set of projects such as those outlined in this document requires both a good understanding of the logic behind biodiversity management interventions, and consideration of how best to select sites to maximise biodiversity outcomes. The logic behind the Department's intensive management of biodiversity is set out in a manuscript that has been submitted recently for publication in the New Zealand Journal of Ecology (a copy of this can be provided). Key components of this logic are highly relevant to your decision making process and can be summarised as follows.

Firstly, the Department's biodiversity management is aligned around the high-level goals of the New Zealand Biodiversity Strategy, the third goal of which identifies the need to conserve and maintain a full range of natural ecosystems and to maintain and restore populations of threatened species. This duality recognises that strategies based solely on threatened species management are inadequate for a number of reasons:

- they fail to acknowledge that the internationally accepted understanding of biodiversity encompasses ecosystems and communities as well as species;
- they are compromised by our lack of knowledge of the distributions and causes of decline for many species; and

Mistletoe *Photo: DOC*

Short-tailed bat and *dactylanthus Photo: DOC*

- they ignore the dependence of threatened species on the habitats and ecosystems in which they occur.

Given this complexity, it is argued that approaches that aim to conserve a full range of ecosystems, supplemented by work targeted at particular species, is the most cost-effective strategy for biodiversity management.

Secondly, because of the pervasive effects of a range of pressures (browsers, predators, weeds, etc) many elements of New Zealand's biodiversity are dependent on active management for their persistence. Evidence for this can be seen both in widespread declines in the abundance of susceptible species (plants, birds, bats, large invertebrates, reptiles) when introduced species are left unchecked, and the dramatic differences in their abundance either on pest-free offshore islands (e.g. Hauturu – Little Barrier Island), or mainland sites from which those pressures are largely removed (e.g. Zealandia, Maungatautari). In general, it appears that systematic management of all major pressures is much more effective than removal of just one or two pest species. This reflects a degree to which working with Mother Nature can create a vacuum, some pest species will respond to the removal of a competitor by expanding to fill the gap that is left (e.g. rats or mice may increase in numbers when stoats are selectively controlled). In recognition of this complexity, in areas of key biodiversity priority, the Department encourages management of all significant threats for which feasible control techniques are available.

Thirdly, having identified the need to comprehensively manage threats to both ecosystems and threatened species we are left with the question of how best to choose where to apply such management. Conceptual models developed within the discipline of systematic conservation planning view this as a 'team' selection problem, in which:

(i) the biggest gains are delivered by applying at least some management across a full range of ecosystems; and

(ii) the marginal contribution of any site will reflect not only the biodiversity features that it contains, but also the sites that have already been selected.

Kaka *Photo: DOC*

Site selection can therefore be likened to selection of a sports team. For example, once a wicket keeper has been selected for a cricket team, adding a second wicket keeper will add much less value than adding a fast bowler, and so on. Critically, the strength of a team is often determined more by having a set of players with complementary skills, rather than by choosing a team consisting of the most brilliant individuals but whose skills do not fit together in a complementary fashion.

Given this context, it is worth considering the potential contributions of the projects that have been proposed for your consideration, assessing those using a variety of criteria. At an ecosystem level we have rated sites for their:

- **diversity** including both the number of ecosystems they contain and their variation in character;
- **distinctiveness** i.e. how different are they to those occurring elsewhere in New Zealand;
- **irreplaceability** if this site was not available, are there other sites that could be used in its place;
- **intactness or ecological integrity** i.e. to what extent has its ecological pattern, composition and functioning been modified (directly or indirectly) by human activity.

At a species level we have rated the proposed sites for their numbers of threatened species, both overall and for species that are locally endemic (occur only at that site). Note that these rankings are qualitative, as we generally lack the quantitative data required to provide numerically-based rankings. The following notes describe the distinctive features of the individual sites, moving from north to south, together with other opportunities identified.

Waipoua Forest – contains distinctive kauri-dominant ecosystems that are notable for their extent, lack of logging, and connection with other unlogged forests across an entire landscape sequence from coastal to high elevation. This makes it highly irreplaceable, given the lack of any other examples of extensive, unlogged kauri forest – other virgin stands are all either small and / or fragmented. The site contains moderate numbers of threatened species (North Island brown kiwi, kokako) including several found only here (*Ackama nubicola*, *Coprosma waima*).

In Waipoua Forest there is an existing strong partnership with iwi and huge potential to involve iwi and the community in the project, creating a local sense of pride and ownership.

Aotea / Great Barrier Island – this site would have been similar to Waipoua Forest prior to human settlement, but it has been profoundly modified through human activities, so that very little is left that has not been affected. Considerable potential remains for restoration, in part because of the absence of possums and mustelids. Threatened species include kaka, brown teal, and a diverse mix of lizards.

The proximity of this site to 1.5 million people, strong local political support for pest free status, and alignment with the wider Hauraki Gulf restoration strategy makes this a high risk but high return project. This project will be community and iwi led and offers an exceptional opportunity to understand community views and motivations towards achieving a conservation vision.

Pureora – arguably contains the best surviving examples of the dense podocarp forests that once dominated the Taupo basin and its surrounds, and which have been greatly reduced in extent through Maori firing and European logging. It also contains good examples of fire-induced 'frost-flat' successions, and podocarp-broadleaved and podocarp-tawa forests. Moderate numbers of threatened species with good populations of kokako, kaka, and whio, along with two bat species and a number of lizards and threatened plants.

Its central North Island location makes Pureora an ideal centre for outdoor education and an ability to work with Landcorp to link these podocarp forests together. Pureora is the priority site for kokako management in New Zealand and could be the centre for threatened species recovery and subsequent distribution of threatened species to other sites in New Zealand.

Mt Taranaki – a diverse sequence of lowland to montane forests and sub-alpine tussock-shrublands on fertile, recent andesitic soils in a high rainfall climate. The montane forests of kaikawaka, Hall's totara, and kamahi are distinctive, the absence of beech (the usual dominant in such climates) probably reflecting the recurrent volcanic disturbance. The dynamic geological history probably also explains in part the relative paucity of endemic threatened species in this site; most threatened species occurring here also occur widely at other sites.

No other site offers such a community-wide connection and ownership as Mt Taranaki. Bounded by high value dairy farms with more than 300 streams and rivers supplying freshwater to adjoining lands, Mt Taranaki stands out as a partnership project in the waiting.

Kahurangi o Mōhua – the cool, humid climate of this site is typical of New Zealand's western ranges with broad ecosystem patterns that are correspondingly 'typical' in their dominant species and sequences. By contrast, it has New Zealand's highest complexity of geological substrates from infertile coal measures to limestone and marble, and this, coupled with its relative stability in geological time, has resulted in one of New Zealand's greatest concentrations of plant species of restricted range. It also contains a range of other threatened species including lizards, birds and large land-snails (mostly Powelliphanta).

Map showing 12 sites considered for shortlisting

Management of this site would see a western-top of the South Island restoration project, connecting to Project Janszoon in the Abel Tasman. The enormity and significance of the site is such that the Golden Bay in its entirety would become a Zealandia equivalent. The small and diverse nature of the Golden Bay community makes it ideal for carrying out social research into community responses to wrap-around, large-scale restoration.

Giant weta *Photo: DOC*

Alpine weta *Photo: DOC*

Tania Cole with spider *Pianoa isolata* at Waikaia Forest *Photo: DOC*

Waiau toa / Molesworth – Seaward Kaikoura – this site has a highly distinctive climate, typified by extreme temperatures, low rainfall, and very high evaporation. Inland parts are arguably as functionally dry and frosty as central Otago. It is also topographically complex, including coastal hills, the Kaikoura Ranges, and extensive inter-montane basins; it includes important habitats on limestone. Although it has been so highly modified by human activity as to make the original ecosystem cover hard to define accurately, it supports large numbers of threatened species, particularly plants, many of which occur only here. It also connects with a significant stretch of New Zealand's coastline which has its own community driven marine protection programme.

This site could become a showcase for the co-existence of conservation, recreation, cultural values and high country farming that can be transferred to other high country farms in New Zealand. There are opportunities to partner with agricultural training providers and Landcorp Farming to develop a young farmer programme focused on Molesworth.

Arthur's Pass – Otira – this unit is similar to Kahurangi in being typical of western humid mountains, but with distinctive features in its transitions across the northern boundary of the West Coast beech gap, and from west-to-east along the steep gradient of declining rainfall down the Waimakariri. It has extensive altitudinal gradients with sub-alpine tussock grasslands. Forests are dominated by southern-rata and kamahi (western), mixed beech (north-west), and mountain beech (eastern); large-scale braided rivers and glacial basins occur in the east. Moderate numbers of threatened species occur here, including the locally endemic orange-fronted parakeet.

The proximity of this site to Christchurch and with the West Coast highway connection running through it means Arthur's Pass – Otira presents an outstanding opportunity to connect New Zealanders and visitors with conservation, via innovative ideas such as an open zoo.

Paringa – Haast – this unit is typical of much of the high rainfall climates of southern Westland. Complex lowland sequences occur on coastal dunes, alluvium and outwash glacial gravels west of the Alpine Fault; altitudinal sequences dominate east of the Alpine Fault, but include the expansive braided river bed of the Landsborough River. A number of threatened species,

Weevil on *Aciphylla pinnatifida Photo: DOC*

particularly birds, have been identified for management here, but few of these are endemic to the area. Should this site be selected there is also significant potential to expand the values captured by this project through adjusting boundaries to include parts of the adjoining Ahuriri and Haast/Makarora sites, both of which build on the representativeness of values.

This vast area of untouched intactness and picture-perfect landscape provides the opportunity to showcase New Zealand as it once was, with healthy forests, fast flowing clean rivers and thriving native fauna. The site is connected to other significant lands offering the potential to become the largest transformational conservation project in New Zealand.

Adaptive management

These site proposals are predominately 20 year projects. It is difficult to know what conservation challenges and opportunities will exist 20 years from now. The success of the selected projects will depend on our ability to adapt our management as threats continue to adapt and evolve. We refer to this approach as adaptive management.

Adaptive management is about learning about the response of ecosystems to our actions as we are operating in the short term (acting and measuring), in order to improve our management of them in the long term (responding). The challenge in using the adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge.

An example of this is in small mammal predator management – rats, possums, and mustelids (stoats, weasels and ferrets). Our current tool set and methodologies enable us to suppress these predators to levels that allow native biodiversity improvement. We will be employing those techniques at these sites. However, this partnership also allows us the opportunity to

explore new ways of using those tools (or developing new tools) to generate efficiencies in effort and outcomes in the long term (e.g. building on the work by Landcare Research on enhancing boundary control to greatly reduce immigration and thereby maintain very low numbers of possums within core areas for longer).

In establishing selected sites to maximise the potential to learn through adaptive management, the Department will be utilising its network of technical experts in all areas of biodiversity management to assist with the development of the management plans (e.g. predator control, species recovery, weed control, monitoring).

Site research and development themes

Each site proposal has been developed independently, as requested by the Trust. However, once a site or sites have been selected, a suite of sites will likely offer the opportunity to address themes of common interest through combined research and development work programmes (rather than running duplicate programmes within each site). In this way, the tools or techniques could be trialled across multiple sites to test their strengths and weaknesses in a number of ecosystem types.

One such example is a single hare control research and development programme across multiple sites. Five of the eight proposed sites have identified hares as an emerging pressure and a gap in our management knowledge (in terms of their impact and our ability to control them). The research and development programme for hares would work across all selected sites where hares are recognised as a potential problem, rather than focus only on one site at a time.

In this way, the portfolio of sites offers the advantage of being able to gain understanding across the range of ecosystem types affected (alpine areas, dune systems, open drylands, tussock/grasslands) and develop solutions to trial in each case at the sites selected. By applying the programme across the portfolio of sites, the learning and improvements in hare management will likely have utility and applicability across multiple additional sites in New Zealand where hares are present.

WAIPOUA FOREST

CHAPTER

1

Tane Mahuta *Photo: DOC*

Waipoua Forest

Project Vision

Tane Mahuta and his children; Kaitiakitanga restored, our forest and community transformed.

Waipoua is an ancient, mighty living forest: an inspiring and enduring national icon, sustainably balancing its heritage, stories and connections; and offering all who visit a unique, meaningful and enjoyable experience. People will reconnect with the 'awe of nature' so often forgotten in the modern world.

Introduction

Waipoua is an ancient green world of huge trees and rare birds. The outstanding, unlogged, old growth kauri forest ecosystem of Waipoua is the largest and most significant tract of kauri forest remaining in the world today. It is irreplaceable.

The iconic Tane Mahuta and Te Matua Ngahere trees in Waipoua Forest are ancient trees, thousands of years old. Tane Mahuta, a jaw-dropping giant of a tree, is the largest living kauri in New Zealand and the second largest in the world. Tane Mahuta (Lord of the Forest) could be up to 2,500 years old and Te Matua Ngahere (Father of the Forest) is possibly 4,000 years old.

This proposed site is one contiguous forest dominant ecosystem combining the Waipoua, Mataraua and Waima forests. It has international and national significance and contains one of the highest diversity of flora and fauna of any forest in the North Island. The cloud forest of the Waima is unique and it is quite possible that this ecosystem supports undiscovered unique endemic plant and animal species.

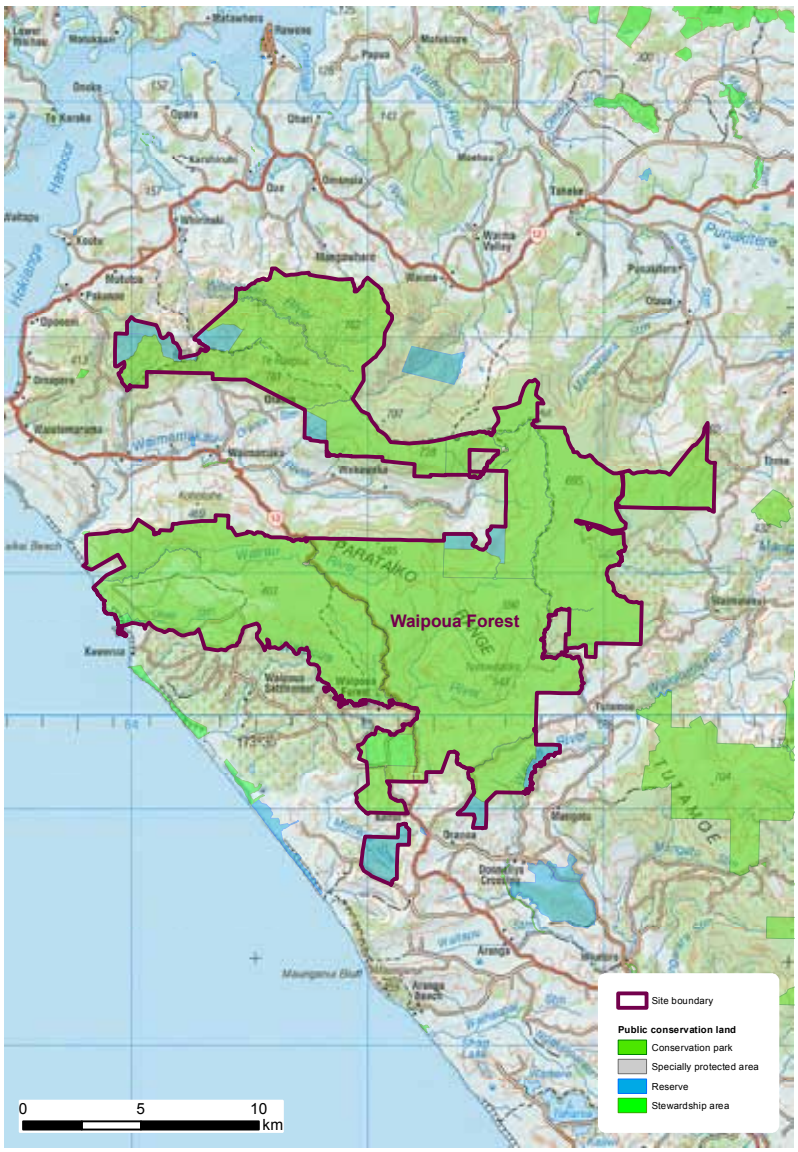
The forest contains 18 different ecological units identified for protection and provides habitat for many endangered species, including birds, bats and snails.

The Waipoua River and its catchment are valued for their near pristine state. The river has been identified as nationally important for sustaining New Zealand's freshwater biodiversity, including the survival of several nationally and regionally significant species.

Both the forest and river are valued for the recreation and economic benefits they provide locally, and for their cultural and historical significance. The proposed site includes 230 registered archaeological sites. As well as sites related to the kauri gum-digging and logging history of the area there are many wāhi tapu sites and wāhi taonga (treasured) sites significance to Te Roroa in Waipoua Forest, which reflect their history of association and interconnection with the landscape.

The proposal reflects conservation and ideas that the community has had in the past. Restoration of both the ngahere (forest) and awa (river) of the Waipoua would be important for iwi, including Te Roroa and Nga Puhi. There are existing relationships and programmes with iwi which will be useful foundations for the project. Local maori guides offer walks in the forest at night, providing both a cultural and environmental understanding of this unique ecosystem.

The site covers over 31,000 ha, it is mostly public conservation land (23,000 ha), but also includes private forest estate. Investment in this site would build upon the Department's existing restoration work here to create New Zealand's largest restored Kauri forest.



Proposed Waipoua forest site

Biodiversity Values

The Waipoua forest is unique - there is nowhere else in the world like it. The iconic, ancient, giant forest trees of Tane Mahuta and Te Matua Ngahere are thousands of years old. The outstanding, unlogged, old growth kauri forest ecosystem of Waipoua is the largest and most significant tract remaining in the world today. Covering over 31,000 ha, it is of international and national significance, containing one of the highest diversities of flora and fauna of any forest in the North Island. At least 82 nationally significant and 68 regionally significant plants and animals, including several endemic species, occur here.

The continuum represents the best altitudinal sequence in Northland, from the coast to the high altitude swamp forest of the Mataraua Plateau, and onto Northland's highest point, Te Raupua. A myriad of species, such as invertebrates, lichens and mosses are yet to be described and understood let alone many more that are awaiting discovery.

The Waipoua River system is one of the North Island's most intact and pristine river catchments, with its associated diverse aquatic communities and riparian terrestrial plant communities.

North Island kokako populations are thriving in the upper reaches of the forest due to sustained and targeted management. This population is now one of the best and most robust in the country.

Rare *Rivuarlis* orchid, Toronui River *Photo: Andrew Townsend*

This forest once supported the largest known North Island brown kiwi population in the country but is now at a much reduced state.

Nationally threatened short-tailed and long-tailed bats are present.

The cloud forest of the Waima supports three nationally threatened endemic plants species that are found nowhere else. It is classed as a Naturally Uncommon ecosystem which would have naturally occurred over only a small area in the absence of human activity. Terrestrial ecosystems which were rare before humans colonised New Zealand often have highly specialised and diverse assemblages of flora and fauna, characterised by endemic and rare species. The cloud forest at Waima reflects this with at least three extremely rare nationally threatened endemic plants.

Coastal ecosystems support nationally threatened species such as little blue penguin, northern NZ dotterel, variable oyster-catcher, katipo spider and North Island fernbird.

Kaitui Reserve is a regionally significant coastal forest that provides an important linkage between Waipoua and other forest fragments to the south.

Key Pressures

Kauri Dieback (PTA) is the biggest direct threat to kauri trees at this site. As there is no known way to treat the disease yet, we need to focus on understanding the full picture of its presence in the forest and then manage the risk of infection and spread across the forest.

The usual suite of other pests exists here:

- Rodents are the most widespread and most influential pressure on forest fauna within the site. These mild and wet forests support moderate to high numbers of this pressure year round and year in and year out. Aerial 1080 operations are proposed to be expanded on a three yearly cycle. In conjunction with aerial 1080 it is proposed to run a network of bait-stations and traps over 6000 hectares.

- Possums are under sustained management. Additional ground control is proposed to complement the aerial work.
- Stoats, ferrets, and weasels predate on rare and endangered fauna.
- Pigs pose a threat to ground fauna such as kauri snail, but are also potentially a key vector for kauri dieback.
- Goats are under periodic control.
- There is zero tolerance for feral deer in the region, with any incursion on Public Conservation Lands quickly dealt to.
- Dogs are a threat to kiwi and shorebirds at this site.
- Stock exert low pressure, but only on some margins.
- Weeds are generally only a threat in the margins, especially the riparian margins, where ground cover species are the key issue. Wilding pines are an issue in some of the coastal shrublands. Four ground cover weeds (wild ginger, African clubmoss, aristea and wandering jew) pose the biggest threat within this site to native terrestrial plant communities, especially edge communities such as on riparian margins. Weed control is proposed for eight management hot-spots.

Cleaning boots to minimise spread of PTA *Photo: Karen Joyce-Paki*

Focus for investment

Investment in the Waipoua Forest project will allow the creation of New Zealand's largest restored Kauri Forest. This will be achieved through:

Managing plant and animal threats to allow native species to flourish

The project will expand intensive management around current biodiversity hotspots. 6000 hectares of additional forest will be managed intensively for all pressures. These areas would be managed so that there would be substantial over flow into the surrounding forests.

The entire forest (outside the intensively managed areas) would have wide ranging forest pests such as goats and pigs under sustained management to a moderate level. Dog control and advocacy would be upscaled in the greater region using all available tools.

Regenerating forest on the margins of the Waipoua will have sustained control of key invasive exotic plants such as wilding pines. All forest boundaries will have adequate stock and goat proof fencing to better manage domestic animals incursion.

Increasing populations of native fauna

Threat management will create the platform for native species including birds, bats and plants to flourish and spread, and for species lost from the area to be reintroduced. Intensive pest control over 6000ha and additional predator trapping over the remaining area is proposed.

North Island robin, whitehead and riflemen will be translocated from elsewhere to Waipoua. Forest birds, such as kiwi, kokako and kukupa, which are currently sparsely distributed will be

recovered and encouraged to spread throughout the forest. Bat and kauri snail populations will be secured within the forests.

Becoming the national leader in managing Kauri Dieback (PTA) infected ecosystems

The project can become a national leader into PTA research, the protection of kauri trees from kauri dieback and the development of management protocols to help combat this threat. This component of the project will include developing enhanced distribution surveys of where PTA currently is, research into how this pressure can be better managed and outreach and education within the community to drive sustained behaviour change. The knowledge gained here will help protect kauri throughout the upper North Island.

Monitoring and data collection

Smart and useful biodiversity and pressure monitoring both before work starts and during the work will be used to demonstrate the effectiveness of the work. Distribution surveys of the numerous data deficient plants and animals will be conducted to help better secure them.

Building capability with local communities

Local communities will be included in the planning and delivery of work within the site and the project will engage with the community to identify and develop conservation opportunities locally which are of benefit to the community, whanau, hapu, iwi as well as the department.

By delivering the work themselves the community will develop tangible values associated with protecting and restoring the Waipoua ecosystem.

The project will establish infrastructure and education programmes that will build capability with the local communities. The department will provide advice, support and advocacy for work that community groups manage.

Tools and learning opportunities

Conventional tools are a starting point for achieving the site objectives, but plans would adapt to advances in knowledge. With Trounson Kauri Park Mainland Island at the doorstep of the proposed site, this will continue to allow new methods and tools to be fine tuned before larger scale deployment.

Available tools include:

- Aerial and ground goat control
- Ground pig control
- Aerial and ground rat, possum and stoat control
- Aerial and ground invasive pest plant control
- Intensive pest management methods for threatened species recovery
- Effective pressure and biodiversity monitoring

The local community already has knowledge of these tools and capacity to assist the work via independent contracts.

For Waipoua Forest the following gaps in knowledge are the top areas for immediate focus:

- Understanding the threat to kauri in Waipoua from PTA:
    - Surveying: Assess the use of high resolution imagery and airborne remote sensing for rapid large scale mapping of PTA occurrence within the project area and quantifying change over time (using canopy volume and health as a surrogate for tree health).

Dead Kauri trees in Waipoua forest *Photo: Karen Joyce-Paki*

  - Vector management: investigate what level of pig control is required to reduce pig vectoring of PTA to acceptable levels; develop cost effective large scale pig control strategies to reduce vectoring risk; understand the role of humans in vectoring PTA and develop strategies to reduce this risk.

- Building our knowledge of managing populations of Northern short-tailed bat and North Island long-tailed bat:
  - What is the effect of aerial 1080 application on bat populations in kauri forest?
  - What level of predator control is required to protect bat populations in kauri forest?

Value for others – flagship opportunities

Community building

The opportunity to practically contribute to the restoration of Waipoua, whether in planning or doing the work, the chance to see the change in the forest or to have work within your community as a result of that forest, will increase people's connection and pride in Waipoua. The community, delivering the work themselves, develops the values within them for protecting and restoring the Waipoua ecosystem, becoming vocal advocates for generations to come.

Including local community and Iwi in planning and delivering the work supports capacity and capability building for those already with a great passion for the forest to continue to deliver what it needs in the future.

Hunters ready to do kiwi aversion training *Photo: Karen Joyce-Paki*

Regional collaboration by connecting with Reconnecting Northland

Reconnecting Northland is a significant region-wide ecological restoration project working at a large landscape scale. Reconnecting Northland aims to restore natural processes and ecosystems across the whole region, while helping people improve their social, cultural and economic well-being. The two restoration projects of Waipoua forest and Reconnecting Northland will be able to collaborate across many areas to involve communities and achieve ecological restoration aims.

Building on existing strong partnerships with local iwi

Restoration of the both the ngahere and awa of the Waipoua is important for iwi, including Te Roroa and Nga Puhi, as is the opportunity for their people to benefit from jobs or economic prosperity created through the restoration, and for them to express their kaitiakitanga.

Te Roroa are the recognised kaitiaki of the Waipoua Forest and surrounding area, and have been involved in a wide range of environmental management and development issues and research with various government and private organisations over the years. Te Roroa are currently involved in many aspects of the Department's work in the Waipoua area, and are established as service contractors who undertake archaeological surveying and monitoring, pest and weed control and biosecurity monitoring of kauri dieback disease.

The visitor centre, campground and cabins that Te Roroa run could serve as the ideal platform for advocacy and education, and help give them ownership of sharing these stories to the wider community.

There is a pending Treaty Settlement with Nga Puhi which will clarify their aspirations for the site. Working more closely with Nga Puhi will provide a more knowledgeable and skilled workforce, strengthen existing relationship and help provide an economic boost.

Water catchment and filter for Kaipara Harbour

The water quality and flow downstream of the rivers that flow out of the Waipoua would be enhanced to the betterment of those living downstream. This would include the Kaipara Harbour.

Visitors in Waipoua *Photo: Karen Joyce-Paki*

Integrated economic potential

The proposed approach is labour intensive with lots of work to set up and service the pest management activities. This will provide employment opportunities making Waipoua/Hokianga more desirable places to visit and live. Long term we would see the communities prospering and benefiting from a thriving forest ecosystem.

Local, national and international tours and guided walks are popular concessions at this site and restoration would enhance the tourism potential. There are also transferrable models of cultural and environmental tourism such as the world's first sister tree relationship between Tane Mahuta and Jomon Sugi, Yakushima, Japan. This relationship will raise the profile of both regions and encourage international tourists to experience both destinations.

Future-proofing through education

Waipoua is a key icon destination with over 200,000 visitors per year and has the potential to engage visitors in a unique ecosystem and to reconnect them with nature. Restoration of the ecosystem and increased awareness of the site should boost these numbers.

The ease of access to much of the forest using the current track network and the Waipoua Visitor Centre, allows a good flow of information through to visitors, including school groups. It is a multi track site which caters to all age groups and physical abilities.

This project will build on current education programmes such as Project possum (a trapping Enviroschools project), Oranga whenua (planting), cultural and heritage projects, commercial tours and guided walks, science and research programmes and volunteering.

Trounson Kauri Park Base is within a 20 minute drive and could provide infrastructure to open an education facility.

The visitor centre, campground and cabins that Te Roroa run could also serve as a platform for advocacy and education, and help give them ownership of sharing these stories to the wider

community. Their existing infrastructure could easily support a learning centre for conservation programmes to be run on site, managed by the local community/ whanau, hapu and Iwi.

University students will use the forest to complete conservation research about pristine waterways, kauri ecosystems, species - pest control methods and the visitor experience.

Engaging the local community through outreach and education activities will be a key tool to increase community understanding and appreciation of the natural environment, build capability, encourage participation in community projects and create community advocates. In particular, community education about PTA will be a driver to ensuring behavioral change occurs which is necessary to protect and support the survival of the Kauri forest.

Promoting the success and work of the Waipoua Forest regeneration project to the local and wider community will help educate them on the values they have, and have lost, and the work required to restore them.

Risks and barriers

Some opposition to large scale aerial 1080 is expected. More advocacy and education is required in this area. Previous successful 1080 aerial operations within these forests will assist with consistency in assuring the community that their welfare and interest are equally as important as that of the forest. Education through partnership work will be necessary to raise awareness of the benefits and costs of aerial pest control and strengthen knowledge in the community restoring kaitiakitanga (guardianship) over the land.

Recreational hunters will have concerns about the how the proposal may impact on their ability to hunt the area. Any liberation of pigs or other pests into the area would pose a concern.

Fire is inevitability a high risk. Educational messages and updates via media sources providing quality advocacy in conjunction with rural fire services and council will help to minimise the risk and potential of fires occurring.

Working closer with our pending Treaty Partners, Iwi o Nga Puhi, will provide a wider skill and knowledge work force. Better understanding and support of their aspirations for the Waipoua, Mataraua and Waima Forests will strengthen that existing relationship. The ability to upskill and bring employment opportunities to those isolated pockets will provide the much needed economic boost. It will provide tangible benefits for whanau, hapu and iwi that will see generational change occurring (employment, less illness, better education opportunities, whanau living on the land). We will be a trusted partner that acts with integrity in all of our mahi and actively growing conservation overtime.

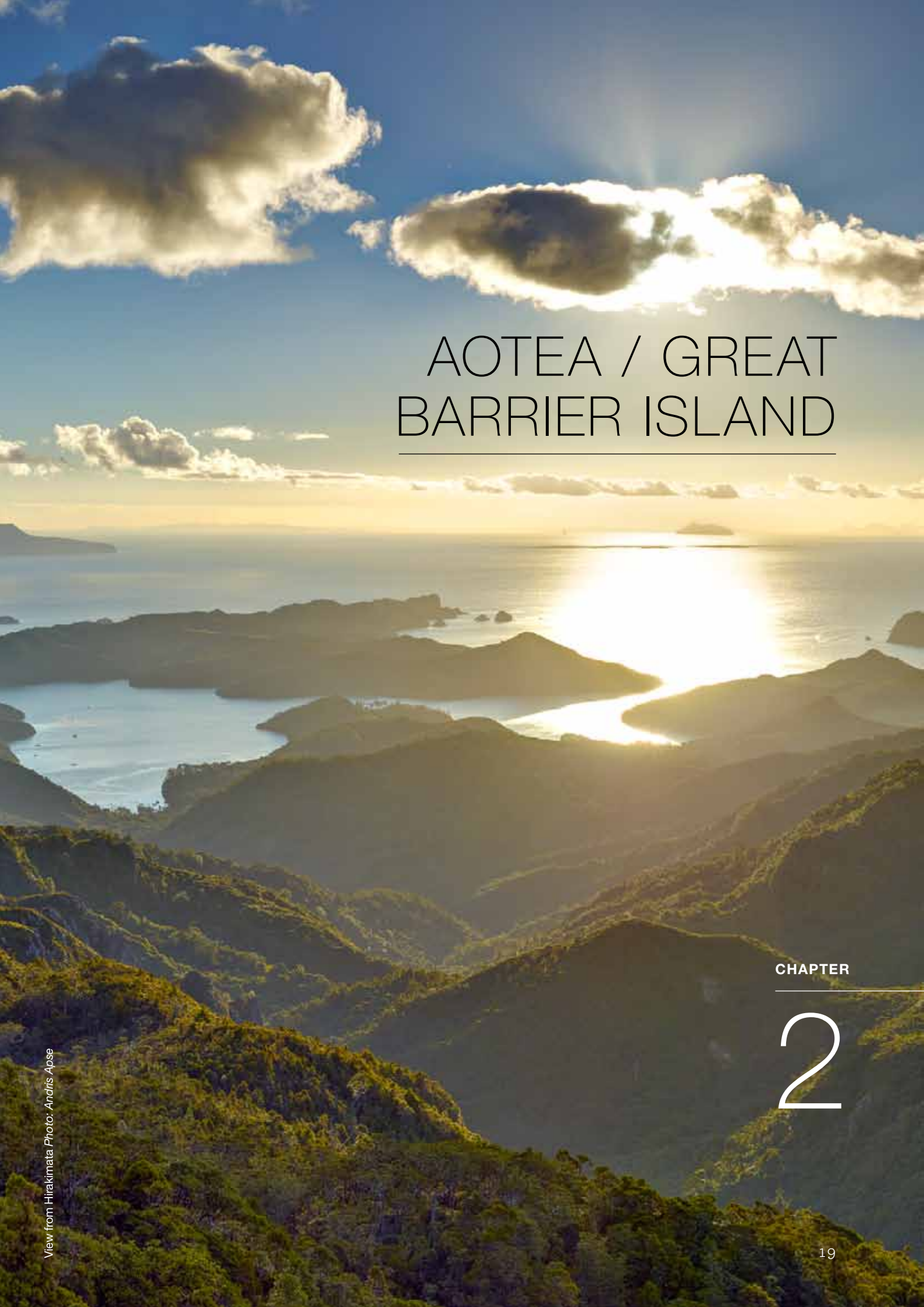
It is integral to the success of this project that the Project Team has the right people for the job. External recruitment will be a vital part of the process, providing opportunities for locals to get involved at all levels of the operation. Delivering the increasing workload will be done by a combination of fixed-term staff to manage and oversee the work, and contractors delivering the work. Most of the work will be achieved by independent contractors. Local contractors are already competitive and involved in delivering current conservation work programmes, and would be expected to adapt to this proposed upscaling of work.

Another issue to consider is the proposed Kauri National Park. While this will bring changed management, it also brings great opportunity including lifting exposure potential of what is possible for conservation of these forests to many more people.

AOTEA / GREAT BARRIER ISLAND

CHAPTER

2



View from Hirakimata *Photo: Andris Apse*

Aotea / Great Barrier Island
Te Motu Tapui ā Aotea

Project Vision

An island sanctuary with flocks of forest birds, recovering kauri forests, clouds of seabirds in the evening sky, a dawn chorus of bellbirds, tui and kokako, lizards rustling in the grass, a multitude of shorebirds on the beaches and wetlands alive with bitterns, pateke and fernbirds.

The community treasures this biodiversity and benefits from a robust island economy based on ecotourism and conservation investment. Biosecurity is driven by the community to protect these high conservation values and a way of life that is integrated with the natural environment.

Introduction

Aotea/Great Barrier Island is a whole of island pest removal and restoration programme that would create a large scale island ecosystem sanctuary and recreation playground on the doorstep of Auckland. The project has the potential to lead a step change in what is achievable not only on the conservation estate but also on private land when there is a shared conservation vision. This project would build on the current significant achievement of 29 of 62 islands over 10 hectares within the Hauraki Gulf being mammalian pest free, totaling 10,600 ha.

The eradication of rodents, feral cats and rabbits would make Aotea the largest mammalian pest free area in New Zealand. This would be a world first example of large scale pest removal in a place with significant private land ownership and residential communities.

The project would create significant benefits for seabird and shorebird habitats.

The development of a conservation vision for Aotea will be led by the Aotea community and involve economic development for the community so that it is sustainable on the island. The community will need to own, and deeply value, the biodiversity gains from this partnership. The objective is for conservation outcomes to be so ingrained within the residents they will not only willingly adapt their habits and increase biosecurity requirements as a matter of course but that they call on others to do the same.

Due to the social and technical complexity this project will require innovation beyond current technology. There is a need for research and development to find workable solutions for pest removal that are acceptable for the community.

The proposed project has clear exit points for the Trust if it becomes clear that ongoing investment is not desired by the community or if the proposed outcomes are not achievable.

The proposed site covers 28,500ha, 60% of which is public conservation land. The Minister of Conservation has initiated the Great Barrier Conservation Park project which will reclassify stewardship land into a higher conservation status. There is also strong support/advocacy for "Rat free" Great Barrier Island from local MP Nikki Kaye.

Proposed Aotea / Great Barrier Island site

Biodiversity Values

Most of the 28,500 hectares on Aotea Great Barrier Island is in the early phase of kauri and podocarp forest regeneration. There are areas of kauri forest, kauri–broadleaf forest, podocarp–broadleaf forest, coastal broadleaf forest, and upper montane, towai-rata-silver pine forest. In addition there are areas of shrubland, gumland, dune vegetation and regenerating dune manuka forest, as well as nationally significant upland rhyolitic shrubland which contains two endemic shrubs. The Kaitoke swamp is a regionally significant wetland with bittern, fernbird and crake species.

At least five hundred native plant species occur on Aotea Great Barrier Island. There are eight nationally critical plants, twenty other threatened plant species, and at least 30 nationally at risk plant species present.

Aotea Great Barrier Island is of significant importance to a number of animal species and is the stronghold for black petrel, North Island kaka, banded rail, and chevron skinks. Two-thirds of the population of pateke, one of the rarest ducks in the world, live on the island. It also contains the only island population of Hochstetter's frog. Current predator-managed areas and adjacent islands host small populations of species now rare or absent from the main island, such as North Island robins and tieke.

Banded rail *Photo: Andris Apse*

Black petrel *Photo: Isabel Mabey*

Brown teal *Photo: DOC*

A number of features of Great Barrier Island make it particularly important from a marine perspective. Whangapoua Harbour, a large estuarine area, is considered to be of national significance due to its unmodified state and range of habitats. It is thought to be used by species such as flounder as a breeding site and also provides important intertidal habitats for species such as the threatened New Zealand dotterel.

Great Barrier Island is also important for a variety of other seabirds, which use the island to rest, breed and raise their young, and can be highly vulnerable to land-based threats such as predators. A number of species that used to occur extensively on mainland New Zealand are now found only on offshore islands, due to the introduction of pests. The black petrel, endemic to New Zealand, is known to breed only on Little Barrier and Great Barrier Islands. Black petrels formerly bred throughout the North Island and northwest Nelson, but have been lost from mainland New Zealand due to the introduction of feral cats, feral pigs, mustelids and rats. Nesting in burrows, the main breeding area on Great Barrier Island is Mount Hobson, where ongoing population monitoring has been taking place for nearly twenty years. The latest survey indicated that around 1500 breeding pairs occur on Mount Hobson. Predation by rats and feral cats has been shown to affect black petrels at this location, with ongoing predator control being identified as important to continue.

Because seabirds carry nutrients and energy across terrestrial and marine boundaries, changes in seabird species' populations can have impacts across both small and large spatial scales. In addition, there are also a range of terrestrial species, such as plants, and in turn associated invertebrates, that are reliant on the nutrients (guano) that seabirds bring back to shore. Recovery in seabirds can therefore increase the availability of nutrients to plants and associated species around the breeding colonies.

Key Pressures

Aotea Great Barrier is fortunate not to have possums, mustelids, hedgehogs or Norway rats. The animal pest species present are ship rats, kiore, mice, feral cats, rabbits, feral pigs and feral stock. Feral goats and deer were present but have been eradicated. Feral pigs are an important valued food source for residents therefore eradication is unlikely to be an option.

Cat traps, Hirakimata *Photo: DOC*

Rats and cats have had a large impact on the bird, reptile and invertebrate fauna of the island, either eliminating or severely reducing populations of once common species.

Lack of some of the key pressures means the island already has a very good starting point. The Island Biosecurity Plan and measures have kept the island free from key pests. Aotea is also well outside the swimming range of mustelids. However, there have been recent incursions of rainbow skinks and argentine ants.

The risks to native plants on the island include plant disease, drainage of wetland in dune areas, grazing by rabbits and rats, the breakdown of pollination and fruit dispersal processes due to low numbers of birds and other pollinators, disturbance by pigs, weeds and fire. Wandering stock can also be a problem. Kauri forest is under significant threat from kauri dieback disease with it currently known to be at three sites on the island.

Focus for investment

The project has been divided into five stages:

STAGE 1 Iwi/ Community Engagement – buy-in. › **STAGE 2** R & D – tools and methodologies › **STAGE 3** Implement pest removal operation › **STAGE 4** Monitoring, maintenance, biosecurity and species reintroductions › **STAGE 5** Education

Stage 1: Design phase – iwi/community engagement

An inclusive community led process will set a common conservation vision, including the biodiversity gains from being free of mammalian pests and the core requirements of the project design from the community's perspective.

The Department will support this process by establishing a governance body that represents all affected interests across the community. The objectives of the governance group are to determine whether there is a consensus for the conservation vision for the island; establish critical partners to achieve the vision; set out the baseline requirements from the community's perspective and

articulate perceived challenges. The Department will act as a facilitator to establish the body, provide technical support and funding.

The governance group will require at least three technical reports to support their process, including:

- an economic analysis setting out the possible fiscal benefits of being rat, mouse, rabbit and feral cat free;
- an environmental report that sets out the biodiversity outcomes and establishes the current baseline measures; and
- a stocktake of current pest eradication methods that could be low impact for communities.

Discussion of a 'pest free Great Barrier Island' vision has circulated within the community for a number of years. It is a concept that currently would have a ground swell of local support, Local Board and political support. However, without a mandate from iwi and the community, the project will not be feasible. If the community does not support a conservation vision or pest eradication options, then the Department would not recommend on-going investment at Aotea.

Stage 2: Research and development of tools and methodologies

The project methodology for how to remove selected mammalians pests on this scale will be a significant research and development challenge. Using aerial toxin over the entire island presents challenges due to the size of the area, the presence of residential areas and areas of private land and the community opposition to some existing tools.

The following section 'Tools and learning opportunities' outlines some of the major areas of focus in stage 2.

Once the research and development has been completed relevant resource consents/permits will need to be obtained which could take two to four years.

If research and development reveals a higher than anticipated cost for eradication or that no technology can be developed to meet the communities' challenges, then we would not recommend on-going investment.

Stage 3: Implementation of pest removal operation:

The methods used to remove pest species will depend on the results of Stages 1 and 2 and the resource consent requirements.

Stock will likely need to be removed from the island during pest removal, depending on methodologies developed. If they need to be removed, as in the case of the Rangitoto-Motutapu eradication project, then compensation for the cost of shifting stock and loss of income will be required. Other business operations may also require compensation.

Stage 4: Monitoring, maintenance, biosecurity and species reintroductions

A comprehensive monitoring and surveillance programme will be implemented. Once the implementation phase is programmed, additional biosecurity systems will be designed, implemented, and fully tested to ensure robust processes are in place.

Species reintroductions can be implemented via existing processes and with involvement from iwi and community groups.

Stage 5: Education

Numerous education opportunities would arise from the project. These are covered in the 'Future proofing through education' section.

Black petrel monitoring *Photo: DOC*

Tools and learning opportunities

The tools we currently have available for island eradications (such as aerial application of brodifacoum) will not be the complete answer given community views on toxins, residential communities and private land holdings, and the likely resulting residual presence of brodifacoum in pigs used for food source. New technologies are needed. Tools and methods to support a pest free concept (mice, rats, cats, rabbits) will need to be agreed with the community and developed.

Once the community is fully engaged and supports the project, the project methodology for how to remove selected mammalians pests on this scale will be the biggest challenge. Key research and development challenges include:

- Understanding community views and motivations in relation to existing and new technologies
- Development of socially acceptable tools, toxin delivery systems and methodologies for areas where people live and the interface with public conservation land
- Development of tools and methodologies for targeting rabbits in the bush
- Development of methods that 'allow' consumption of pigs by local people (in anticipation they will still want to hunt and eat them)
- Development of detection tools for pests at low abundance and incursion response systems applicable for use at this scale
- Management of domestic pets (cats, dogs) and feral pigs

Value for others – flagship opportunities

There are a large number of benefits that would flow from this project:

Growth of the local economy and employment opportunities

There will be strong ecotourism and recreation opportunities as a result of the project. Biodiversity gains will set an overall inducement for tourism. The island is on the doorstep of Auckland's 1.5 million people and there is potential for considerable international and domestic visitors.

The investment would build on the work of Auckland Council and Auckland Tourism, Events and Economic Development to develop tourism opportunities and increased visitation within the Hauraki Gulf. Significant infrastructure upgrade work has been invested on Aotea such as roading upgrades, and the current work to seal Okiwi airstrip.

This project will demonstrate benefits of a conservation economy for the island and be a showcase for others. Local employment opportunities will be enhanced with eradication, monitoring and biosecurity work opportunities. Bee keeping and horticulture on Aotea would be boosted through improved ecosystem services.

The project could allow for local business development such new track and campsite developments, an Outdoor Pursuits Centre, accommodation providers, transport island and water, and guided tour provision.

Community and iwi benefits

Employment opportunities and economic improvement would help address current community issues of a declining population, high unemployment and youth leaving the island.

Iwi will benefit from the return of cultural treasures (particularly kokako)/resources, as well as the wider community benefits flowing from employment and eco/cultural tourism.

Community and iwi participation will be a key factor in the success of this project. The high levels of engagement will develop community based solutions that will lead to a sustainable long term outcome.

Auckland's population will also benefit from the recreational, aesthetic, health and educational opportunities the project will provide on their doorstep.

National and international significance

The Great Barrier Island project will be of international importance as the largest sanctuary of its type in the world and will be leading the way for other larger scale conservation projects – bringing to life the concept of Pest Free NZ.

The research findings on how to undertake pest removal on a large complex scale will be applicable internationally.

The project will be highlight internationally important conservation and social research on how to create sustainable communities with conservation as the core economic driver for growth and well being.

Planting on Aotea / Great Barrier Island *Photo: Isabel Mabey*

Future-proofing through education

Some of the education benefits are likely to be:

- Technology and social media will provide access to the project reaching a long way beyond the project site. Cameras watching key species, adopt a species integrated education opportunities with Glenfern Sanctuary, Enviro-Schools and/or Kiwi Ranger.
- Local schools will have an opportunity for hands-on learning and skill development about environmental monitoring and to learn about conservation/species by being involved in the programme. In the broader Auckland region there are 42 intermediate schools and 117 secondary schools which could benefit through field trips and online learning about conservation in their region.
- Fully developed research programmes with tertiary providers such as Auckland University, Massey University and Auckland University of Technology.
- Young leaders and iwi cadetship programmes have potential to both future proof this project and transfer skills, knowledge and advocacy throughout New Zealand.
- Leverage off Outdoor Pursuits Centre and other programmes.
- Leverage off the Treasure Islands Campaign education.
- Dedicated outreach and communication with the yachting sector and various marinas to create a "Pest Free Hauraki Gulf" boating community.

Risks and barriers

It is considered that there are high risks and challenges but the potential for high return.

- Community objectives and the local way of life may not align with the project vision. Without a mandate from iwi and the community, the project will not be feasible.
- It will be a challenge to get the right mix of people on the governance body to lead the development of the vision with the community.
- We may not find research and development solutions; or the project is feasible but actual costs exceed available funds.
- There is a risk of commencing a consultation journey with community, raising expectations, then not being able to deliver. The project may lose momentum if R&D is unable to deliver, and the Department is unable to continue the commitment.
- Full Departmental commitment is critical to achieving step change in this project.
- Discussion of a "pest free Great Barrier Island" vision has circulated within the community for a number of years. Community concerns to date include: use of toxins, the need for privacy for private landholders and a caution, or a lack of trust, around government and local government interventions.

As the success of the project is contingent on third party outcomes during the first two phases that are yet to be determined, the project is high risk for high return. There is also a high need for R&D to find workable solutions for pest removal that are acceptable for the community. It will be possible for the Trust to exit after phase 1 or phase 2, if it becomes clear that ongoing investment is not desirable or if outcomes are not achievable.

Medland Beach *Photo: Pat Sanderson*

PUREORA

Crossing the Maramataha Bridge (The Timber Trail) *Photo: DOC*

CHAPTER

3

Pureora

Project Vision

Pureora is a treasure chest and the first source for threatened species to grow other conservation projects; a place where New Zealanders experience biodiversity and join the conservation community.

Introduction

The awe-inspiring podocarp forests of Pureora are among the best remaining in the country. They lie at the junction of the Waikato, Waipa and Whanganui catchments, which feed these iconic North Island rivers, and Lake Taupō.

The Pureora Forest Park is home to the only remaining short-tailed bat *Dactylanthus* ecosystem. It also contains the only viable kokako population available for translocations. The adaptive management practices developed to save kokako in Pureora have become the blueprint for work with this endangered bird across the country.

A highly engaged community is involved in conservation projects throughout Pureora. People from throughout the North Island are actively working at this place. The department enjoys a warm and co-operative relationship with iwi groups that have mana whenua within the park. Iwi have been supportive with 1080 work and kokako and robin translocations from Pureora to other parts of the country.

The project proposes intensive control of weed and animal pests, and restoration work on corridors to link large tracts of forested land. This work will create the ecosystem integrity needed to grow a range of treasured threatened species. The strengthening of native species will be the ultimate display of how ecosystem health can be achieved across large living landscapes.

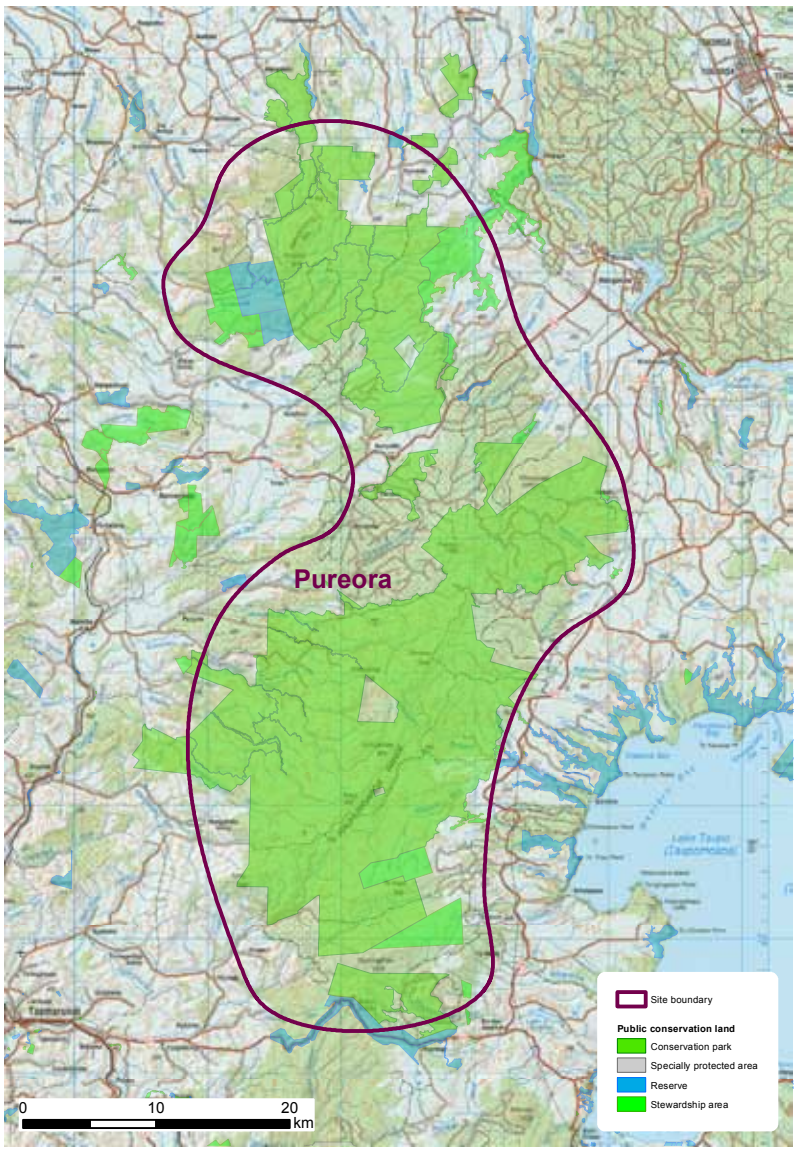
Through education, advocacy and providing volunteer opportunities, people will be inspired and empowered to visit, learn and contribute to the park via a range of programmes. Pureora lies in the geographic centre of New Zealand and as a large forested area in the middle of the North Island, it provides connectivity with the Central Plateau, Bay of Plenty, northern Taranaki and Whanganui. 55% of New Zealanders live within a three hour drive of Pureora, providing a large base for education and volunteering activity. The forest has 300km of recreational tracks, including the Timber Trail (cycle trail).

We propose introducing generations of New Zealanders to the power of conservation in Pureora Forest - an outdoor classroom, and partnerships with local outdoor education providers. Meaningful volunteer opportunities will be readily available through a volunteer programme, with a mix of community-led projects and Department-led programmes to add interest and variety to a visitor's experience.

We will support local businesses to act as advocates and guardians for conservation in the wider community by encouraging corporate responsibility to conservation, and support for local community conservation aspirations. Partnerships with universities and research organisations will enable the trialling of a new range of scientific and adaptive management processes.

Pureora is the spiritual home of modern conservation and has been inspiring conservation work since the 1978 logging protests. Investment in this project will allow us to enhance this legacy, and write a new chapter for Pureora and conservation for New Zealand.

The entire proposed site of 80,000ha is all within public conservation land, administered by the Department. Within the site is the 70,000ha Pureora Forest Park, a conservation area containing 10 ecological areas. An additional 10,000ha of contiguous forest is managed by the department as scenic reserves, conservation areas and wildlife refuges. Adjacent to this site are further forest areas on private land which are protected under QE II and Nga Whenua Rahui covenants.



Proposed Pureora site

Biodiversity Values

The awe-inspiring forests of Pureora are among the best unlogged podocarp forests in the country. These towering giants of totara, rimu, matai, miro and kahikatea have reigned since the time of the Taupō eruption when Lake Taupō was formed, and their unlogged status is particularly important to maintain a number of species that rely on ancient trees for their survival. This dense podocarp ecosystem is joined by podocarp-tawa and podocarp-mixed broadleaf forest to create the holy trinity of podocarp heaven.

The podocarp ecosystems are complemented by other, less widespread forest ecosystem types: the beech forest of Nga Morehu Ecological Area; the montane cloud forest within the Mount Pureora Ecological Area; and the distinctive silver pine forest at the southern end of the Hauhangaroa Range.

There are also several frost flats across the park, including Whenuakura Plains, which is probably the most intact of all the North Isdland frost flats. These frost flats host threatened species such as *Pittosporum turneri*, *Hypericum minutiflorum* and *Pimelea tomentosa*.

There are numerous intact wetland mires without weeds present.

This is the only site in the country that has a functional short-tailed bat - *Dactylanthus* ecosystem. While this interaction was suspected for many years, it was in the Pikiariki Ecological

Short-tailed bat and *Dactylanthus Photo: DOC*

Area that the connection was finally proven and today the site boasts not only a healthy ecosystem, but the potential for growth through the newly proposed *Dactylanthus* seeding programme.

There is an opportunity to create eco-corridors to join the north block to the south block of Pureora and facilitate the natural colonisation of species such as kokako and short-tailed bats. Similarly, with the eradication of a number of weed pests, the integrity of ecosystems within the park could be enhanced.

Threatened species include whio, kaka and kiwi in remnant numbers, kakariki, kokako, *Dactylanthus* and short-tailed bats. Re-introductions into the park will be explored as part of this project, such as weka and pateke.

Key Pressures

Pureora is plagued with a medley of animal pests and some weed pests.

Although the canopy is in excellent condition, the forest health of the area is variable due to 30 years of sustained possum control. TBfree New Zealand is attempting a total eradication of TB vectors throughout Pureora, which has seen possums effectively eliminated as a pest to current very low levels.

Wild cattle have been eradicated from the park. Red and fallow deer are found throughout the site at moderate levels and their numbers are contained through recreational hunting and periodic commercial hunting. There is also likely to be limited by-kill from aerial 1080 operations. Goats are the other significant browsing species in Pureora. Due to an intensive pest control programme in the 1980s their numbers are low overall, but are growing in the south-western sector where increased control is required. The understory could be improved using control methods that work in collaboration with recreational hunting interests to target browsers.

Fauna predation is significant in Pureora, primarily due to stoats and rats which are present throughout the site. Some stoat control is achieved through secondary poisoning, and kill trap operations are underway across some parts of the park. Rat control is via infrequent 1080 by-kill,

Stoat *Photo: DOC*

Goat *Photo: DOC*

and more sustained, but limited, anti-coagulant bait station operations at key priority sites. There is potential to significantly expand this work.

Cats are another fauna predator found around key sites. Although currently in low numbers, there is no effective control of these pests. Other pests include pigs, whose numbers are possibly on the increase. Their ecological effects are largely unknown, but they are considered to be having impacts on local plant populations.

There are also some weed pests present in low densities throughout the park, in particular in wetlands and frost flats, and on the park boundaries.

The fencing of adjoining farmland is an ongoing activity. Fences are in place at all ecologically important sites with farm boundaries; however conversion of neighbouring plantation forest to farmland is likely in the short-medium term, which will create some financial pressure for increased fencing.

Focus for investment

Current management of Pureora is effective but patchy. This proposal will improve management over the whole forest, and allow intensive predator management focused on core sites.

Expand pest control to restore forest health

Core sites (Waipapa, Waihaha, Pikiariki and Waimanoa) will be intensively managed for predators and browsers to achieve a very high level of ecological integrity. The rest of the proposed site will be protected to a high level of ecological integrity. Goats will be reduced to low levels and deer impacts will be managed in collaboration with recreational hunters. Regular aerial 1080 operations will be used to reduce possums and stoats to very low levels, and used intermittently to reduce rats to low levels. Weed threats will be reduced to very low levels or zero density.

A healthy functioning *dactylanthus*-short tailed bat system will be sustained as an indicator of forest health.

The populations of key species, such as bats, whio, kaka, kokako and kakariki, will be maintained at carrying capacity so that they are available for dispersal to adjacent areas and for translocations to other New Zealand conservation sites.

Where feasible, additional threatened species populations such as weka, Mahoenui giant weta and pateke will be restored.

Advocacy trip to large totara *Photo: DOC*

Increase engagement through community led conservation projects

The project aims to grow awareness and involvement in conservation, by building a volunteer culture that links major population centers with conservation projects in Pureora. Pureora has had success in the past with engaging people in conservation work, even people from as far away as Auckland. The proposed trapping and baiting regimes lend themselves to volunteer work – most of the sites are readily accessible, low risk, and already have existing accommodation and workshop infrastructure to support them.

In order to inspire and engage more local people and grow awareness and involvement from people that live further afield, a dedicated staff member would need to be appointed to focus on advocacy, publicity and promotion of Pureora as a destination.

Develop a forest education centre which encourages learning through an 'outdoor classroom'

There is a fantastic education story in the logging history and the growth of the conservation movement which has its roots at Pureora. There is considerable potential to develop a place-responsive outdoor education experience at Pureora. There are existing buildings that can be revamped into a day shelter for visiting schools. The education project would look at building authentic teaching and learning opportunities experienced at Pureora and extend the learning and connection to this special place back at their home locations through further learning and a digital learning platform.

Research to improve forest protection techniques

The adaptive management practices developed to save kokako in Pureora have become the blueprint for work with this endangered bird across the country. We propose continuing

Pureora's history as a research site for forest ecosystems and conservation methods, with a particular focus on new methods and efficiencies in animal pest control and protecting native species. Key research opportunities are outlined under 'Tools and Learning Opportunities'.

Corridor enhancement

The northern and southern parts of Pureora are separated by several kilometers of private farmland. Conservationists have campaigned for the restoration of this corridor for many years. Corridor enhancement is a condition of the recent sale of this property. Together we will work with the landowners to provide enough forest connection to allow kokako, and perhaps other species, to recolonise southern Pureora naturally.

Working with kokako *Photo: DOC*

Tools and learning opportunities

Effective methods are available for most types of animal pest control, but these can be improved. Bait stations, kill traps, aerial 1080, hunter-dog goat control are all in use at Pureora.

Pureora has a long history of research being conducted at the site due to ease of access (for example, around kokako protection and rat control).

For Pureora, the key gaps and learning opportunities are focused on:

Informing pig and deer management decisions

Effective deer or pig control will be dependent on working collaboratively with recreational hunters. Some work has already been done to test adaptive deer management methods at Pureora. The next stage would be to develop these techniques to make them more effective.

Key questions arise around: how to use 'reward-based social engagement' to inform pig and deer control management decisions? what are the 'rewards' that could result in win-win situations for hunters and the Department in managing deer and pigs?

Understanding the biodiversity response in podocarp forest from the use of 1080

We have built a large body of evidence around the optimal 1080 application timing in beech forest systems, but know less about optimal application timing in podocarp broadleaved forests. Key questions are: what is the optimal timing for aerial 1080 application in podocarp/broadleaved forest? does timing vary depending on focal native species (e.g. kiwi, whio, kokako, bats and frogs)?

The role and impact of mice on ecosystem function

Mice are known to affect forest systems, but their effects on key ecosystem functions are poorly understood (i.e. pollination, seed predation/plant regeneration, and invertebrate predation).

Pureora provides the opportunity to better understand what difference mouse control makes to ecosystem function.

Our questions are what level of impact do mice have; and is it 'important' enough to warrant control?

This would be done by managing mice down to low levels at core sites, and comparing key indicators of ecosystem health against sites where intensive mouse control is not undertaken. Measures of forest health need to be developed further to ensure they are nationally relevant and applicable to an ecosystem context, but could include the role of mice as pollinators of *Dactylanthus*, and invertebrate diversity or abundance. This knowledge will allow a better assessment of the costs and benefits of managing mice at other mainland sites where they cannot be eradicated.

Converting previous pine areas to podocarp forest

This project would develop new techniques to return cut-over pine plantation areas to podocarp forest (such as aerial seeding of native species), as part of the wider forest restoration objective.

Value for others – flagship opportunities

Provision of key ecosystem services

Pureora provides significant benefits to the North Island economy through the provision of freshwater to the Lake Taupō catchment, the Waikato River, and the Whanganui River. This clean water plays a significant role for many sectors including farming, tourism and major power generation, as well as providing the source water for the internationally-recognised Taupō Trout Fishery.

Economic opportunities grow in the region

There is huge potential to promote Pureora as an eco-tourism destination by linking to the major tourism flows through the nearby Waitomo, Rotorua and Taupō visitor circuit.

The new Timber Trail is an ideal new recreational opportunity in Pureora which can be used as a catalyst to develop economic opportunities. A marketing group, Destination Pureora, has been formed by the community and a number of businesses have formed or expanded to provide services associated with the Timber Trail.

The growth of Pureora as a destination for recreation, tourism, education and volunteering will produce significant growth of service businesses in the local community.

With our business partners also working as education and advocacy champions for biodiversity, this could introduce new volunteers to the area, as well as opportunities for sponsorship.

Pureora shuttle *Photo: DOC*

Existing partnerships with potential to grow

Pureora is already providing significant value to a number of partners, including Genesis Energy, Hancock Forestry and Holcim Cement. Investment in the site will provide additional benefits to deepen these existing arrangements, and provide opportunities to partner with new organisations.

Pureora is also a key site for TBfree New Zealand which has an aspirational goal of removing TB from Pureora by 2026.

Five iwi look to Pureora, including the maunga (mountains) of Pureora and Titiraupenga, as their wellspring of life. There is a strong potential to collaborate and partner with these iwi to enable kaitiakitanga and mātauranga to flourish.

Community benefits

Pureora will provide people with a sense of belonging to a place. People from out of the area will want to return and give back to Pureora. Improvements to recreation and education opportunities and an improved employment market and local economy will make Pureora a more attractive place to live and invest.

Improving forest health and integrity will lead to an increased aesthetic appreciation by the community, an increased connection to the environment and a desire to give back to conservation. Engagement of the community in key decisions, community work and volunteering will enhance their connection to place, and build a range of transferrable skills.

Local businesses will act as advocates and guardians for conservation in the wider community by encouraging corporate responsibility to conservation, and support for local community conservation aspirations.

Create an education and volunteer hub of national and international significance

A number of groups already volunteer on conservation land in Pureora, including Auckland based groups. There is huge potential to expand volunteering by working with a network of community groups and organisations to create a volunteer hub in Pureora.

A volunteer base, including a workshop and accommodation in Pureora Village, will encourage volunteers from out of town or overseas to volunteer at the site, and will also act as a centre for volunteer open-days or training. A volunteer co-ordinator would oversee opportunities and manage stakeholder and community group relationships.

Discussions are already underway with Conservation Volunteers NZ about establishing a volunteer programme at Pureora with the department, there is the potential to encourage the return of international student volunteer groups. Enhancing volunteering fits well with community aspirations - a 'Friends of Pureora' interest group held an initial meeting in 2013. This group, or something similar, offers a great opportunity to coordinate a variety of volunteer activities.

Translocations to other conservation areas

Healthy populations of threatened species will be used to contribute to the growth of other conservation projects around the country. Pureora will become the first source for threatened species to support other conservation projects.

Place responsive outdoor education *Photo: DOC*

Future-proofing through education

Education has long been recognised as an important component of the Pureora experience. There is a fantastic story of the natural heritage of Pureora, including the logging history and conservation movement. A real strength of this site is its close proximity to large urban populations and the rich conservation education experiences it is able to provide to its visitors.

Education at Pureora will be based around the concept of 'place responsive outdoor education'. This approach endeavours to build a lasting relationship of caring and understanding between people and their local place. We will connect people with this unique and very special environment and provide an authentic conservation education experience.

Within and bordering the park, a number of partner organisations have seen the potential for outdoor education opportunities utilising the park. These facilities have been a service to the education community for more than 20 years and enjoy regular use by universities, both classes and research students. Schools visiting the area for class camp experiences usually stay here.

Opportunities to enhance education at the site include:

Innovative and up to date teaching and learning resources

We propose developing teaching and learning resources that are specific to Pureora Forest learning opportunities and in line with current pedagogy and practice.
Providing fresh, innovative and up to date resources will support teachers to deliver best practice programmes and will attract local teachers to utilise the Forest Park and maximise its conservation education potential. Some of these resources could be based on digital learning platforms to ensure greater outreach and follow-up of 'at place' experiences, and to attract more urban visitors.

Developing education and support for teachers

We propose developing education and 'face to face' support for local teachers to demonstrate how they can best utilise conservation education opportunities. We propose providing opportunities for teachers to train in conservation education contexts where they will gain confidence and knowledge of the learning opportunities for their students, and learn to use the teaching and learning tools created for Pureora.

Developing forest education which encourages learning through an outdoor classroom

Existing infrastructure can be revamped into an education/visitor day shelter and there is opportunity for virtual learning to connect wider audiences and extend learning outside the classroom experiences.

We will work with existing education providers to widen our reach into classrooms and bring classes to Pureora to widen their environmental education modules.

Opportunities outside of primary and secondary school education

Local staff will work with existing outdoor education providers in Pureora to enhance the conservation education components of the products they offer. We also propose developing new relationships with differing education programmes (e.g. programmes for the blind or other disabilities) with a view to widening the social reach of conservation.

The Department's Māori Cadetship Programme can be extended to the Pureora area to train and educate young Māori youth in the field of conservation and reconnect them with knowledge of the whenua. We also propose working with local iwi to include mātauranga in all education initiatives.

Research scholarships with universities would support the work taking place. There is a potential for shared scholarship funding with industry to highlight the benefits of restoration.

As well as the Timber Trail there are a number of short walks with moderate visitor use around Pureora Village. Building on existing interpretation, there is an opportunity to develop education packages and interpretation in the central Pureora area, leveraging off the existing walks and the rapidly growing Timber Trail experience.

Risks and barriers

Recreation vs Conservation

There are both ecological areas and a recreational hunting area gazetted over the same sites in Pureora. The legislation states that hunters are given first opportunity to control deer in the recreational hunting area. Deer management is likely to strike some opposition from the hunting lobby.

We will be working hard with hunters to create opportunities for recreational hunting activities to contribute to increased protection.

The draft Waikato Conservation Management Strategy sets a policy to review the Pureora Recreational Hunting Area, including the consideration of ecosystem management priorities and wild animal control responsibilities. The Department could solve some of the tensions by relocating the hunting area to another place in Pureora, for example, west of the Hauhungaroa Range may be a more suitable spot.

Red deer *Photo: DOC*

Aerial 1080 has been used as a control mechanism for possums and rats across Pureora including the recreational hunting area since its inception. Its increased use over the course of this project will cause concern for hunters. Careful consultation is expected to mitigate most concerns.

TBfree New Zealand involvement

Pureora has had great success in reducing possum numbers through the investment from TBfree New Zealand in aerial 1080 operations across Pureora. TBfree New Zealand aims to eradicate TB from Pureora by 2026, at which time its investment in pest control and research may decrease rapidly. This will affect the current animal pest control programme. We will work with partners and researchers to provide new innovations to solve this issue.

Growing community involvement

Pureora has had success in the past with engaging people in conservation work, even people from as far away as Auckland (such as the Howick Tramping Club). However the challenge will be in growing further community input. In order to inspire and engage more local people and more people that live further afield, effort will be put into promoting Pureora as a destination. Developing a connection with the major tourism flow through the North Island would increase its profile and identify Pureora as an essential place to visit.

MT TARANAKI

Mt Taranaki *Photo: DOC*

CHAPTER

4

Mt Taranaki

Project Vision

The heartbeat of Taranaki mounga is healthy and vibrant, so that all who surround him prosper.

Introduction

Ko Taranaki tōku whakaruru hau.

Our whakatauki: roughly translated as 'Taranaki is my protector, my shelter from the winds' links this work with the historical role of the mounga as a refuge for people, a future as a home to threatened species and as the continued spiritual centre and identity for the region's people.

Taranaki, the mountain, the mounga, defines the cultural and social identity for all who reside in the region. Mounga Taranaki is central to the sense of belonging – for many it is what makes Taranaki home.

Taranaki Mounga is a stronghold of biodiversity in Taranaki and in conjunction with its two related ranges Pouakai and Kaitake, the National Park contains a diverse array of ecosystems and habitat types that still form intact functioning ecosystems. The park extends from the rock and ice on the peak of Taranaki, to the coastal plain at the northern edge of the Kaitake Range.

There is an array of threatened flora and fauna species including rare species that are only found in the National Park. This project will have significant conservation gains by restoring the biota to how it once was and enabling the re-establishment of the ten 'lost' species we propose to reintroduce. We want to break new ground in terms of species re-introductions, capitalising on the superb habitat condition that has already been achieved on Mounga Taranaki.

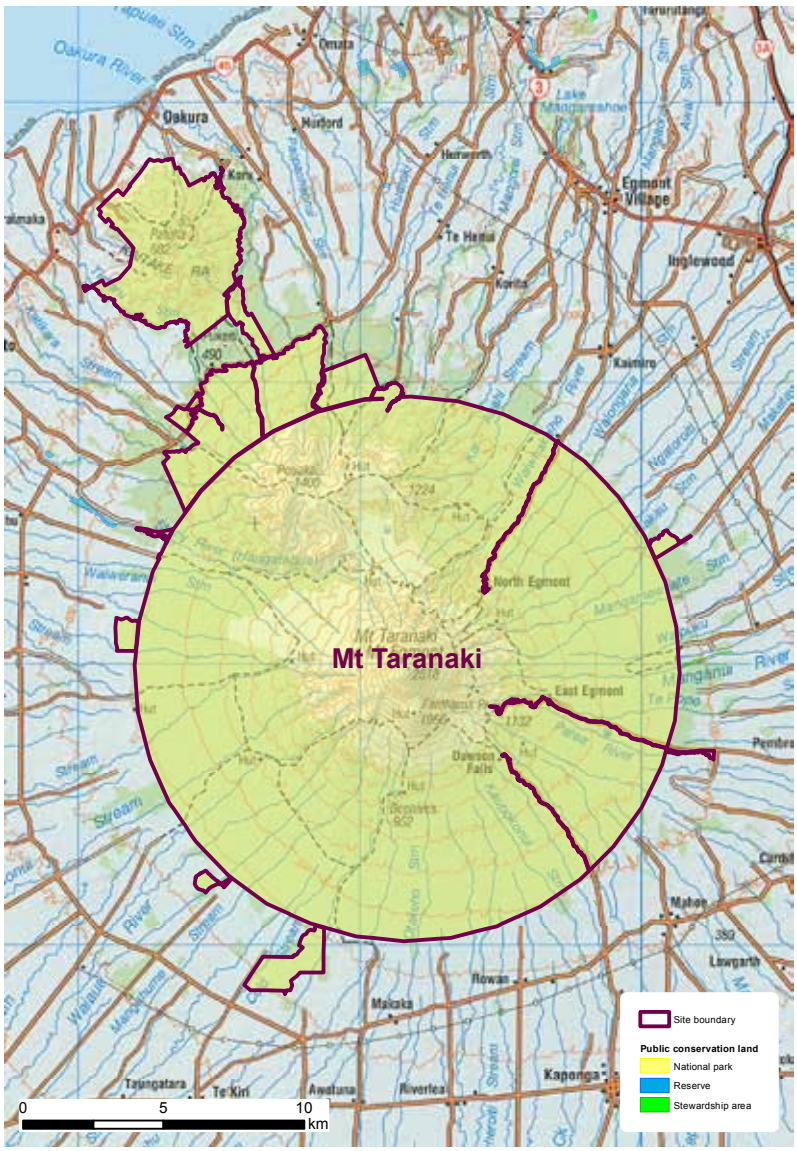
Mt Taranaki is deer and pig free, which makes this site unique as there are no social pressures or value conflicts from local hunting bodies and species flourish here that are browsed close to extinction elsewhere.

Over 300 rivers and streams flow out of the mountain, providing a vital source of high quality freshwater to New Plymouth, the towns and the dairy farming communities that surround the mountain. Situated only a few kilometres from the ocean the mounga waterways feed into a marine protected area and a marine reserve.

This iconic landscape is recognised nationally and internationally. Mounga Taranaki is easily accessible, with three main roads that penetrate deep into the park. The ease of access to the mountain, the proximity of a relatively large population, and the visitor centres and i-sites provide excellent advocacy and education opportunities.

Mt Taranaki has immense cultural significance for the eight iwi who surround this sacred mountain. The mounga is a revered, benevolent ancestor and for many, their ancestors have been buried or placed upon the mounga. We believe that restoration of bird communities is a vision we share with iwi, particularly if it leads to greater enablement of mātauranga Māori on the mounga.

There is deep community support and involvement for threatened species protection and restoration in Taranaki. On Mounga Taranaki there is potential to grow this further in an affluent region with a strong sense of community identity. We also have strong relationships with the one regional and four district councils who largely share a similar vision for the park. This is a vital foundation for further growth of protection and restoration across the region.



Proposed Mt Taranaki site

The project aims to directly work over 35,000ha of public conservation land in Egmont National Park, and proposes inspiring communities to undertake additional activities on private land to create a halo of protection around the national park and to grow the links between the park and ocean along river corridors.

Biodiversity Values

A cloak of forest spreads in all directions from Taranaki's steep volcanic cone. The National Park is the largest tract of forest in western Taranaki, in sharp contrast to the highly modified farmland of the Taranaki Ring Plain. To the north the park is separated from the ocean by less than 3km of developed land and is within 10km of the Tapuae Marine Reserve and the Nga Motu Marine protected area. Growing riparian restoration programmes are rapidly bridging this gap. The forests at all levels are in superb condition from decades of sustained goat and possum control and the absence of deer and pigs.

The park is the source of almost all economically important freshwater for the Taranaki Region. The Taranaki Regional Council works closely with the dairy farming community to protect waterways through riparian planting and fencing. Increasingly forested riparian corridors extend beyond the national park.

Taranaki Mounga and its two related ranges, Pouakai and Kaitake, contain a diverse array of ecosystems and habitat types that still form intact functioning ecosystems - from the rock and ice on the peak of Taranaki, to near sea-level at the Kaitake Range park boundary. Ecosystems within the project area include a range of forest types from kohekohe-tawa-pukatea-rewarewa-nikau to rimu-rata/kamahi, to kahikatea-rimu/kamahi, to kamahi, to mountain totara-kamahi 'goblin' forests, to pahautea-mountain totara/kamahi.

Black Petrel *Photo: DOC*

Non-forest ecosystems include wetlands (including alpine tarns and a lake) rivers and streams, moss-fields/scree-slopes, rock bluff, sub-alpine shrublands, tussock herbfields, and alpine snowbanks, and bare gravel rock and ice. The extensive wetland of the Ahukawakawa Swamp, the broad band of subalpine shrubland and the alpine grasslands and herbfields are included in the project area. The swamp contains a rich and diverse flora, with more than 260 indigenous plant species.

Kaka *Photo: DOC*

Taranaki Mounga supports nationally and regionally significant populations of threatened species such as whio, western North Island brown kiwi, land snails and lizards. Although Taranaki may not be as floristically distinctive as some more geologically unusual places, there are a number of locally endemic plants. This is the only site in New Zealand where whio/blue duck have been re-established, where this species had previously been lost. The North Island brown kiwi population that was in danger of extinction in the park in the 1990s is also well on the way to being restored to a sustainable population on at least part of the main mountain.

Robin *Photo: DOC*

What is missing are some of the indigenous species that were once likely to have been found in the park or that have been reduced to low numbers due to small-mammal predation. Lost species that are realistically options for reintroduction include kaka, North Island robin, kakariki, kokako, pateke, pekapeka (short-tailed bat) and titi (Black petrel, Cooks petrel, mottled petrel, grey-faced petrel). Depleted species whose abundance could be dramatically increased include karerere (falcon), kereru, kiwi, whio and other forest birds.

Key Pressures

Goats: The goat control in the park is the longest running vertebrate pest control programme in the world, initiated in 1925, and resulting in superb overall vegetation, noticeable threatened plant recovery and an increase in suitable bird habitat. Reinvasion of goats from neighbouring farms into the park is infrequent due to years of advocacy with national park neighbours. There is now the

opportunity to eradicate goats from the entire national park. This would further our biodiversity gains and free up valuable resources to put towards other priority work.

Deer and Pigs: Deer and pigs are absent from Egmont National Park. Unlike many other areas there are no recreational hunting pressures, which makes control of these species and frequent use of 1080 less challenging.

The short-tailed bat population has been impacted by rats
Photo: DOC

Rats: There is no sustained rat control in the park. Rat numbers are very high due to the good forest condition and available food. Bird, invertebrate, bat and lizard populations have been impacted by the high rat numbers, and many species historically present are now absent. The control of rats is the critical missing element for restoration of the birdlife. To suppress rats we plan an increased frequency (*although not necessarily quantity*) of 1080 use (three yearly) supplemented by focused ground based rat control to allow the re-introduction of many species historically present, and integral to the park's ecosystems.

Mustelids (stoats, ferrets and weasels) and cats: An intensive community assisted mustelid trap network protects whio and kiwi habitat in about 20% of the park. Mustelid control has allowed the successful re-introduction of whio and recovery of the kiwi population, showing what could be achieved with more effort. Partnership projects have led to an additional large area of mustelid control outside of the park boundary.

Ferrets have been found to be responsible for whio and kiwi deaths. Increased frequency of 1080 would dramatically reduce ferret and stoat populations (via secondary poisoning). The impact of 1080 on weasel populations is not clear and research into this has been included into the research component of this project.

There is no cat control in place currently.

Possums: For three decades, possums have been controlled through a 7–10 year cycle of 1080 bait application, covering all of the vegetated parts of the park. In addition, possums along the park boundary are controlled in association with the Taranaki Regional Council's self-help possum programme. The condition of the forest canopy is testament to the sustained possum control history inside and outside the park. Aerial 1080 control to manage rats will also effectively manage possums.

Hares: Threatened plant species are impacted by browsing from hares. Hares are believed to be threatening the species composition of the Ahukawakawa Swamp, a nationally important wetland. Since hare control is difficult, yet thought to be essential for ecosystem integrity, there is value in conducting research to find an effective method of control that could also be used nationally.

Weeds: Weeds are restricted to the park boundary. With additional funding and community support we could eradicate climbing asparagus from the National Park. Other weed threats are limited and manageable.

Focus for investment

This project aims to restore the wildlife of Taranaki Mounga to match the profusion and vibrancy of the plants. The Mounga will become a showcase of healthy, functioning ecosystems, a source of pride for the local community and the country.

The main components of the proposal are:

Strengthen the mauri (life force) of Taranaki through the control of pests, the strengthening of populations of threatened species and the restoration of lost species

The project proposes the eradication of goats and an ongoing triennial sequence of aerial 1080 pest control of targeted species. We are confident that through the use of scientifically tested, cost effective methods plus some use of adaptive management techniques we can develop an acceptable and successful approach to achieve our goals.

This project will produce significant conservation gains by restoring the biota to how it once was and enabling the re-establishment of the ten 'lost' species we propose to reintroduce. The return of these lost species will build on the forest restoration work that is ongoing, and bring the park closer to its state before the surrounding forests were removed and pest populations decimated birdlife.

A kiwi release: strengthening populations of threatened species *Photo: DOC*

This is the rallying point for community involvement. The excitement and anticipation associated with species reintroductions is the key to building community support.

A successful eradication would also remove the annual burden of goat control, providing a long term release of resources for other work in the future.

Creation of a halo of protection to control pests on private land surrounding the park

The ring of high-value farmland around the National Park can provide a buffer against reinvasion of pests. The successful 'Self-help possum control programme' run by Taranaki Regional Council has been an effective model to stimulate pest control around the park periphery by private landowners. We propose to work with the Taranaki Regional Council and landowners to establish a buffer of stoat traps and ground based predator control around the park, perhaps with the support of the wider community to sponsor and/or maintain the traps. In return the mountain will provide source populations of species (e.g. invertebrates, birds, and bird, wind or water transported seed) to repopulate and diversify the riparian margins.

Empower the community by building a shared vision

We will seek to engage the Taranaki communities with our vision, to gain their trust, ideas, support and contributions for the mahi (work) that is ahead. This includes enhancing and strengthening the networks of community groups able to contribute to the project via Taranaki iwi structures and the Taranaki Biodiversity forum.

We will place particular emphasis on tangata whenua and we expect that restoration of wildlife and mātauranga Māori will be a focus of future treaty settlement.

We intend to build this shared vision as a pre-cursor and foundation for all other work.

Develop 'mountain classroom' education initiatives

Currently up to 20,000 local students and 450 000 visitors a year could be reached through the development of multiuse facilities and educational resources which will raise awareness of conservation work and participation opportunities.

Further information on how we will use education to future proof this project is covered in the 'Future proofing through education' section.

Tools and learning opportunities

The Department has had proven success on the mounga with:

Browsers: 1080 for possum control, sustained goat control and ground based rabbit control.

Predators: Ground control of mustelids at critical sites for species re-introductions. This has been further enhanced by community led mustelid trapping outside the park. Elsewhere, in similar habitats, e.g. Whanganui National Park and the Tararua Forest Park, the Department has had success with three yearly aerial 1080 cycles to suppress rats and stoats.

Weeds: Climbing asparagus infestations are known, and existing reliable control methods are keeping this species to low levels.

Species re-introductions: Translocation techniques for most of the proposed species are proven through adaptive management at other sites. We plan to boost mainland source populations using proven ground based rat and possum control techniques.

Community relationships and engagement: Strong existing relationships have been built from working with: iwi, external agencies (especially Taranaki Regional Council), conservation community groups, external funders, schools and the wider community - with strong projects coming out of this.

Key gaps remain in:

- **Goat eradication technologies:** new tools and strategies are needed to support the eradication of goats from the park (e.g. use of toxin gel). In addition, it is proposed to develop novel tracking and surveillance techniques (e.g. faecal DNA and trail camera identification), and a satellite tracking program to understand goat movement and preferred habitat use.

Working alongside iwi to understand causes of decline for key species *Photo: DOC*

- **Detection of 'zero' pests:** development of cost effective detection tools and techniques for deer, pigs, and goats (capable of detecting ungulates at extremely low abundance over large landscapes to maintain known 'freedom' from these species).
- **Hares:** development of hare control strategies to protect vulnerable threatened plant populations within the alpine zone and wetland areas.
- **Weasels:** understanding the interaction web of predators and pests within the ecosystem, with particular focus on the role of weasels, to inform management approaches (e.g. what is driving the increase in weasel numbers following aerial 1080 operations and how can their impacts be suppressed).
- **Translocations:** developing a translocation methodology for bats (noting that there has not been a successful bat translocation anywhere in New Zealand to date).

Whio release *Photo: DOC*

Value for others – flagship opportunities

The park will be a place of increased pride at the heart of Taranaki while continuing to be the source of water of the highest quality for practically all the people and enterprises of the region.

The project will become a focal point for strengthening community identity and an inspiration for community led conservation in Taranaki

The project will develop a community that is committed to conserving the park in its natural state, who understand the intrinsic value and richness that it provides, and who are inspired to give back to conservation.

The Taranaki region has a strong biodiversity Forum, a network that brings together community groups, agencies and individuals to share knowledge and support. The Forum and the strategic *Taranaki Biodiversity Accord* show there is strong commitment by diverse parties to work cooperatively, scientifically and strategically to boost biodiversity throughout Taranaki. Further protection of this precious taonga is only going to increase that community inspiration and effort. There is a huge opportunity to cement strong relationships between groups with the project being the catalyst that allows them to tell the story of the past 200 years and what the future looks like.

Develop and enhance partnerships focused around biodiversity protection

There is considerable potential for biodiversity-related partnerships to expand and increase capacity in Taranaki.

Existing partnership projects have developed with the East Taranaki Environment Trust and the Taranaki Kiwi Trust which protect both whio and kiwi. The East Taranaki Environment Trust protects whio outside the park as well as providing a buffer of protection for those inside the boundary. The Taranaki Kiwi Trust supports monitoring of kiwi throughout the region and has supported the restoration of other kiwi populations through such programmes such as Operation Nest Egg. The Rotokare Scenic Reserve Trust is another community initiative growing biodiversity in Taranaki by maintaining a predator free site.

The Okato Development Trust and the Oakura School (with Taranaki Kiwi Trust) have initiated their own community-led predator control project on the Kaitake Range. The Taranaki project would reinforce their sense of ownership and pride by providing a greater sense of achievement and purpose, which will in turn inspire more groups to become involved, as well as showcasing the current ones.

The Taranaki Regional Council and other local authorities are active, effective and already working closely with the Department to support conservation in their region. The project will provide many opportunities to deepen these connections

Economic growth through enhanced recreation and tourism

Throughout the restoration and beyond, the Mounga will continue to sustain and support the economic prosperity of the region. There are numerous short, day and multiday tracks with huts, lodges, shelters and other infrastructure available on the Mounga. The area is untapped in regard to eco-tourism and currently under utilised as a tourism destination.

Upgrades planned to current infrastructure within the park provides potential to grow multiuse activity with the added bonus of raising awareness of conservation work and participation opportunities i.e. Konini Lodge, Eco Lodge, Conference Centre.

Strengthening ecosystem services and benefits

Restoring fauna populations will strengthen ecosystem functions that are currently in decline. Establishing a seabird colony, for example, will revive historic synergies between this avifauna clade, soil nutrients and vegetative composition.

Although water quality at the park boundary is currently very high, that quality degrades en-route to the sea. Growing enthusiasm for restoration stimulated by this project will seed an acceleration of riparian land retirement and restoration of water quality as a consequence. The $1 billion dairy industry in Taranaki is dependent on both an ongoing supply of clean water and the environmental reputation of the area.

Forested habitat improves air quality for people, and provides a carbon sink to process methane emissions from dairy, oil and gas industries. The forest cover on the mountain also moderates extreme climatic events.

Flourishing kaitiakitanga and mātauranga Māori

The mauri of this place will be strengthened and enhanced by the restoration of indigenous species that have been lost during the last century. The project provides a strong social and cultural platform for tangata whenua and the community to connect on the mutual benefits of restoring this significant site.

An alpine hut provides a base for climbers *Photo: DOC*

Seabird populations could reach a carrying capacity, allowing sophisticated and thoughtful conversations to be had about the re-introduction of some aspects of mātauranga Māori such as the harvest of titi. Iwi self reliance can be reconnected back to the health of the Mounga.

National and international inspiration

We anticipate that the project will be globally renowned for its success in reversing ecosystem decline and returning a National Park to pre-human condition while contributing to the social, cultural and economic prosperity of Aotearoa and coexisting with a progressive farming and natural resources industry. It will inspire the achievement of similar outcomes elsewhere in the region and in other national parks.

Future-proofing through education

We will provide an interactive learning site showcasing to the world the story of Taranaki Mounga/Egmont National Park from natural beauty and health through 200 years of change and back again.

A strength of this site is its close proximity to a large urban population. There are approximately 450,000 visitors per annum to the Mounga / Park. There are also 85 schools in the area, with 7500 secondary students and 11 000 primary students.

Education at Taranaki will be based around the concept of 'Place responsive outdoor education'. This approach endeavours to build a lasting relationship of caring and understanding between local people and their local place. We will connect people with a 'real' purpose for learning and provide a genuine experience for students to connect with their place and their people.

Opportunities to enhance education at the site include:

Innovative and up to date teaching and learning resources

We propose developing teaching and learning resources that are specific to the unique components of the Taranaki project and in line with current teaching and learning pedagogy and practice. This would include updating the existing education kit to ensure there are strong links to the curriculum.

Providing fresh, innovative and up to date resources will support teachers to deliver best practice programmes and will attract local teachers to utilise the Mounga and maximise its conservation education potential. Some of these resources could be integrated IT tools that could provide greater outreach, and attract more urban visitors.

Developing education and support for teachers

We propose developing education and 'face to face' support for local teachers to demonstrate how they can best utilise education resources. We propose providing opportunities for teachers to train in conservation education contexts where they will gain confidence and knowledge of the learning opportunities for their students and learn to use the teaching and learning tools created for Taranaki.

Development of a mountain classroom which encourages learning for the whole community

A mountain classroom can be developed as a community 'hub' which can also provide training and skill sharing initiatives to support neighbours, landowners, iwi and conservation community groups using best practice examples for use of traps, poisons etc.

We will work with existing education providers to widen our reach into classrooms and bring classes to Taranaki to widen their environmental education modules.

Moturoa school *Photo: DOC*

Tertiary opportunities

DOC's Māori Cadetship Programme can be extended to the Taranaki area to train and educate young Māori youth in the field of conservation and reconnect them with knowledge of the whenua. We also propose working with local iwi to include matauranga in all education initiatives.

Research scholarships with universities would provide research support for the work taking place. There is a potential for shared scholarship funding with industry to highlight the benefits of restoration.

Community education and awareness building

Opportunities exist to engage with the local community and increase their understanding of how the environmental well-being (hauora) of the Mounga impacts directly on the community's quality of life and health and well-being.

We propose employing a full time Communications Team Leader and a full time Education Officer/volunteer coordinator to educate and advocate the project to iwi, wider community and key stakeholders as well as to seek their engagement in the project.

Students potting up native plants *Photo: DOC*

Risks and barriers

The community may not connect or work collectively. We need to ensure shared objectives and work to understand the barriers and benefits to ensure commitment. The Taranaki community is proud, protective and parochial. There is huge opportunity to cement strong relationships within the community with the project being the catalyst that allows individual groups to tell the story of the past 200 years and what the future looks like.

Governance and management structure arrangements may alter due to Treaty Settlement outcomes. Liaising with iwi at the earliest possible time will inform any future plans and ensure a strong understanding that the benefits outweigh any risks

The increased frequency of use of 1080 may be controversial. We can use this as an opportunity to educate on the benefits, and break down the often perceived barriers. (It is likely that the total quantity of 1080 used over time will be similar to what would be used to maintain the existing possum control programme.) The mountain classroom will be instrumental in increasing knowledge around the use of toxins in pest control operations

Some planned re-introductions are cutting edge. We want to break new ground in terms of species re-introductions, capitalising on the superb habitat condition that has already been achieved. This carries some risk of failure, which will be mitigated by a staged approach to re-introductions, and through applied research to support the re-establishment of more challenging species such as seabirds and short-tailed bats.

KAHURANGI O MŌHUA

CHAPTER

5

Farewell Spit *Photo: Andy Dennis*

Kahurangi o Mōhua

Project Vision

Zealandia unfenced: our unique natural heritage restored

We discover long-lost Zealandia as Golden Bay's valleys are resettled by iconic species that thrive in actively protected wildlands surrounding and supported by our community.

Introduction

Kahurangi o Mōhua provides an opportunity to link the existing Abel Tasman Janszoon project with northern Kahurangi National Park and Farewell Spit in a massive landscape-scale restoration project across Golden Bay.

The interaction of complex geology, climate and landforms has created a rich range of biodiversity which represents a large part of our Gondwana heritage. North Kahurangi is a meeting place of North and South Island biodiversity and a centre for speciation and endemism , many species only exist (are endemic) here. Farewell Spit Nature Reserve is a Ramsar wetland of international importance and is recognised as a key site on the East Asian/Australasian Wader Flyway. Farewell Spit is also one of the ten international geopreservation sites that are located within Kahurangi o Mōhua

Kahurangi o Mōhua is considered worthy of World Heritage Status by the New Zealand government. Sustained landscape wide management of possums, stoats and rats is proposed across Kahurangi o Mōhua to significantly improve the habitat of existing species such as kea, kākā, kākāriki, snails, whio, rock wren and great spotted kiwi. Intensive management of conservation hotspots is also proposed. These include:

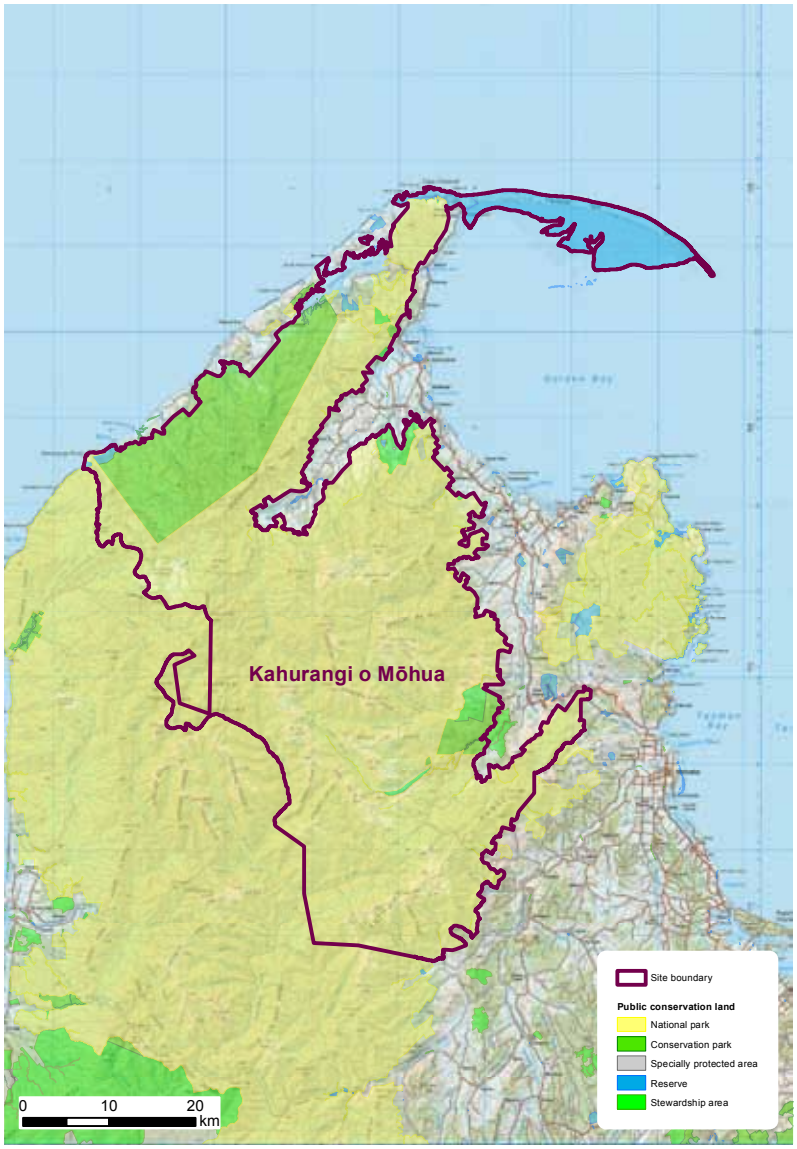
- Farewell Spit's dynamic dune lands and extensive estuarine wetland,
- Whanganui Inlet (a marine protected area)
- Mangarakau wetland (the largest freshwater wetland in northwest Nelson),
- Mt Burnett's unique dolomite ecosystems and endemic plants,
- Parapara Peak (the hub of *Powelliphanta* snail diversity), and
- The Cobb / Mt Arthur marble area, with its diverse landforms, alpine karst, unique flora and fauna, ultramafic area and frost flats.

The combination of widespread general pest control and targeting specific hot spots provides the key for transforming the values in this site.

Mōhua is the indigenous name for Golden Bay, the home of the yellowhead. We propose to return mōhua back to its home, Kahurangi o Mōhua.

This site is 230,000 hectares in size and all on public conservation land. It includes the northern part of Kahurangi National Park, Farewell Spit Nature Reserve and Whanganui Inlet Marine Reserve and Wildlife Reserve.

Kahurangi o Mōhua, together with the Janszoon Abel Tasman Project, will create a wrap-around large scale restoration project across the hinterland of Golden Bay. This provides an ideal opportunity to carry out social research into the response of a rural community to large-scale ecological restoration. Gaining an understanding of this is critical for the long-term success of conservation management. This project will include measuring community attitudes as biodiversity restoration happens around them.



Proposed Kahurangi o Mōhua site

Biodiversity Values

Underlying the biodiversity of Kahurangi o Mōhua is one of the most geologically complex areas in New Zealand, including our oldest rocks (Galena Ck, Cobb Valley). Mountain building episodes and subsequent erosion has resulted in a landscape of immense variety, from folded mountain ranges, peneplains, glacial and river cut valleys, karst surfaces and extensive cave systems, alluvial terraces, dunes, and the largest sand spit in New Zealand.

Within Kahurangi o Mōhua 41 distinct ecosystems have been identified, each created and maintained by a different set of physical conditions and processes. These ecosystems in turn support many species of plants, birds and animals. Kahurangi o Mōhua contains almost half of New Zealand's plant species. It has 85 species classified as threatened and 51 of these species are high priority for conservation action.

Genetic studies support the idea that this area was a refuge for species during past ice ages and a source for subsequent radiation of species during warm inter-glacial periods. Many plant species in this area are shared with the North Island and are at their southern distribution limit. Similarly, many species extend south from this area, a situation best described as an ecological cross-road.

Many plant species have evolved on specific rock types and now have a strong dependence on those rocks. For example, the magnesium rich dolomite of Mt Burnett has eight plant species which are found nowhere else. The full extent of endemism will be revealed as species-determination work progresses but presently the proposed area has at least 50 endemic species. The area is the largest centre for Powelliphanta snail diversity and endemism with 27 distinct subspecies (over two-thirds of all Powelliphanta species). Other invertebrates show a similar pattern and include giant slugs, ground beetles, moths, weta, caddis flies and Peripatus.

A large proportion of the total range of the great spotted kiwi (roroa) is within the area. Also present are populations of kākā, kea, kākāriki, falcons, whio, weka, rock wrens, international wader species (godwits, knots, turnstones), wrybills, gannets and fernbirds.

Further notable animals include five reptile species, katipo spiders (on Farewell Spit), and fresh water fish species (in Onekaka River and Mangarakau Swamp).

Mistletoe flower buds *Photo: DOC*

Powelliphanta hochstetteri *Photo: DOC*

The Geosciences Society of New Zealand have identified 61 geo-preservation sites in the proposed project area, ten of which are internationally significant. The site has 19 naturally rare ecosystems based on landforms like dunes, cave and karst features, basic and calcareous boulderfields, moraines, cliffs and erosion pavements.

Key Pressures

Kahurangi o Mōhua's unique diversity is based on an assemblage of supporting ecosystems which are often small and rare. They sustain only small populations of dependent species with specialised ecologies that are vulnerable to any threat pressures.

Possums browse rare plants and predate on birds, their eggs and invertebrates such as *Powelliphanta* snails. Approximately 80% of Kahurangi o Mōhua has been subject to possum control, predominately by aerial 1080. Some areas have been controlled since 1994 on a 5–7 year cyclic basis and some areas buffering private land have been treated on an annual control cycle as part of Tb Free NZ's programme. The remaining 20% is at the interior of the proposed site.

Stoats predate on small birds and also impact on the nests and adults of larger birds such as kiwi, whio, kea and kākā. Stoats are currently controlled through trapping in the Cobb/Mt Arthur area

by some of the largest (and longest running) community group predator control initiatives. The Department controls stoats in the Gouland Downs area to protect whio.

Rats are present throughout the site and predate on seeds, small birds and eggs of larger birds. Although present at seasonally consistent high levels throughout the lowland/coastal areas, rat populations at higher altitude sites are influenced by episodic high seed production of beech species and other masting species (e g. tussock). The effects on species, such as rock wren, at higher altitude areas during rat irruptions can be devastating. Rats are not currently controlled at a landscape scale except as a secondary target species from aerial possum control operations.

The entire site is likely to be treated with aerial 1080 in spring 2014 as part of the national "Battle for the Birds" rat irruption campaign.

Mice are present throughout the site and eat a range of seeds and invertebrates. The extent of these impacts is poorly understood and the available control measures are similarly limited.

Pigs are present throughout most of the lowland and forest-fringe areas and are a significant predator of native land snails, as well as depleting forest ground cover and disrupting forest regeneration processes. The only specific control of pigs in Kahurangi o Mōhua is a recently instigated aerial and ground hunting programme at Farewell Spit, aiming to eradicate pigs to protect one of the few gannet colonies on mainland New Zealand.

Goats and deer are the main agent of decline of locally endemic species plant species such as *Pittosporaum dalli*, *Pittosporum patulum* and *Melicytus obovatus*. Their impact is mainly visible in the forest understorey, where preferred food species, such as pate and broadleaf are heavily browsed. Goats are widespread at varying densities with the highest concentrations in lowland and high fertility sites. Goats have been periodically controlled by ground hunting in susceptible areas (sustained management 52420 hectares). An eradication of deer took place on Farewell Spit in 2007. Other than that there is currently no control except some recreational hunting, mainly in the Cobb Valley and at Shakespeare Flat.

Hares are present in open river valley tussock/grasslands, montane tussockland and herbfields and in lowland open areas such as Farewell Spit. The protection and recovery of some species

Goats *Photo: DOC*

such as pingao (*Ficinia spiralis*), *Euphorbia glauca* and sand daphne (*Pimelea villosa*) requires the suppression of hares.

Wasps are seasonally present in large numbers due to the prevalence of beech forest and the associated native scale insect that produces large quantities of energy-rich honeydew. The competitive effect of wasps removing a key food source for a number of native invertebrate and bird species may have a huge impact on the environment but the effects are poorly understood.

Weeds are not a huge problem in many parts of Kahurangi o Mōhua as habitats are largely still intact. However a range of weeds that have the potential to spread are currently controlled within eight of the proposed management hot spots. They include Spartina, climbing asparagus, heather, pampas, gorse, broom, old man's beard and buddleia.

Focus for investment

The vision for this site is to achieve a *Zealandia* experience for all people living and visiting Golden Bay. Key indicator species of birds such as kākā, kākāriki, kea, whio, and more common forest birds such as robin, pigeon, tomtit, bellbird and tui will be so numerous that they spill into the Takaka and Aorere Valleys. They will re-colonise the landscape and use Golden Bay's reserves as stepping stones as they travel between Kahurangi o Mōhua and the Janszoon Abel Tasman project.

This vision will be achieved through:

Widespread landscape-scale control of possums, rats and stoats

Sustained control of these three main predators will result in widespread species recovery. Birds with the capacity to breed rapidly are likely to recover in an exponential trajectory and spread throughout and outside the area. Species such as mōhua and takahē will be re-introduced.

Whio, Flora Stream, Kahurangi National Park *Photo: Andrius Pasukonis*

Targeted goat and deer control

By targeting goat and deer control to specifically vulnerable areas (such as limestone outcrops and the sedimentary belt) within Kahurangi o Mōhua we expect a widespread recovery of vulnerable plant species such as the endemic Pittosporum dallii and Pittosporum patulum.

Intensive management of nine biodiversity hot spots

Intensive management at nine biodiversity hot-spots in this landscape will enable specific ecosystem and species recovery outcomes:

- **Farewell Spit (Onetāhua)**: one of New Zealand's largest dune ecosystems and an internationally important wetland. Currently, pigs threaten ground nesting birds and hares jeopardize re-vegetation efforts on the dunes.
- **Kaihoka Lakes**: a unique forest type on dunes, with mixed podocarp forest including northern cedar and northern rata surrounding two freshwater lakes. It is home to a population of *Powelliphanta gillisi* snail.
- **Whanganui Inlet**: the inlet includes marine and wildlife reserves and is supported by one of the most intact catchments in the country.
- **Mangarakau wetland**: the largest freshwater wetland in northwest Nelson, with significant freshwater values. An active community group currently manages part of this wetland.
- **Mt Burnett**: a unique dolomite forest ecosystem which supports a suite of endemic plants. It is home to another *Powelliphanta gillisi* snail.
- **Kahurangi Point**: an intact altitudinal vegetation sequence from coastal lagoon and original coastal forests, to upland forests and tussock landscapes of Gouland Downs. This area is a stronghold for lowland great spotted kiwi and *Powelliphanta gillisi* snails.
- **Gouland Downs**: an extensive peneplain plateau which is crossed by the Heaphy Great Walk. This is a stronghold for great spotted kiwi, *Powelliphanta superba* and *P. proseorum* snails, and whio. Takahē and mohua are proposed to be translocated to this site, providing potential to transform the Heaphy Great Walk into a web-based interactive journey through Zealandia unfenced.
- **Parapara Peak**: is the epicentre for *Powelliphanta snail* diversity, and a location where mistletoes and birds such as kaka, kiwi, robin and weka are regular sights. A track to the top of Parapara peak provides access to this remote hub of biodiversity.
- **Cobb / Mt Arthur**: the diverse geology and landforms of the glaciated Cobb Valley and Mt Arthur marble support a range of ecosystems (alpine karst, marble and limestone flora and fauna, ultramafic area and frost flats). Currently the Cobb and Mt Arthur tablelands are protected by one of the largest stoat trapping programmes in New Zealand which is run by volunteers. This area is easily accessible by vehicle and has potential to be a showcase for this project.

Farewell Spit *Photo: Andy Dennis*

Social research and learning to build shared values in the community

For conservation management to be successful over the long-term, there is a need to understand community responses to

conservation management actions and how this may change, effect or influence community support for restoration projects. This project will include measuring community attitudes as biodiversity restoration happens around them.

For instance, what is the community's response to changes such as increased bird numbers in their backyard? Does seeing the birdlife actually increase their perceived value of biodiversity conservation?

The small Golden Bay community (4,500 residents) is an opportune place to conduct such social research. Although small, this rural community is diverse. As well as a traditional farming community (largely dairying), aquaculture and tourism, Golden Bay has a diverse sector of people seeking non-urban lifestyles: artists, alternative health practitioners, and other professionals who choose to work remotely.

If the Kahurangi o Mōhua project goes ahead, together with the Janszoon Abel Tasman Project, the Golden Bay community will be surrounded by intensive, landscape-scale restoration. This situation offers an ideal opportunity to carry our research into how we successfully socialise the benefits of ecological restoration on a large scale.

Tools and learning opportunities

The main components of the proposed suite of management tools are well proven for effectiveness, and most have previously been used at various parts of Kahurangi o Mōhua. The following techniques will be used:

- Aerial 1080 for possum and rat control will be used as needed, depending on monitored pest densities and beech mast triggered events, with stoats killed as a by-kill through secondary poisoning.
- Rat and stoat ground control (trapping and bait stations) will be linked with existing community group and volunteer programmes to support species re-introductions.

Kiwi monitoring at Saxton, Gouland Downs *Photo: DOC*

- Deer and goat control (ground and aerial hunting) will be focused on areas of high values/impacts and used in conjunction with hare control at some key threatened species sites.
- A range of existing pig control techniques will be used (both ground and aerial hunting, using fencing and traps). Sodium nitrate, a significant new tool, will also be used as it becomes available.

Biodiversity learning

This site presents a number of learning opportunities, particularly around dune-system recovery. For Kahurangi o Mōhua the top areas for immediate focus are:

- Dune-system recovery:
  - assess the use of high resolution imagery for large scale surveillance to validate success of marram control;
  - develop a methodology for enhancing native succession after marram control;
  - develop hare control techniques in coastal dune systems; and
  - develop pig control techniques.
- Protection of non-target native species: develop techniques and strategies to reduce the non-target impact on native wildlife from predator control methodologies.
- Wasps: develop techniques to enable landscape scale wasp control.
- Pigs, mice and hares: investigate the impact of these pest animals and develop control methodologies to reduce their impacts.

Social learning

Engagement from the start with iwi and the community is critical to the success of this project as it has far-reaching implications for life in Golden Bay. Undertaking community-based social research about people's attitudes and perceptions towards conservation and ecological restoration offers huge learning potential.

Value for others – flagship opportunities

Iwi kaitiakitanga research and teaching site

Iwi (Ngati Rarua, Te Atiawa, Ngati Tama and Ngati Apa) have strong ties to Kahurangi o Mōhua. Onetāhua (Farewell Spit), for example, has many dimensions from an iwi perspective including as a boundary marker, food basket, and source of cultural materials and it is the departing place for spirits for Te Waipounamu.

The Department in Golden Bay has a close working relationship with these iwi. The strength of that relationship will serve as a foundation for the Kahurangi o Mōhua project to build model structures, systems and processes for supporting iwi kaitiakitanga in restoration projects. Investment in building the model will have long term benefit by enhancing iwi mana and ensuring that the project remains strongly supported.

Showcase community and volunteer effort

This site offers potential to showcase the enormous amount of work contributed by community conservation groups and volunteers to conservation. Currently, Friends of Flora, Friends of Cobb and the Golden Bay Branch of New Zealand Deerstalkers Association check over 1000 traps

within a trapping network covering approx 10,000 hectares of the Flora Valley, Mt Arthur Tablelands and the Cobb Valley. These organisations have more than 70 members between them actively trapping. They have an intimate knowledge of these areas and are passionate about improving species survival and ecosystem health. These groups and individuals could be a powerful resource in promoting the project and supporting its outcomes. They would gain huge value from seeing their long term conservation goals realised.

Friends of Flora kiwi release *Photo: DOC*

Maryann Ewers, Friends of Flora founder, with ranger Gavin Udy *Photo: Nelson Mail*

The New Zealand Deerstalkers Association promote recreational hunting in the Cobb/ Tablelands area of this site and could potentially partner with the project by taking responsibility for managing deer and goats within agreed areas.

The Ornithological Society of New Zealand (OSNZ) contribute extensively to bird research in this site. OSNZ have monitored the gannet colony at the end of Farewell Spit since it established in 1983 and also monitors shorebird populations on the Spit. Its members have researched rock wren and have also searched for South Island kokako. OSNZ members have valuable local knowledge of bird distributions and ecology and could support the project by continuing to monitor changes in bird distribution and abundance.

Build on existing business partners to extend support for the project

A number of large businesses in Golden Bay have connections to conservation and there is potential to grow these connections and leverage off them. For example, Golden Bay Dolomite (owned by Solly's Contractors) quarry dolomite rock for fertilizer on Mt Burnett which is one of this site's conservation hot spots of exceptionally high plant endemism. Solly's currently undertake weed control at Mt Burnett (as part of their agreement for access). Golden Bay Dolomite markets the dolomite as an 'organic' fertiliser and could gain brand value from being associated with Kahurangi o Mōhua. In turn, Kahurangi o Mōhua could benefit from Solly's relationships with the bulk of farmers in Golden Bay which could help socialise the project vision in the wider rural community.

Dairying is a significant industry in Golden Bay. Kahurangi o Mōhua presents an opportunity for dairy farmers to be associated with a major conservation project to showcase the part this industry is playing in conservation and improving water quality. Such a partnership could serve as a pilot project for deepening the national relationship between DOC and Fonterra. Most neighbours to Kahurangi o Mōhua are farmers who will benefit from intensive pest control in the bush blocks behind their farms (TB Free NZ has a long term goal of eradicating bovine Tb from Kahurangi National Park).

Trustpower owns the Cobb dam and hydro scheme in the Cobb Valley. Trustpower currently supports conservation projects within the Takaka catchment through the Cobb Mitigation Fund, which is managed by the Tasman Environment Trust, and also supports trapping carried out by Friends of Cobb.

A range of tourism businesses already operate in Golden Bay (guided walking, mountain biking, horse trekking) and in years to come, when wildlife are a feature across the region, it could become a prime location for ecotourism.

Future-proofing through education

A key opportunity for this site, as identified above, is to socialise the benefits of landscape scale restoration in a community which will be completely embraced by two restoration projects, Kahurangi o Mōhua and the Janszoon Abel Tasman Project.

There are already many community conservation initiatives on both private land and conservation land in Golden Bay. Two large scale restoration projects (Kahurangi o Mōhua and the Janszoon Abel Tasman Project) will inspire and empower these groups and their ongoing efforts will complement the project's work. There are only 4,500 residents in Golden Bay and many people choose to live there because of its high natural values. There is the potential for this project to have a high level of community participation, ownership and pride.

Golden Bay attracts a large number of holiday makers over the summer period, the majority of whom (around 85%) are domestic visitors - 70,000 people visit Te Waikoropupu Springs each year. As populations of indigenous wildlife increase, visitors will experience the benefits of large scale ecosystem restoration. They will take new-found knowledge and understanding of conserving flora and fauna back to their own communities, potentially initiating or contributing to their own local projects.

This site offers potential to include formal education participation to cover the transition from primary, secondary to tertiary education and to link with the Janszoon Abel Tasman Project. There are 36 schools in the site catchment, as well as tertiary providers already active on the site. Universities regularly run field trips to Golden Bay and many post-graduate dissertations have been based on research in the area. There is the potential to further involve other tertiary providers such as Whenua-iti Outdoors and Nelson Marlborough Institute of Technology.

Risks and barriers

Some of the identified risks and barriers at this site are as follows.

Use of contentious management tools: Aerial 1080 operations have been undertaken by the Department and TB Free NZ in Golden Bay since 1994. There are parts of the community that still strongly oppose the use of 1080 poison. Increased use of this method will have to be accepted by the community and compromises may be required over operational boundaries. Some of the opposition may be reduced if the project is successful at noticeably increasing the populations of indigenous bird life.

Aerial 1080 use in areas that are highly prized by recreational hunters will be contentious. Deer repellent options could be considered but this could compromise the ability to achieve the full range of desired conservation objectives at these sites.

Community value of pigs and deer: Deer and pig control using any method (including standard hunting methods) throughout the site will produce some level of general opposition. To be successful the project may have to allow for these species to remain accessible to residents at some locations. High priority areas could be identified where total control of deer and goats is needed to achieve conservation objectives, with less intensive control elsewhere. The hunting community could also be involved in the project through taking responsibility for managing deer and goats in some places.

Multi-pest responses may be subject to compromise: Control of an entire suite of pests that exert a common pressure at a site may be essential to achieve conservation goals and the failure to do so effectively may significantly compromise those goals. For instance, the inability to control deer at some sites due to community views may negate the potential benefits of goat control.

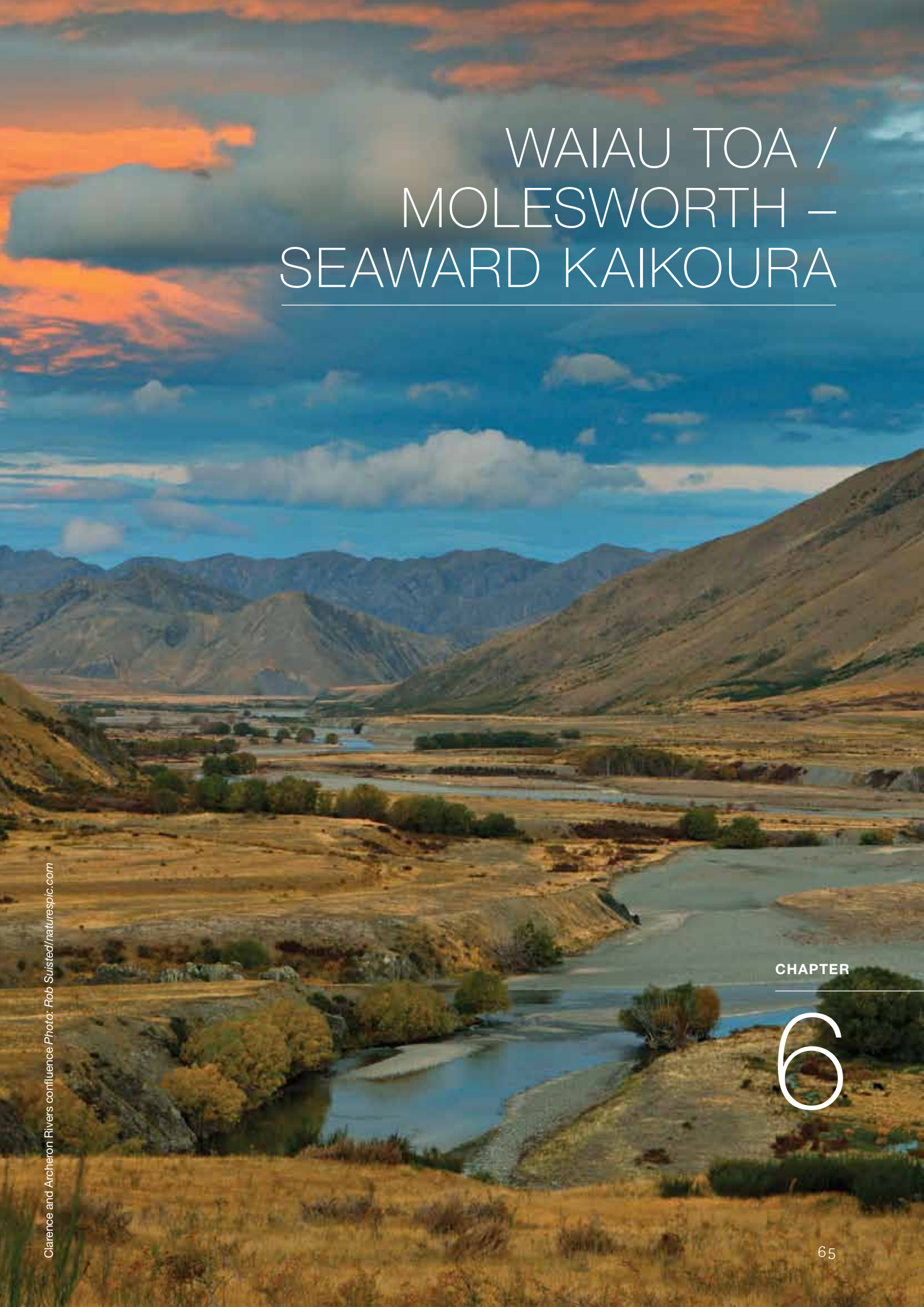
Outcome monitoring is not sufficiently robust: The delivery of robust information derived from outcome monitoring that clearly demonstrates that the project has delivered on its objectives will be an expectation, particularly by the public. Monitoring may not be established at a level that can provide such information in the required timeframe.

Support for existing local conservation groups: The continued involvement of local conservation groups (such as Friends of Flora, Friends of Cobb, Friends of Mangarakau) should be a priority as it is the foundation for ongoing community involvement. The project needs to support and enable more successful outcomes by these groups, otherwise there is the potential for disenfranchisement.

Wildlife becomes a nuisance: There is the potential for some bird species such as kereru, kea, weka and falcon to be perceived as a nuisance by parts of the community once they become more abundant. The impact of these species on infrastructure and horticulture could become significant. The possibility of increased populations will have to be accepted by the community well ahead of time and strategies put in place that mitigates the impacts (for example, help netting fruit trees and vegetable gardens). Social research to help build shared values in the community and build awareness of and involvement in the project across the community could also help.

Mt Arthur and Twins from Tableland, a popular deer hunting area *Photo: DOC*

WAIAU TOA / MOLESWORTH – SEAWARD KAIKOURA



Clarence and Archeron Rivers confluence *Photo: Rob Suisted/naturespic.com*

CHAPTER

6

Waiau toa / Molesworth – Seaward Kaikoura

Project Vision

Waiau toa is renowned as an iconic natural New Zealand landscape by:

- *Creating a coherent and functioning ecological area that spans the full range and scale of environmental gradients (sea to summit, maritime to dryland)*
- *Providing a full range of opportunities for those who wish to participate in or experience the benefits of the project*
- *Developing and augmenting management techniques for dryland restoration which can be applied elsewhere*

Introduction

From the Pacific coastline, over the towering Seaward Kaikoura Ranges, through the Clarence River and into the extensive dryland basins and ranges of Molesworth and the Inland Kaikoura Range, this part of the world is like no other. The massive tectonic uplift associated with major fault lines running off the central axis of the main divide has created a dryland environment sheltered from the west by the Southern Alps and from the east by the Seaward Kaikoura Range.

This geological history has also formed lakes and wetlands and pushed limestone and volcanic substrates to the surface. It is these contrasts which have led to the unique collection of ecosystems, plants and animals in Waiau toa. The ecosystems in this site cover the range of coastal, lowland and montane forest. There are subalpine and alpine communitie on the eastern faces of the Seaward Kaikoura Ranges and dryland shrublands, grasslands, alpine screes and bluffs in Molesworth and the Clarence catchment.

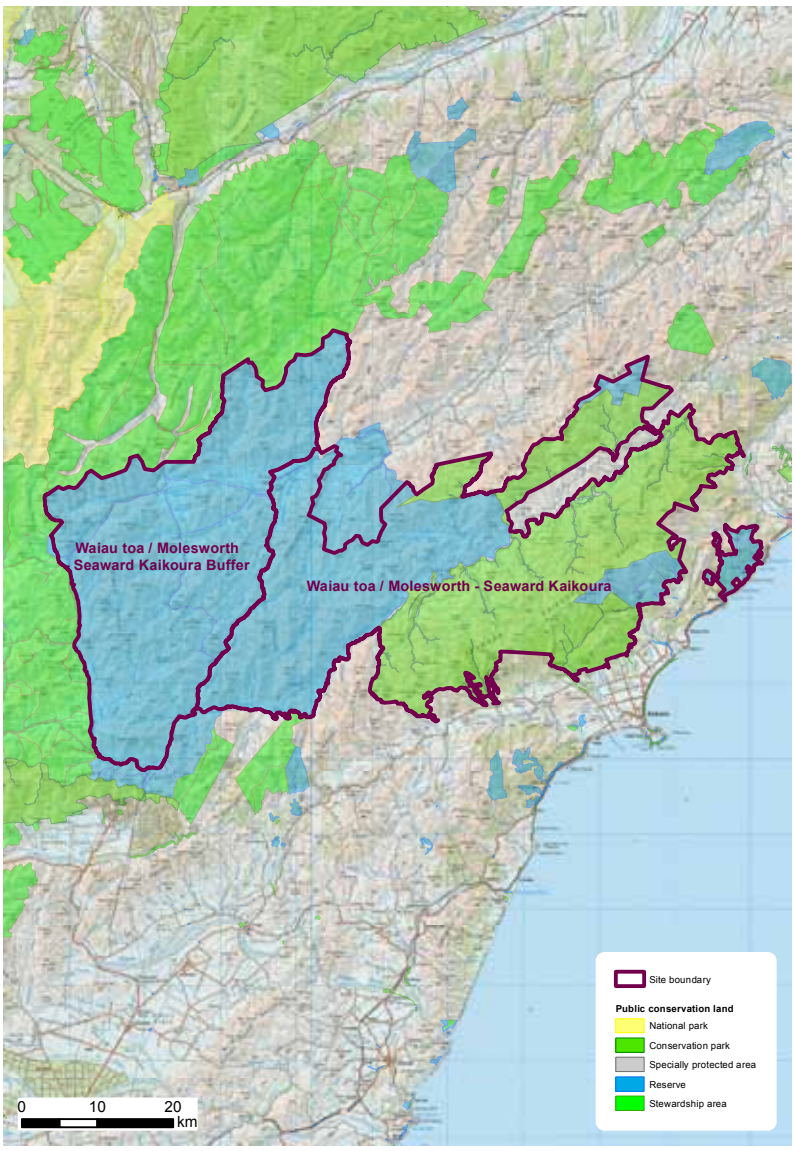
The Clarence River is the life force through the heart of this expansive landscape and is interwoven into its cultural history.

Ngati Kuri, hapu of Ngai Tahu iwi, Rangitane ki Wairau and Ngati Toa Rangatira all have an association with this area. The Clarence River catchment (known as Waiau toa to Ngai Tahu) has a whakapapa status as the parent of many other rivers in the region and figures strongly in tribal history. There are trails through the area for mahinga kai and pounamu. Topuni has been placed on Tapuae o Uenuku by Ngai Tahu. This is the metaphorical placing of a protective cloak to signify the importance of the area to Maori.

Both Maori and early European settlers used the major river valleys as routes from either coast, which has left a legacy of archaeological sites and human stories. The area also has a long pastoral history starting with grazing runs in 1857 through to present.

Molesworth Station is an iconic piece of South Island high country. The sheer scale of the terrain, from mountain tops to the intermontane basins, is recognised nationally as being a classic example of dryland back country New Zealand. This project will 'turbo boost' a landscape scale expansion of targeted weed and pest control to restore this dryland ecosystem to its former glory. Research partnerships with tertiary institutions will assist in filling current gaps in knowledge about drylands restoration.

This project also offers the opportunity to be a model for how conservation, farming and recreation can work together. It is proposed that dialogue will be opened with agriculture



Proposed Waiau toa / Molesworth – Seaward Kaikoura site with adjacent buffer area

training organisations and Landcorp Farming Ltd with the aim of developing a young farmer programme focused on Molesworth.

The Waiau toa site encompasses a large amount of public conservation land, from the Patutu Reserves on the coast and the eastern flanks of the Seaward Kaikoura Range, through the mid reaches of the Clarence River valley catchment to the Inland Kaikoura Range, and the eastern part of Molesworth Recreation Reserve. This is a continuous unit with the exception of the Patutu reserves which form a coastal outlier close to the eastern edges of Ka Whata Tu o Rakihouia Conservation Park.

The buffer area on the western side of Molesworth is proposed to strategically manage wilding pines and also incorporates some of key sites for the black-fronted tern population on the braided Clarence River.

The protection status of Waiau toa is comprised largely of Recreation Reserve (Molesworth) and Conservation Park (Ka Whata Tu o Rakihouia) but also includes areas of Scenic Reserve, Scientific Reserve, and Nature Reserve.

The proposed area forms the eastern portion of a protected indigenous belt which spans the waist of the South Island, from the West Coast to the East Coast and as such can be seen as contributing to a larger sequence of ecosystems straddling the Southern Alps. The sequence of ecosystems and their continuous protected status is unique.

Biodiversity Values

One of the most striking features of this site is the sequence, range and diversity of ecosystems which span coastal to alpine zones in a very short distance from the coastline. The rainfall pattern changes dramatically from the wet maritime climate in the east to a semi-continental dryland climate in eastern Molesworth and the Clarence Valley. This variation, in tandem with the geological and landform diversity, gives rise to the unique range of ecosystems and species and is a key reason for South Marlborough being one of New Zealand's five centres of plant endemism.

There are 23 nationally or regionally significant geopreservation sites in Waiau toa, highlighting the diversity of geology and landform within the area.

Hutton's shearwater *Photo: DOC*

Weta on Kowhai deinacrida parva *Photo: DOC*

Black-fronted tern in flight *Photo: DOC*

Priority ecosystems and species

Waiau toa contains multiple examples of rare and threatened biodiversity values:

- dryland valley floor flat and terrace environments
- a variety of wetlands, ranging from permanent to ephemeral with associated plant and animal life (alpine flushes, seeps, tarns, fault related swamps, lakes)
- 11 naturally rare ecosystems including: braided riverbeds, screes, boulderfields, limestone erosion pavements, cliffs, scarps and tors. The scree ecosystems within the proposed area are some of the most diverse and best representations in the country.
- At least 100 'nationally threatened' and 'at risk' species are present within the site, including 16 vascular plants endemic to South Marlborough. 'Nationally threatened' and 'at risk' fauna include six fish, six lizards, nine birds and 22 invertebrates.

Waiau toa is a national stronghold for indigenous broom species. Nine species of broom are present, including six which are 'nationally threatened' or 'at risk species'.

The Seaward Kaikoura Range is the only breeding site for Hutton's shearwater and is the largest seabird colony remaining on the mainland.

The black fronted tern population on the Clarence is one of the most significant in the country.

The site takes in a major portion of the dryland landscape in South Marlborough. A significant amount of dryland habitat (more than 70%) has been lost from New Zealand and dryland environments contain some of the most transformed, least protected and most threatened native ecosystems and species in the country.

Mountain totara (Podocarpus hallii) shrublands, treeland and forest are characteristic of this part of the country, though much has been depleted. There is a very high natural treeline in this part of the country (1600m) but fires have meant that woodlands have been replaced by grasslands over much of the area. It is a key site for species and ecosystem recovery and restoration.

Freshwater values

The Clarence River is one of New Zealand's wilderness rivers. It is free of dams and without the degradation of water quality and water abstraction regimes that characterise most other South island braided river systems. There are diverse freshwater habitats within its catchment, including main stem braided river sections and tight gorges, abundant tributaries, riverine wetlands and the large, high altitude landslide-induced Lake McRae. In addition to the diverse native fish community, the Clarence is a valued sports fishery for populations of brown trout and salmon. The river is popular for a range of recreational activities, including river rafting and kayaking, which are all underpinned by good water quality. The natural heritage values of the Clarence River were recognised most recently in its recommendation for a water conservation order by Environment Canterbury.

The Scenic Reserves to the east complement the freshwater environments of the mountain and dryland ecosystems further inland by encompassing freshwater habitats within regenerating coastal forests. These habitats support increased diversity and abundance of more coastal migratory galaxiids such as inanga and banded kokopu, as well as populations of shortjaw kokopu and koaro. They also have reasonable numbers of bluegill bully and torrentfish.

Key Pressures

Waiau toa includes a typical range of pressures which occur in dryland and upland parts of New Zealand. There are also lowland/coastal weeds within the coastal reserves and on the eastern flanks of the Seaward Kaikoura Range. While the long pastoral history of this area has led to the modification of the original dryland indigenous cover, a combination of management, retirement and conservation has seen recovery of some ecosystems and key elements of biodiversity.

Goats, deer and chamois are all present. Decades of goat control and commercial wild animal recovery (WARO) have resulted in reductions, but considerable additional effort is required to bring levels below ecological damage thresholds.

Both rabbits and hares are present in varying densities across the landscape, with rabbit density fluctuating due to RCD. Currently rabbits are managed in Ka Whata Tu o Rakihouia for compliance with the local Regional Pest Management Strategy and Landcorp Farming regularly manage rabbits in Molesworth for farming purposes.

Possums are also throughout, although in the drylands they are at relatively low densities compared with lowland forests. TBfree NZ has carried out a number of aerial 1080 operations around the boundary of the proposed area to manage possums, both on Conservation and adjoining land.

Cattle and sheep grazing takes place on both Molesworth Recreation Reserve and parts of Ka Whata Tu o Rakihouia Conservation Park through grazing licences, although both have stocking limits.

Pigs occur throughout and pose particular problems in the Hutton's shearwater colonies and in forest and wetland ecosystems through rooting, habitat destruction and predation. A pig trap is in place near the Hutton's shearwater colony.

There is no active management of cats, rats, mice and hedgehogs which are throughout the area and pose a threat to fauna. Rats and mice may also have a role in consuming the fruits and seeds of indigenous plant species. Stoats and ferrets also occur throughout and are only actively managed on Molesworth.

Wilding conifers are a major threat to this area. The western Molesworth buffer zone is heavily infested in places such as Tarndale and with prevailing winds this seed source poses a major threat. Control has been initiated in Western Molesworth but it is proposed to boost this effort in order to protect the values in both the core area with associated benefits in the buffer area as well.

Controlling wilding conifers, Molesworth *Photo: DOC*

Broom, rowan and willow, are a threat to this area. There are also pockets of other woody weeds that are localised and will require management, for example gorse, buddleia and hawthorn. There are many species of Hieracium in the proposed area. They are widespread in open grassland communities and monitoring suggests that they continue to expand in range and density.

Problem pests which typify other South Island ecosystems, (e.g. wasps in beech forest, lowland weeds such as Tradescantia, old man's beard), are either absent, in low densities, or are largely confined to the eastern flanks of the Seaward Kaikoura Range.

The open nature of the terrain in the drylands lends itself to aerial control of wilding pines (using the basal bark application technique) and also has advantages for aerially shooting goats and deer.

Focus for investment

Create a coherent and functioning ecological area that spans the full range and scale of environmental gradients (sea to summit, maritime to dryland)

A key objective for Waiau toa is to protect and enhance the values within this unique blend of indigenous ecosystems and species through landscape-scale pest control.

The long-term restoration of dryland ecosystems is a key focus. This will be achieved through a combination of removing browsing animals and the staged reintroduction of strategically placed 'nuclei' of indigenous woody species as seed sources so that nature can take its course over the longer term.

Site-specific management of small, rare and vulnerable ecosystems in the site is also critical. These include:

Goats in the Clarence *Photo: Jan Clayton-Greene*

- black-fronted tern populations in the Clarence catchment;
- limestone-dependent plants and ecosystems on Limestone Hill;
- the network of wetlands associated with Lake McRae;
- alluvial terraces which offer restoration opportunities;
- threatened *Wainuia* snail populations in the mid reaches of the Kowhai River; and
- Kaikoura weta populations in the Tone catchment.

There is also the potential to reintroduce threatened birds such as rock wren, blue duck and kea.

Provide opportunities to participate and learn

Farming practices and biodiversity protection have commonly been in conflict in dryland parts of New Zealand. This project has the potential to provide an opportunity to work with a key farming partner (Landcorp Farming Ltd) to showcase how farming, biodiversity and recreation can be managed in these landscapes for multiple outcomes.

This project offers the opportunity to involve and work collaboratively with a range of stakeholders, including iwi, adjoining landowners, the Kaikoura community and visitors. Weed and animal control will be integrated with other agencies and adjoining landowners. The proposed work will add significantly to knowledge already gained from the drylands research work undertaken by Landcare Research.

The Waiau toa project will contribute to New Zealanders' appreciation of the significance of dryland ecosystems and their diverse and special array of fauna and flora. It is also a chance to show that restoration can be achieved through the reintroduction of key species back into the landscape, where these have been either lost or substantially reduced in the past.

Further develop management techniques for dryland restoration which can be applied elsewhere

Dryland areas once contained indigenous woodland vegetation cover. For the most part, the key woody components such as mountain totara (*Podocarpus hallii*), kohuhu (*Pittosporum tenuifolium*), mountain toatoa (*Phyllocladus alpinus*) and akiraho (*Olearia paniculata*) have either disappeared or been reduced to small pockets of refugia which have escaped fire and the effects of herbivores.

The long-term nature of this project offers the chance to develop an adaptive management approach to dryland restoration, such as the planting of nuclei as seed sources, possibly aerial seed sowing and potential development of ideas into new techniques. Successes achieved through this project will provide an impetus for other dryland restoration projects in the South Island and provide a cost-effective long-term solution to dryland woody restoration.

Some threatened dryland species are poorly understood. An ability to increase our knowledge will lead to a further refinement of their management requirements in the future, not just within Waiau toa but in other parts of New Zealand as well.

Tools and learning opportunities

This project will implement best practice for widely-used pest control but will take an adaptive management approach at a local level to ensure success.

There is a high level of confidence in achieving biodiversity gains where there are already good tools and planning in place (e.g. wilding pine control). Basal bark application, for example, is fast and efficient and is a contemporary tool which has greatly improved the speed and cost-effectiveness of wilding conifer control. Further refinement of this technique is ongoing to manage dense stands of woody weeds in the most efficient way.

Wilding trees, Molesworth *Photo: DOC*

Effective pest control for many of the threats that face the dryland landscape can only be adequately implemented through large-scale control operations. Uncertainties exist over what thresholds of goat control are required to achieve threatened species recovery and long-term broom control at a landscape level will be a challenge.

There are a number of areas for learning how to manage dryland ecosystems. For Waiau toa, the top areas for immediate focus are:

Broom control and native woody vegetation succession:

- Investigating the optimal broom control strategies (i.e. leave it or remove it)
- Understanding the role broom plays in native woody species succession and using that knowledge to enhance native woody succession post broom-control
- Investigating the role of native woody species in carbon sequestration

Hares: develop hare control strategies for application across a landscape scale.

Pigs: develop pig control tools and strategies for significant seabird areas (Hutton's shearwater in the Kaikoura range) and for wetland protection.

Goats and deer: develop control strategies for application across a landscape scale.

Predator control in river ecosystems: understanding the interactive web of predators and pests within the braided river ecosystem to inform development of the optimal control regime to protect black-fronted terns.

Value for others – flagship opportunities

Opportunity for involvement

There will be significant opportunity to engage with iwi, community groups, volunteers, universities, scientific research institutions and the farming sector in all aspects of this project. This will be achieved in a range of ways, including: participating in learning and applying new and innovative restoration techniques; and enhanced recreation and tourism opportunities.

The project will support and maximize the ongoing conservation efforts of Kaikoura District Council, Marlborough District Council and Environment Canterbury (e.g. the Clarence River integrated catchment management project).

Molesworth muster *Photo: DOC*

Inland Kaikouras *Photo: Kerry Clapham*

Cultural significance of the area

Ngai Tahu, Rangitane ki Wairau and Ngati Toa Rangatira are key partners for this site. The Department will work with these iwi to identify opportunities to involve them in ongoing management of the area (e.g. through cultural harvest, research protocols and tourism investment). Topuni status has been placed on Tapuae o Uenuku by Ngai Tahu. This is the symbolic placing of a protective cloak to signify the importance of the area to Maori.

Trails through Waiau toa were used for mahinga kai and to reach pounamu gathering sites. Trails through Molesworth offered an easy summer route to the West Coast by way of the Upper Wairau or Awatere valleys, Tarndale and Lake Tennyson. There is potential to re-establish the old mahinga kai pathways and integrate education into this.

Increased recognition of the cultural and historical significance of Waiau toa will be one of the benefits of this project.

Model for conservation, recreation and farming working collaboratively together

Waiau toa includes two working high country stations (Molesworth and part of Muzzle) and visitors can see farming in action. Molesworth, in particular, represents an important part of New Zealand's high country farming heritage. It has long held a place in the New Zealand psyche, as attested by strong input into the recent management plan processes. Molesworth is currently farmed, under a lease, by Landcorp Farming Ltd. Some conservation land adjoining Muzzle is subject to a grazing concession.

The project area also has high value for recreationalists and offers the opportunity to help reshape the relationships that the various stakeholders of this land have. A new generation of young farmers and student leaders will be engaged to learn about integrated management enabling conservation, farming and recreation to co-exist for the benefit of all.

Rafting on the Clarence River *Photo: DOC*

Enhanced tourism experience and opportunities for economic growth

Although access to a large proportion of this area is challenging, the physical and spiritual value of the Kaikoura Ranges is significant to New Zealanders. These ranges are visible from the North Island and as far south as Christchurch. They are landmarks that set the back drop to Blenheim and Kaikoura as well as the highly regarded coastal highway and coastal pacific railway. The landscape is also appreciated by air travellers as they fly over it, particularly on the Christchurch to Nelson or Blenheim route but also other routes down the South Island.

From the 1850s, the main inland route between Nelson/Marlborough and North Canterbury ran through the heart of Molesworth and it wasn't long before a series of accommodation houses were built to shelter visitors. Today the Molesworth–Acheron road is a key route for visitors.

There is the potential to partner with the tourism industry, councils, environmental and recreation groups, and concessionaires to enhance recreation opportunities around these historic heritage and iconic landscapes.

Kaikoura District Council promotes Kaikoura as the gateway to Molesworth (via Clarence). Opportunities exist for this project to be part of a bigger east coast/ west coast trail as conservation land is virtually continuous across the South Island through Waiau toa. The development of the East-West route (with the addition of a bridge across the Clarence River and an upgrade of the route to mountain bike/horse trek standard) would provide an important physical link between the two areas. Upgrading the track will open it up to more trampers, mountain bikers and horse trekkers. It will also provide more opportunity for commercial enterprise in guided trips through the area.

Lizard trip, Molesworth *Photo: DOC*

Future-proofing through education

Dryland ecosystems are generally undervalued and poorly understood by the general public and this is perhaps one of the reasons why they remain at risk of continuing development and degradation. Redressing this understanding is a key opportunity for the project.

Waiau toa is currently under-used by education providers. While there are some secondary and tertiary providers going to Molesworth for outdoor education, these programmes usually focus on recreational aspects and not on science and conservation management.

The greatest educational outcomes for this project will be achieved through:

Tertiary institutions: There are currently significant gaps in our knowledge about dryland restoration. Funding from this proposal would be used to establish ongoing and substantial partnerships with tertiary institutions to assist with the research needed to fill these gaps, initially targeting Masters and PhD students. Canterbury University already has facilities in Kaikoura and there is the possibility of expanding and/or partnering with this programme. There are ample facilities in Hanmer to provide a base for other programmes.

High schools and young leaders: Focusing on high school students and young leaders will fill a gap in conservation education and will assist with future-proofing of the project by engaging and involving the next generation of scientists and researchers. This project will offer opportunities for local schools to participate hands-on science learning in a diverse, unique habitat on an ongoing basis. Students would be able to assist with trials and implementation of innovative restoration.

Young farmers: As noted above, this project will model how farming can remain commercially viable and still support conservation and recreation goals. A proposed young farmer programme focused on Molesworth could be developed in partnership with agriculture training organisations and Landcorp Farming Ltd.

Acheron accommodation house, Molesworth Station *Photo: Rob Suisted, naturespic.com*

Risks and barriers

Mismatch between local values/priorities and project priorities

Stakeholders with concessions or other interests in the project area, including farm management, may have values and priorities that may not always align with project objectives. Examples include:

- Hunters have an expectation there will be game animals present where they have been historically.
- The control of wilding trees on Mt Fyffe is essential to restoring scree faces such as those favored by the giant weta. There is a perception amongst some people that this will result in erosion rather than the return of a natural process.
- Concession, leases and licenses have existing commitments. The government has an expectation that farming will continue to operate in a commercially viable manner in Molesworth Recreation Reserve, in accordance with the lease Landcorp Farming Ltd holds. This will mean that day to day operations will have to be managed and planned to avoid conflict with farming operations. If limitations arise as a result of these existing legal commitments, the Department will need to work through them via an amendment or review process.

Time needs to be allocated to adequately consult and engage with the community and stakeholders to gain support and understanding for this project.

Pollinators and dispersers

There is a risk that the pollinating and dispersal agents are so reduced within the landscape that they will not effectively function in the role for reintroduced woody species. It is envisaged that the birds, invertebrates and lizards that perform these roles will have a positive response to pest control.

Access restrictions

There are physical and legal restrictions on access to the area because of private land margins, farming leases and a limited number of formed access ways. It is essential that the Department maintains and enhances its relationships with key landowners, stakeholders and pastoral lessees.

Fire

Historically the plant communities of this area would have reflected infrequent naturally occurring fires, albeit in the absence of herbivores and weeds. These communities are now so fragmented and the seed source for many keystone species so rare, that fire poses a major threat.

ARTHUR'S PASS – OTIRA

Kea in flight *Photo: onebigphoto.com*

CHAPTER

7

Arthur's Pass-Otira

Project Vision

The Pass to a New Nature

The unique sequence of ecosystems spanning the East-West divide (Ka Tiritiri o te Moana) are restored to its ancient abundance. A place of research and innovation in ecological and social engagement, where all New Zealanders re-connect with their NZ identity.

Introduction

Arthur's Pass-Otira is ecologically diverse with alpine, forest, grassland, valleys and braided river ecosystems. The site has a wide range of high biodiversity values and presents a special opportunity to connect New Zealanders to a spectacular mountain forest and alpine environment.

Investment in predator control at this site could lead to a flourishing dawn chorus and a greater abundance of species which are currently threatened.

Arthur's Pass-Otira is close to a large urban population in Christchurch and easily accessible by road and rail. This site presents a number of flagship opportunities to re-connect New Zealanders with a New Zealand identity, including up-close encounters with kea, whio and roroa (great-spotted kiwi). The presence of two universities in Christchurch offers significant collaboration potential, both around technical research and innovative education and interpretation.

The redevelopment of the Arthur's Pass Visitor Centre provides an excellent opportunity to ensure that a greater appreciation of the area and its iconic species (kea, whio, roroa and rata) can be experienced by all visitors.

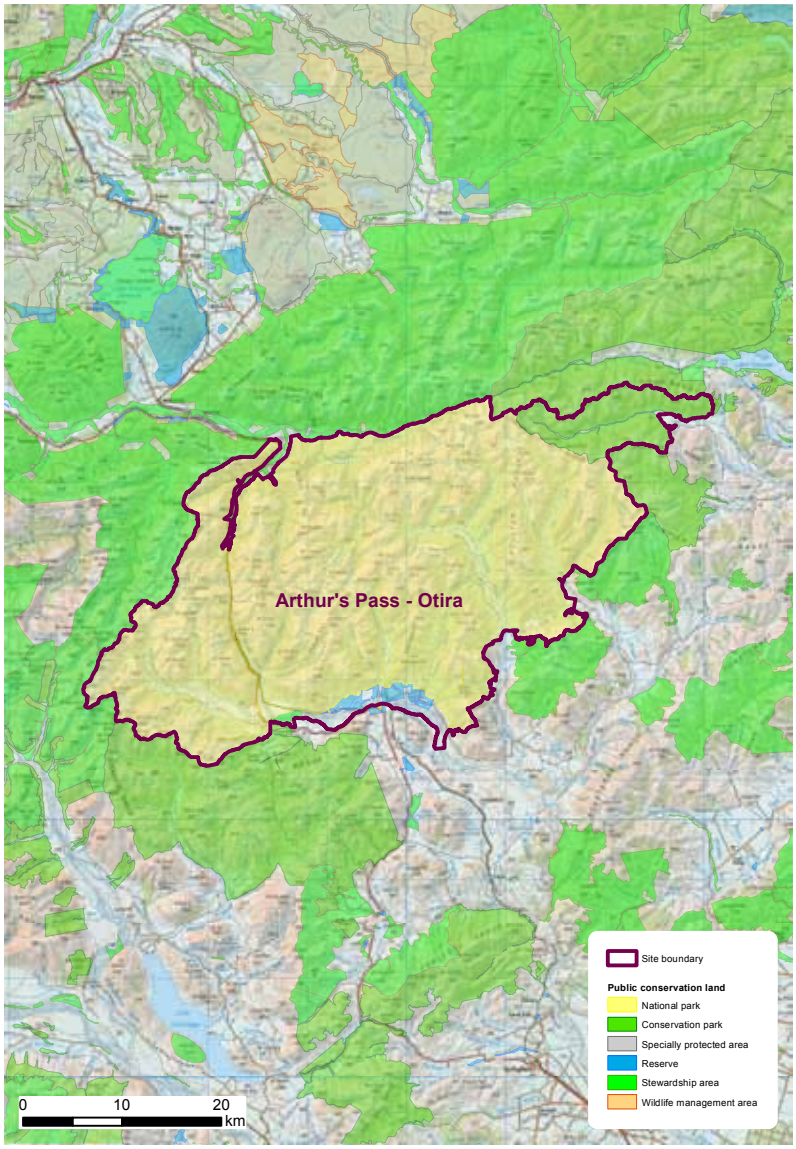
The site includes Arthur's Pass National Park, the valley of the South Branch of the Hurunui River and a braided river section of the Waimakariri River. The site area is approximately 130,483 ha (see map).

The proposed site is mostly public conservation land, except for the braided river section of the Waimakariri, which includes 'unallocated crown land' riverbed (administered by LINZ) and some private land.

Biodiversity Values

The landscape at Arthur's Pass-Otira is dominated by forested, steep-sided valleys and extensive alpine communities on the tops. Arthur's Pass National Park straddles the Southern Alps and the processes which formed this mountain chain are clearly in evidence. There are marked differences on the east and west sides of the national park. High rainfall on the western side means Hall's totara-rata-kamahi forest predominates (this is the scientifically noted 'beech gap'), while the eastern slopes are covered with beech forest.

The South Branch of the Hurunui River is a high-altitude, steep sided valley dominated by mature mixed beech forest on the valley sides, river flat grasslands and alpine shrubs and herbs on the tops. The valley floor is notable for its almost intact plant assemblage, with relatively few areas of introduced grasses and virtually no weed species.



Proposed Arthur's Pass – Otira site

The mature red, silver and mountain beech forests of the South Branch Hurunui contain the highly threatened orange-fronted kākāriki and the best remaining population of mōhua in Canterbury.

The alpine ecosystems in the site also vary from east to west. The western side is dense, with an extremely diverse species composition. The drier eastern side is dominated by tussock and alpine herbfields with snow totara. The shorter alpine snow tussock grasslands have a diverse range of associated flora species related to the snow, rock outcrops, screes, and moisture levels. These habitats contain a range of insects such as wētā and beetles, as well as alpine birds such as rockwren and the loveable kea.

The Waimakariri River is an alpine-fed braided river – this type of river is a rare and threatened ecosystem, home to unique and specialised bird species (such as black-billed gulls, black-fronted terns and banded dotterels) that are dependent on its habitat. The river itself has significant freshwater values, largely due to the absence of glacial sediment.

Eleven of the bird species present in the proposed site are threatened, including one 'Nationally Critical' (black-billed gull), five 'Nationally Endangered' (black-fronted tern, orange-fronted kākāriki, kea, rockwren, New Zealand falcon) and five' Nationally Vulnerable' species (mōhua, roroa, whio, South Island kākā and banded dotterel).

The site contains 20 plant species which are currently threatened or at risk. The site offers a range of habitats suitable for invertebrates, including alpine tarns and streams, beech forest and screes. Many of the site's invertebrates are endemic to the area. Bats have recently been confirmed in Arthur's Pass National Park and freshwater values include at least five native fish (Canterbury and alpine galaxias, longfin eel, koaro and torrent fish) as well as freshwater mussels, freshwater crayfish and many mayflies, stoneflies and beetles. Around 80 caddisfly species have been found in the area including three rare species. Current data on the distribution of lizards in the area is incomplete and further investigations would be a priority for lizard conservation management.

Key Pressures

The usual suite of pest pressures exist at this site.

Possums, stoats, weasels, ferrets, rats and mice occur throughout the site. Possum densities are higher in the western valleys (Otira and Deception Valleys) because of the presence of more palatable species. This area has been under long-term possum control since the 1960s. Aerial 1080 operations are carried out in the Poulter, Hawdon and South Branch Hurunui as part of the Department's orange-fronted kākāriki programme and intensive trapping in this area controls stoats and weasels. Aerial 1080 control to manage rats will also effectively manage possums. Ferrets are not targeted and are not numerous within the forest. Community groups contribute to trapping in a number of areas. Additional areas are proposed for trapping networks to protect orange-fronted kākāriki, roroa, whio, kea and a range of other species.

Stoats and rats pose a particular threat in beech mast years when beech trees produce copious amounts of seed, and rodent numbers explode. Rapid breeding and population explosions take place when there is an abundance of seed, followed by population crashes and mass emigrations when the food runs out. Stoats and rats are tied into the beech mast and follow this 'boom and bust' cycle. These events will be managed through aerial 1080 operations, with rat tracking rates

Stoats *Photo: DOC*

used as the trigger for control operations. Tracking tunnel monitoring and beech seed fall traps will need to be extended more widely to provide an early warning indicator to potential spikes in rat numbers.

Cyclic aerial 1080 operations for possums are envisaged every four years.

Existing methods (trapping) will be used for whio protection along the Waimakariri River, to complement the aerial predator control occurring in the adjacent forests.

While mice occur throughout the site, it is currently not possible to control mice over large areas of beech forest. This is recognised as a wider research need throughout New Zealand.

Deer, goats, chamois and pigs are also present in the site.

Exact numbers of deer are unknown but density is likely to be greater on the western side where a variety of palatable plant species occur. Chamois occur in the alpine zone. While there is currently no well proven technique to control deer in forested habitats, aerial control of deer and chamois can be effective in open areas. Currently, the control of deer and chamois is almost only through recreational hunting with a very small proportion of commercial hunting. Aerial control of deer and chamois is envisaged firstly on a two year rotation, then three years, and ultimately out to a 10 year rotation.

Pig numbers fluctuate at this site and until such time as toxins are available for use on pigs, ground hunting (using professional hunters with dogs) is the preferred method. There are occasional reports of feral goats in the park but this is uncommon.

Hares are also present and there is currently a gap in knowledge around the impact of hares in alpine habitats, in particular the impacts on different habitat types and plant recruitment in the presence of browsing. There is no useful control technique for hares and this is a key opportunity for research.

Wasps are not a key pressure at the proposed site largely due to the lack of honeydew, however they are present in the south-eastern part of the site at reasonable levels. There are few if any effective wasp control techniques available at a landscape level

Cats are present in the site but numbers are not known. With ground nesting birds throughout this area such as roroa, whio, kea, and all the braided river species, ground trapping is not an option. Other options include poisoning (PAPP), or using a cat-dog with handler working in key valleys.

A number of weeds are present to varying degrees throughout the site: Russell lupins (Bealey and Waimakariri Valleys), broom and gorse, willows (Bealey Valley and along the railway line). Wilding trees are not a significant problem in the South Branch Hurunui and Arthur's Park National Park but there are large infestations on the boundary. Limited weed control occurs through the local weedbusters group and Environment Canterbury. Broom and gorse are controlled in the national park.

Focus for investment

Landscape scale pest control

Apply aerial 1080 on a four-yearly rotation to manage key predators (possums, rats, stoats). Extend trapping networks along river margins to protect whio and braided-river bird species, working with community groups. Control deer and chamois aerially, working with commercial Wild Animal Recovery operators in the first instance. This predator control will create secure habitats for flagship species (roroa, whio, kea, orange-fronted kākāriki, rock wren, rata and mistletoe) in the wild, but close to where people can visit.

Increase mohua & roroa numbers

Mōhua can be released into the South Branch Hurunui to increase the small remaining population which was decimated in the 2000 beech mast event. Roroa will be re-introduced into the Nina Valley as part of the existing Nina Valley Restoration Trust predator control programme.

Reconnect New Zealanders to nature and Arthur's Pass-Otira

Create up-close encounter opportunities for people to see, engage with and learn about kea, whio and roroa.

Increase community collaboration and co-ordination

A community engagement co-ordinator will enable existing groups and trusts operating at the site to work together towards a shared vision, where each understand how they contribute to the restoration of this site and its education opportunities.

Design for conservation research projects

Build on existing links between DOC, Lincoln University and the national Design for Conservation research network to trial innovative engagement and interpretation techniques.

Demonstrate a difference

Use outcome monitoring to determine what management actions are needed to make a difference.

Rock wren *Photo: rockrogue.com*

Tools and learning opportunities

Most of the proposed tools are tried and tested and will ensure that site objectives are met and maintained. Standard methods exist for:

- landscape scale aerial 1080 predator control (possums, rats and stoats);
- aerial hunting for deer, goats, chamois (some ground hunting with dogs may be required);
- ecosystem targeted predator trapping in riparian zones for whio;
- weed surveillance and control; and
- species re-introductions (including mōhua and roroa).

Braided river predator control has been trialled elsewhere but there are issues around its effectiveness and further research is required.

Cats will be targeted by a specialist cat-dog and handler.

There are a number of areas for learning about how to manage these complex systems. For Arthur's Pass-Otira, the top areas for immediate focus are:

Pittosporum patulum Photo: yukifu

- Predator control in the alpine zone: There is a need to develop methodologies for controlling predators in the alpine zone with a particular focus on minimising non-target impacts (such as kea - kea bait aversion training, repellents, research into self-setting trap use in the presence of kea), the role of mice in that system, and controlling stoats without the presence of rats
- Impact of hares: Understanding the grazing impact of hares in the alpine zone, to inform management decisions.
- Roroa (great spotted kiwi): Investigating roroa survival rate with different predator control methodology and intensity, to develop the optimal control programme for protection of this species.
- Conservation and the community: Investigating the links between biodiversity conservation and the urban community – how do we mobilise the people from our cities? What are the drivers that encourage urban people to engage in conservation action? How do we measure gains made by community contributions to changes in long term behaviour?
- Human interactions with kea: Investigate how best to influence (and improve) human behaviour around native wildlife, using human-kea interactions as the case study.

Value for others – flagship opportunities

Link to 'Bridge to Nature' urban visitor centre in Christchurch

The Department's innovative 'Bridge to Nature' project to create a nature oasis and Gateway Visitor Centre in the centre of the demolished city is the perfect place to showcase the Janszoon Arthur's Pass – Otira project. The centre will act as a feeder and provide opportunities for urban New Zealander's (and international visitors) to re-connect with nature at Arthur's Pass-Otira through experiencing nature in the wild.

Open alpine zoo

A close-up, real nature experience could be provided through an 'open zoo' (no fences or cages) at Arthur's Pass village to create an emotional connection between people and native birds and animals. These ***connect*** experiences will be the launch pad from which people will desire to ***understand*** and through learning ***act*** in a way that supports healthy positive interactions with native wildlife.

Family and kea *Photo: keaconservation.co.nz*

Three examples of experiences that could be part of the open alpine zoo are:

Kea NaturePlay: develop a place in Arthur's Pass village where people can watch and experience kea behaviour. Activities and equipment will allow kea to demonstrate how clever they are, and people will learn about them and how to behave around them.

Roroa banquet: create a glade-like lawn area where roroa can come to feed on earthworms and other goodies should they so desire. Imagine a quiet place in the village where people can sit, eat their takeaway dinner and wait at dusk to hear or possibly see a kiwi moving about and feeding.

Whio observatory: construct a whio hide alongside a stream where people can watch whio on the river. There is the possibility of feeding whio at the site to encourage them to that location.

Innovative engagement

This site offers high potential as a place to trial new and innovative methods of engagement and interpretation, with a focus on technology. It is highly accessible by road and rail and close to a large urban population. There is a high number of existing visitors and enormous potential for growth. Cell phone coverage exists, enabling technology opportunities for interpretation and innovative visitor experiences.

Lincoln University and the Department are already working with the Design for Conservation tertiary research network to develop innovative approaches and technologies across all aspects of design for the betterment of conservation.

Arthur's Pass Visitor Centre re-imagined

The busy existing Visitor Centre requires an up-grade/re-build as it no longer meets current earthquake specifications. This presents an opportunity to develop a new and fresh approach and include space specifically designed to meet the community and education needs of the Janszoon Arthur's Pass-Otira project. Arthur's Pass is the Department's third busiest visitor centre and more than 1.5 million people travel through Arthur's Pass each year.

Community collaboration

Arthur's Pass and the surrounding area has a high number of active and engaged trusts and community groups already contributing to biodiversity and education within the site and just outside its boundary. With facilitation and coordination these groups could work more closely together to support and contribute to the vision for Arthur's Pass-Otira ecologically and socially. The project proposal includes a community engagement co-ordinator.

Scott's Track *Photo: Nico Nuzzaci onebigphoto.com*

Arthur's Pass Wildlife Trust is keen to grow its roroa predator control and monitoring programme and take on new biodiversity work. The Kea Conservation Trust assists in conservation of wild Kea in their natural habitat and is very active in the National Park.

Arthur's Pass village residents are currently involved in predator and weed control. There is a broad skill base in this community ranging from practical to academic. The small, but solid Arthur's Pass community are integral to the success of this vision.

Businesses are already contributing to whio predator control, including the 'Coast to Coast' race concessionaire, and funding from Genesis supports whio work.

There is huge scope to increase iwi involvement in the project area. Iwi are already closely connected to the area through historic usage of the pounamu trail and the iconic tōpuni site of Kura Tāwhiti outside the National Park but located on the Alpine highway. Strong interest exists within Ngāi Tahu to ensure their culture is part of the Alpine highway and Arthur's Pass stories.

There are opportunities to develop a regional partnership with Conservation Volunteers NZ based in Christchurch to provide volunteer opportunities within the Arthur's Pass-Otira site and undertake a range of beneficial biodiversity outcomes.

A number of other well established trusts and groups work outside the proposed boundary but within the Waimakariri Basin tackling weed control and surveillance in the buffer zone.

There is an extensive network of agencies and organisations with enormous influence and potential for growth to support the Arthur's Pass-Otira site, for example: Environment Canterbury, Selwyn District Council, Transit, Fish and Game Council, Forest and Bird, and TB Free NZ.

Ecosystem services

Farming, industry and mahinga kai downstream from this site benefit from a healthy and stable upper catchment and rivers with high water quality. A healthier ecology and high functioning catchment provides the basis for quality recreational experiences and provides potential for the site to be a natural bio-source for other sites. Drinking water for Arthur's Pass and Otira villages comes from the National Park. Local employment and new business opportunities also require healthy ecosystems for their success.

Future-proofing through education

There are a number of existing primary and secondary education providers which offer the potential to future-proof this project through education. The Arthur's Pass Outdoor Education Centre Trust manages and runs school-based education camps from its lodge in the village. Schools come from Canterbury and the West Coast, with the majority coming from Christchurch. There is the potential to develop a partnership with the Outdoor Education Centre Trust to strengthen and include outcomes from the Janszoon project into school learning programme and activities.

There are significant opportunities to increase research collaboration with universities and the tertiary sector. The University of Canterbury has a field base at Cass for students to carry out freshwater, fish and other research. Through Lincoln University and the Design for Conservation research network, there are opportunities to trial innovative interpretation, visitor experience techniques using new technologies.

The successful Kiwi Ranger educational programme is already in place at Arthur's Pass. This self guided family experiential interpretation programme provides the opportunity for families and school groups to connect with the values at a place. The values and learning objectives for the Arthur's Pass-Otira Janszoon project could be incorporated into this programme.

Risks and barriers

Some of the identified risks and barriers at this site are as follows.

Failure to mobilise urban populations: We fail to reconnect urban New Zealanders with nature and conservation and therefore they do not actively contribute to the project. Nature deficit disorder is a national and international problem and this project allows us to develop and trial methodologies to address and turn this around. The easy accessibility of the site by road and rail is of enormous benefit.

Opposition to use of aerial 1080: This will always be an issue nationally, but in the past this area has received little negative feedback compared to other sites around the country and no on-site protests for operations we have carried out. The Arthur's Pass Wildlife Trust and the Coast to Coast trapping programmes may have some resistance to the use of 1080, thinking their trapping effort is enough to control predators. With the correct information presented to them in a careful way these concerns can be minimised.

Opposition to use of aerial control of deer and chamois: This may upset some stakeholder groups (recreational hunters, hunting guides, wild animal recovery operators) but can be managed through providing alternative hunting areas and clear, accurate communication.

Community groups and trusts may not work together: There are a number of established groups and trusts operating within the proposed site and the greatest gains would be made if they were all on board and working towards a shared vision. The establishment of an engagement coordinator is critical to pulling the respective groups together and developing a shared vision where each understand how they are contributing to the bigger picture of restoring this site.

Random events: (beech masts, climate change, fire). This is a beech and tussock dominated site so site specific risks can be mitigated by using adaptive management techniques and monitoring and being flexible to respond. Climate change is a generic global issue and not unique to this site. Fire risk is not site-specific or higher than elsewhere.

PARINGA – HAAST

Ship Creek looking South *Photo: Andris Apse*

CHAPTER

8

Paringa – Haast

Project Vision

Biodiversity celebration from islets to icecaps.

With increased active management of Haast-Paringa, people living in and visiting the area will experience prolific wildlife living safely in a vibrant landscape.

Introduction

Haast-Paringa lies at the heart of an expansive wilderness in South Westland that is recognised internationally as one of the last wild places in the world. This wilderness stretches undisturbed from coastal islets to the ice-capped mountains of the Southern Alps. This site captures quintessential and ancient New Zealand.

Haast-Paringa has widely recognized outstanding natural values. It has a rich diversity of ecosystems and species and captures the region's full range of ecological and landscape diversity. It retains viable populations of a large number of threatened species and its ecosystems are relatively intact.

New Zealanders identify with this place and are immensely proud of its landscapes. 800,000 visitors from all over the world travel through the area each year. Despite its outstanding features, Haast-Paringa is currently a shadow of what it once was and what it could be, both in terms of biodiversity values and the appreciation of these values by visitors.

Haast-Paringa offers an opportunity to safeguard and celebrate New Zealand's unique biodiversity, landscape and wilderness on a large scale. The site opens an opportunity to join 'islands' of exceptional biodiversity value to form one massive, defendable and accessible ark of New Zealand biodiversity.

The Haast-Paringa site extends from the Paringa River in the north, to the Haast River in south and from the western coastline to the mountains of the Main Divide. It lies entirely within public conservation land. The owner of the one small pocket of approximately 50ha of private land within the site is likely to be receptive to pest control. The site area is 157,000 ha (see map).

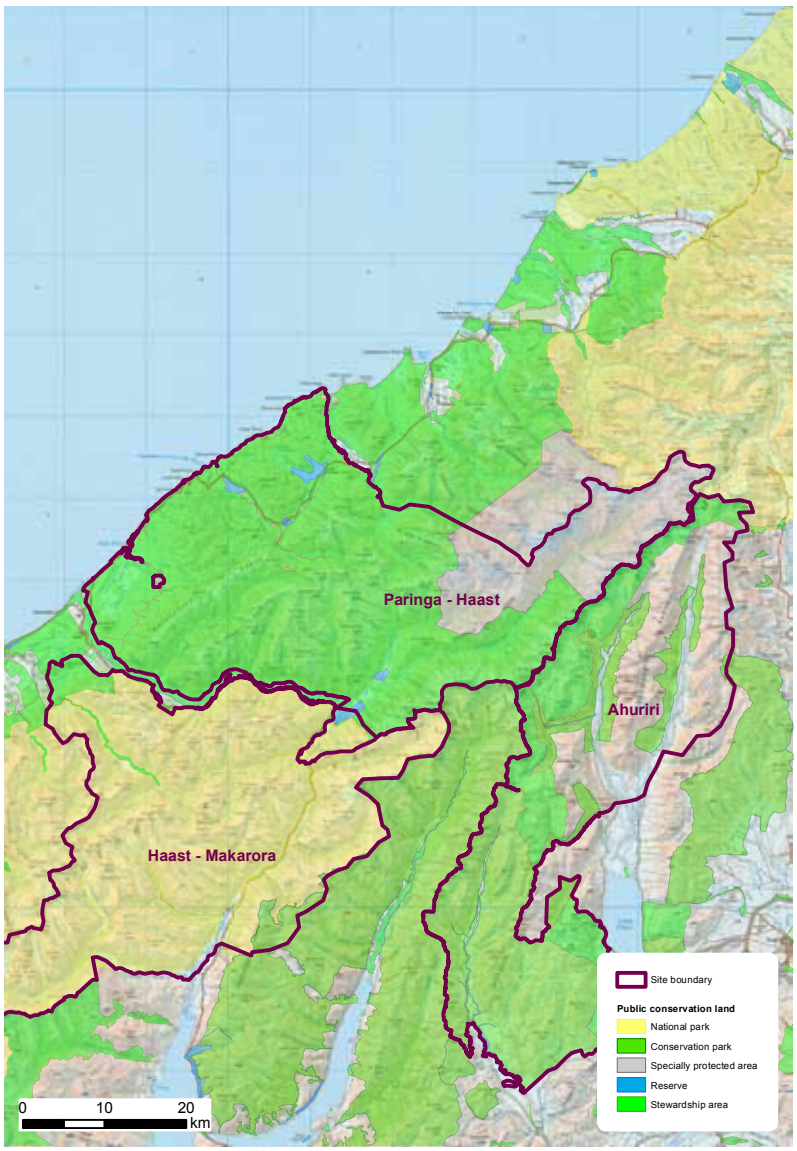
The site is 1.5 hours drive from Fox Glacier and 1 hour from Wanaka. State Highway 6 makes its way into the site from the north, passing two large glacial lakes and along the coastline, before turning east along the Haast River on the southern edge of the site. The small community of Haast (with a population of 300) is immediately adjacent to the site.

The area is remote and human impact on the environment is minimal. The key industries in the area are beef farming, tourism, fishing (based out of Jackson Bay to the south), white baiting and commercial deer recovery. The forests in this area have never been logged for timber.

Should this site be selected there is also significant potential to expand the values captured by this project through adjusting boundaries to include parts of the adjoining Ahuriri and Haast/Makarora sites, both of which build on the representativeness of values.

Biodiversity Values

Haast-Paringa has widely recognised outstanding natural values. Its key features are its rich diversity in ecosystems and species, its large scale and the resulting relative intactness.



Proposed Paringa – Haast site

It is part of the Te Wāhipounamu – South West New Zealand World Heritage Area which recognizes that the southwest of New Zealand is one of the greatest remaining natural areas in the world.

The ecosystems of Haast-Paringa are among the best remaining examples of their kind in New Zealand. They are the result of a wide range of landforms, from coastal dunes to precipitous mountains and gentle valleys, and altitudes ranging from sea level to a maximum of 2,738m at Mt Burns.

Twenty-seven different ecosystem types have been distinguished within this diverse landscape. These include a variety of coastal habitats, large and varied wetlands and glacial lakes. There are extensive forests ranging from lowland podocarp forests with and without beech, to upland beech-southern rata forests and silver beech forests, and to mountain lacebark forests near the tree line. River valleys feature grassland and scrub communities on alluvial flats, whilst at higher altitudes there is subalpine scrub, snow tussock grasslands and a variety of alpine tarns, gravel and cushion fields, and permanent snow and ice.

The large diversity of ecosystems supports a remarkably rich and representative native fauna and flora. Many species that have disappeared from most other areas in New Zealand are still present including over 33 threatened or declining species. The most notable among these are South Island long-tailed bat (only ten viable populations of this species remain nationally), kea,

rock wren, tawaki/Fiordland crested penguin (now restricted to southern New Zealand with several breeding colonies along the Haast-Paringa coast), southern short-tailed bat (in the Landsborough Valley), mohua (disappeared from nearly 85% of its former range), South Island kaka (a nationally significant stronghold for this species), and whio/blue duck. South Westland is one of New Zealand's last strongholds for scarlet and red mistletoe and *Coprosma wallii*. Pingao is still prominent on beaches in South Westland.


Scarlet mistletoe *Photo: DOC*

The biodiversity values in the Haast-Paringa are relatively intact compared to many other sites in New Zealand. This is the result of a range of factors unique to this site:

- Because of its remoteness and the rugged terrain, human impact in the area is minimal and largely restricted to the fringes.
- The dominant silver beech forests do not support rat and stoat irruptions of the scale found in red beech forests.
- Silver beech does not support large populations of honey dew producing scale insects and therefore the wasp populations of the scale found in other beech forest.
- Possums arrived in the area relatively late (in the 1960s), and control was initiated over parts of the area as soon as they were deemed to reach problem levels.

These factors have given the ecosystems in the Haast-Paringa area increased resilience and have slowed the decline of biodiversity compared to many other parts of the country. Here, natural ecosystems are still connected in a continuous, vast expanse of land. Ecological gradients are intact and ecological processes can function at a large scale. This continuity extends well beyond the boundaries of the site, as the Haast-Paringa is nestled within an even larger expanse of wilderness. Not many places remain in New Zealand where ecosystems persist at this scale. The Haast-Paringa has outstanding natural capital on which to build.

Key Pressures

Despite its current relative intactness, the biodiversity values in the Haast-Paringa are not secure. Threatened species are restricted to remnants of their former range; not any one site contains the full suite of species that could be expected. In areas that are currently not managed, values continue to decline rapidly. The pressures on native biodiversity come from a range of introduced plant and animal pests.


Tahr hunter *Photo: Peter Doonan*

These photos show the impact of high tahr densities over 13 years *Photos: DOC*

Possums, rats, stoats and mice occur throughout the area. These threaten the continued survival of a wide range of native fauna. Rats pose a threat mainly to smaller birds, lizards and invertebrates. Stoats and possums will take these smaller prey, but also impact on the nests and adults of larger animals such as whio, kea and kaka. Mice also prey on native fauna, in particular smaller birds, lizards and invertebrates.

An important pressure is the occurrence of mast seeding events and subsequent predator irruptions. Mast seeding is the periodic annual production of vast amounts of seeds. It is a strategy employed by plants to ensure that some of their seed escapes predation. Unfortunately

1080 drop *Photo: Shane Cross*

the abundance of seeds triggers an irruption in mouse and rat populations, which in turn triggers an irruption in stoat populations leading to increased predation pressure on native fauna in the spring following a mast event (as stoats prey switch to other fauna in response to the declining rodent numbers once all seed is consumed).

Possums, red deer and tahr are the key herbivores, threatening the persistence of preferred plant food species and causing a change in plant community composition. Possums heavily impact on fuchsia (which is now largely absent from valleys where possum numbers are high) and are responsible for the widespread decline of mistletoe. Red deer occur at moderate densities throughout. Their impact is mainly visible in the forest understorey, where preferred food species, such as pate and broadleaf are browsed or absent. Tahr occur mainly in the ranges above the Landsborough Valley, but are spreading into the adjacent ranges to the west. Their impact is visible in subalpine scrub and tussock grasslands, where, in some areas, tall tussocks and preferred shrub and herb species have virtually disappeared. Chamois also occur throughout the site, but only in moderate to low densities. They forage in subalpine scrub and grassland and add to the detrimental effects of tahr on these ecosystems. Hares are present in the alpine zone and on alluvial river flats. They forage on grasses and a range of shrubs and herbs, but their impacts on native biodiversity are not understood. Rabbits pose a localised threat in coastal dune systems where they browse on pingao and other native plants.

The most widespread weeds in the site are gorse and blackberry which are present in the lower reaches of the main river valleys. Other weeds are present but very localized (e.g. Tradescantia only found at the mouth of the Whakapohai) or restricted to roadsides (e.g. montbretia and fruit trees).

While many pressures on biodiversity are present, others are absent or rare. Ferrets are absent and cats very rare. Rabbits occur only localized in South Westland, rat populations are not consistently high, and land development and associated edge habitat are minimal. Introductions of pigs have been tried but failed, probably due to the wet and cold conditions in spring that result in low piglet survival. Goats occur only sporadically, mainly as farm escapees. So far, all sighted animals have been successfully killed before populations could establish. The occurrence and diversity of weeds is very limited, mainly because of the limited human impact in the area.

Focus for investment

Ecological / biodiversity management

Fundamental to achieving prolific and vibrant biodiversity in the Haast-Paringa site is effective rat, stoat and possum control. Intensive large scale pest management will create an environment where threatened and common indigenous plant and animal species are abundant.

Species which are currently only present in parts of the proposed site will spread to the whole, and locally extinct species will be reintroduced to achieve as full a complement of ecologically appropriate species as possible.

Eventually, some pest control activities will be able to be scaled back; stoat trap lines are likely to require the longest intensive input. Control via aerial 1080 will need to be maintained in perpetuity, unless other more effective pest control methods are developed.

The proposed partnership will allow management over approximately three times the area at double the intensity of current management. This will create significant efficiencies of scale with longer reinvasion and recovery periods for pest animals and larger more resilient populations of native species.

Research

We propose investing in research to increase our knowledge about the ecology of the area and to increase the effectiveness of our management. In particular, we wish to fill some of the knowledge gaps essential to achieving our vision.

To achieve this we will engage with research institutions such as Otago, Lincoln and Canterbury Universities. We also propose undertaking ecological surveys to provide data that will help us to plan and undertake effective management.

Education and partnerships

The prolific biodiversity of the Haast-Paringa will provide the ideal platform to educate, inform and inspire so that we can mainstream conservation in the local community and among visitors, inspire conservation elsewhere, attract other stakeholders and ensure the long-term success of the project.

Success will be achieved by working together with community partners. We intend to have iwi, council, community sectors, industry and farming actively involved in this project from day one and to work with them to define their aspirations for the site, and the outreach and education activities that are based upon it. This collaboration will be vital to secure long term partnerships which will sustain the project vision.

The development of opportunities to experience and interact with the site will increase the number of visitors, the quality and value of their experience and increase the length of visitors' stays (with flow-on economic benefit).

Tools and learning opportunities

Most of the tools proposed for biodiversity management are tried and tested and will ensure that objectives are met and maintained. However, an adaptive management approach will be used throughout to look for continued improvements and increase effectiveness.

The key tool to achieve effective rat, stoat and possum control will be increased aerial 1080. Gaps in the existing control operations can be filled and brought under sustained management, creating an enormous and continuous 100,655ha area under pest control. The area would be

bounded by natural re-invasion barriers on three sides (sea and major rivers). The funding will also allow increasing the frequency of control to every two years for lowland forests and coastal flats where rat numbers are relatively high.

Kea *Photo: Cielle Stephens*

Currently, intensive stoat trapping is restricted to some valley terrace forests in the Landsborough, mainly for the benefit of the local mohua population. The addition of landscape scale intensive stoat trapping in two 5000ha core areas (Windbag and Lower Landsborough) will supercharge existing bird populations in these areas (e.g. mohua, kaka) and facilitate re-introductions. Riverside stoat trapping will be added to four catchments (Moeraki, Thomas, MacFarlane and Roaring Billy) to maximise the growth and expansion of existing whio populations. Stoat trapping will be maintained throughout the growth phase, then discontinued, with reliance on aerial 1080 for ongoing maintenance of bird populations. Stoat trapping is also planned around the Fiordland penguin nesting colony at the mouth of the Moeraki River to prevent land based predation of penguin adults and chicks.

Translocations will be undertaken for at least South Island robin, mohua and Haast tokoeka kiwi using best practice and experience from earlier translocations.

Tahr are currently controlled through a combination of targeted cull and recreational and commercial hunting, but ecologically acceptable levels that maintain alpine vegetation are not always achieved. Deer are currently not controlled other than by recreational and commercial hunters. Aerial hunting for tahr will be increased to reduce the population to ecologically acceptable levels in the Landsborough, and to zero density in the adjacent ranges to the west to protect and enhance native plant communities in the alpine zone. Aerial and ground hunting of deer will be introduced to create a deer-free area in the upper Landsborough. This will re-establish the natural processes of forest regeneration in this area. Deer and hare proof enclosures will be set up on the alluvial flats in the Landsborough for the protection of the threatened plant *Coprosma walli* and the enhancement of shrubland communities.

Surveys will be undertaken to provide necessary data to plan and undertake effective management.

Currently weed control is undertaken to contain blackberry, gorse and broom in the lower Landsborough Valley. Weed control and surveillance would be increased, using aerial and ground control, to include all valleys, roadsides and the coast line.

We have identified three key gaps that pose risks to achieving the goals and objectives essential to our vision. These gaps will be addressed through targeted research:

- **Predator control in the alpine zone:** Development of methodologies for controlling predators in the alpine zone; with particular focus on protecting rock wren.
- **Mice and hares:** Understanding the impacts of mice and hares, and developing control methodologies in response to their impacts.

Value for others – flagship opportunities

The values gained by others from the Haast-Paringa site will be multi-faceted and long-lasting.

For New Zealanders the Haast-Paringa site will:

- Contribute to a stronger sense of identity by providing a place where they can re-connect with their natural heritage. This will be especially powerful as that heritage will be prolific, vibrant and set in a world class landscape.
- Safeguard this natural heritage into the future. A large expanse of high quality wilderness and secure populations of currently threatened and at risk species will be maintained.
- Provide international recognition to New Zealand for the management of the Haast-Paringa site as part of the Te Wahi Pounamu World Heritage Site.
- Successes and knowledge gained from the project will support other projects around the country and elsewhere to increase biodiversity protection nationally and globally.

For Tangata whenua the Haast-Paringa site will:

- Contribute to cultural identity by providing an increased opportunity for kaitiakitanga and a connection with the land.
- Significantly improve the security of taonga species.
- For the local community the Haast-Paringa site will:
- Boost the local economy directly by providing employment opportunities for rangers, researchers and education providers; and indirectly via additional tourism and support services.

Kaka *Photo: DOC*

Haast Pass *Photo: Andris Apse*

- Increase social cohesion through ongoing economic and social viability of the region and by providing a common focus and 'pride of place'.
- Thriving populations of indigenous wildlife will spill over into surrounding habitats.

For all visitors the Haast-Paringa site will:

- Increase the range of recreation and education opportunities and therefore increase visitors' physical well-being, knowledge and skill.
- For the Department the Haast-Paringa site will:
- Increase the strength and range of relationships with tangata whenua, residents in Haast and Paringa, local tourism businesses and the wider New Zealand tourism industry. This will benefit collaboration in other areas of our work.

Future-proofing through education

Education will be a key component of this project as we aim to establish a hub of experiential conservation learning that draws people to this part of the world and links the indentity of New Zealander's to natural and cultural values.

Create an experiential education hub

The experiential education hub will cater for all audiences and ages, and will attract more visitors who will take the learning home. It will involve a range of innovative nature-based education, recreation and hands-on management opportunities. The aim is for people to:

- Value the natural diversity of the site and the effort that goes into protecting it.
- Develop a sense of ownership of the site and its management
- Celebrate natural values as part of New Zealand identity.

The target audience includes domestic and international tourists, schools and other education providers, as well as the local community and tangata whenua. We will provide a high-value and unique experience to all target groups.

Link tourism, recreation and education on a major tourism route

Tourism and recreation are key vehicles for delivering education at this site. Annually, 800,000 visitors pass already through the area along State Highway 6. The aim is to make these visitors stop longer and to go away better informed.

We will do this through:

- Upgrading the current displays at the Haast Visitor Centre and providing interpretative panels at existing amenity areas (Lake Paringa, Knights Point, Munro Beach, Ship Creek).
- A penguin hide at Munro Beach – providing an opportunity to get close to Fiordland Crested penguins.
- Developing the Kiwi Ranger™ concept – providing family-focused conservation activities.
- A two hour interpreted walk at the Windbag end of the Haast-Paringa Cattle track – providing close up experience of natural and historic heritage.
- Making biodiversity tangible and highly visible by establishing thriving populations of wildlife throughout the site.

Pristine South Westland coast *Photo: Andris Apse*

Involve volunteers and facilitate research

The servicing of the stoat trap lines will be targeted for volunteers through the new activity of 'stomping' (combining stoat control and tramping!).

Volunteer engagement will be increased by expanding an existing relationship with Conservation Volunteers New Zealand.

Research will be encouraged and facilitated through strong relationships with Lincoln, Canterbury and Otago Universities. The focus of this will be opportunities for collaborative research to meet the needs of the project, academic research and student field trips.

Risks and barriers

Overall this is a low risk site. The biodiversity at the site is relatively intact and most management tools are tried and tested. Parts of the Haast-Paringa are already under management and illustrate at a small scale the amazing achievements that are likely to be made over the entire site.

The increased use of aerial 1080 pest control is likely to meet with some opposition from the local community and, in particular, tangata whenua and hunters. To date similar opposition has not prevented any control operations occurring. South Westland has the longest history of widespread large scale 1080 use in the country meaning the local community are more accustomed to it than in other areas. It will be necessary for the project to aim for buy-in and gain ongoing support from the community. The use of deer repellent in some areas may need to be considered.

Southern Westland is remote and has only a small local community. This can be a barrier to attracting and retaining staff and achieving increased visitor numbers and education. Similar constraints are effectively managed for the departments existing programme in South Westland. Remoteness and wilderness also make for an attractive destination and the focus will be to turn this into a feature rather than a barrier.

The local infrastructure will struggle to provide for the required office and living accommodation to support a project of this size. Similar constraints are effectively managed for the departments existing programme in South Westland, Arrangements such as running the project from Fox or Wanaka, or building/hiring structures could be considered.

Other risks and opportunities that are worth noting:

- Most of the land in the Haast-Paringa site is currently stewardship land. This could be seen as a risk, as stewardship land is often perceived as being of lower value and less well protected (although legally, this is not the case). The profile that this project would provide for the area may present a good opportunity to change the conservation status and give its outstanding values better recognition.
- The proposed reduction of red deer, tahr and chamois in the area is likely to meet with opposition from the local community and hunting interests. The project, therefore, needs to establish partnerships with these groups and endeavour to reach agreements for management and make hunting interests part of the solution.

Appendix 1

Summary of estimated project costs for eight sites

Initial estimate of project costs over 20 years ($000 gst excl)

	Waipoua	Great Barrier	Pureora	Taranaki	Kahurangi	Molesworth	Arthurs Pass / Otira	Paringa / Haast
Management costs	9,000		3,400	3,800	2,300	5,000	2,700	9,100
Pest control	20,800		17,000	20,200	32,300	10,500	8,800	16,400
Weed control	3,200		2,100	400	7,300	8,400	300	1,500
Reintroductions	800		9,200	11,800	2,400	12,200	1,500	1,600
Community engagement	600		2,100	4,600	2,400	1,200	500	300
Research	1,000		1,500	1,300	1,500	1,300	1,500	1,100
Outcome Monitoring	5,100		5,100	6,100	7,000	5,600	2,100	4,300
Total investment (20 yrs)	40,500	46,000	40,400	48,200	55,200	44,200	17,400	34,300
Ave Annual Investment	2,025	2,300	2,020	2,410	2,760	2,210	870	1,715
Hectares	31,000	28,500	80,000	35,000	200,000	162,000	130,000	154,000
Dollars per hectare over 20 years	1,310	1,610	510	1,380	280	270	130	220

Financial notes:

1. These financials have been produced using a consistent framework.
2. Figures for each site have been developed independently and therefore there is likely to be some variability in per unit costs as a result.
3. As requested, we extracted all project costs out to a 20 year term when projects were proposed to vary from 10 years (Waipoua Forest) to 20 years. This will make it difficult to compare back to the original cost data for site proposals of less than 20 years. The actual term will be best shaped through detailed site planning for selected projects.
4. As requested, project proposals have to date not involved community or iwi consultation. This is likely to further shape the scope of projects and subsequently the costs.
5. The unknowns for Great Barrier Island precluded the more detailed cost data compiled for other sites. We have therefore just shown the estimated quantum.

Appendix 2: Summary of four sites not shortlisted

Ahuriri

Project vision

New Zealanders recognise the Ahuriri as more than just an iconic landscape and work with us to realise its potential

"We're going to paint the valley red with mistletoe"

Introduction

Home of the nationally critical kaki / black stilt, this site encompasses the Ahuriri and Hopkins and Dobson valleys, which lie to the west of the Mackenzie Basin and run north to the Main Divide and Aoraki / Mt Cook National Park. The valleys and the mountain ranges that separate them offer one of the most recognised and iconic landscapes in New Zealand.

The valley systems with their braided rivers (essential habitat for the kaki), wetlands, beech forest and alpine ecosystems are a perfect reflection of the dynamic land forming processes and human history that makes up the eastern South Island high country. There is an opportunity to include these values into a Haast Paringa supersite to make this the largest high value conservation project in New Zealand.

Proposed Ahuriri site

Site size: 119,025ha, most of which is public conservation land. Some of the area is crown pastoral lease land which is undergoing tenure review. It is anticipated that this land will become public conservation land following the resolution of the tenure review process.

Biodiversity Values

- Excellent representation of high country environments
- Diversity of habitats and species - braided rivers, distinct eastern South Island beech forest through to extensive subalpine shrublands, tussock grasslands
- Best valley floor wetlands in the eastern South Island
- Best area of scarlet mistletoe in the country
- At least 38 threatened species and 10 naturally rare ecosystems

Ahuriri Valley *Photo: Stephen Jaquiery*

Key Pressures

- Cats, ferrets and stoats are the main threat to vulnerable valley floor species
- Possums arrived late, but are a significant threat to threatened plant species
- Rodents are a significant threat due to beech mast driven plagues
- Tahr have high impact on alpine and montane vegetation, some control takes place under the Tahr Management Plan
- Weeds pose a risk to wetland and grassland systems, currently under management

Focus for investment

Management of pest threats to secure functioning examples of nationally important ecosystems.

Secure and grow populations of some of our most threatened plants and animals in these systems and improve viability of small populations of many others.

Focus on growing public appreciation and partnership in achieving the conservation benefits we seek will be a cornerstone of outcomes for the site.

Tools and learning opportunities

Tools

- Standard weed pest control, including aerial and ground toxins and trapping for stoat and rat control in forests, and trapping, toxins and predator dogs for riverbed systems
- Baseline social science surveys of visitor use and economic benefits of recreation and tourism
- Established protocols and procedures for release and monitoring of species

Learning opportunities

- Predator control in river ecosystems; and cat and ferret monitoring tools
- Mistletoe and *Pittosporum patulum* recruitment – relationship between avian pollinators, predator numbers, and plant recruitment
- Hare and mice impact and control mechanisms

Value for others – flagship opportunities

There is strong community ownership to build on with four existing conservation groups and increasing opportunity for business and community participation.

The site is a visitor hot spot – 250,000 vehicles currently pass through each year. Studies show a steady growth in visitors and ecotourism is already developing new opportunities in the area. The Alps to Ocean cycle trail has attracted an extra 6,000 visitors.

The waterways ecosystems within the site provide a linking point for iwi, industry, hydro generation, farming, tourism and the local community.

Future-proofing through education

There are already strong connections with three universities and potential for student research to focus on tools and knowledge gaps.

Ahuriri is already a key destination for a range of outdoor education and leadership training which can be built on and extended.

There are facilities in place for school and leadership camps and site specific curriculum aligned education packages.

There is potential to link into existing Ministry of Education funded LEOTC (learning outside the classroom) programme at Aoraki/Mt Cook National Park which borders the site.

Risks and barriers

- Contentious management tools (aerial 1080) and public opinion
- By-kill and by-catch of kea and falcon
- Issues with vehicle access and adjoining landowner permission
- Failure of anticipated tenure review land negotiations
- Iwi and community buy-in

Haast – Makarora

Project vision

To be the world's finest wilderness journey - following in the footsteps of our ancestors whose names dot the land – Haast was looking for gold, Cameron for farming land, and Maori were seeking a place of learning and transporting taonga.

Introduction

The Haast - Makarora site has a wonderful range of flora and fauna, reflecting the range of climate, altitude, and diversity of soils and landforms found in the Mt Aspiring National Park. Its significant landform processes make it dynamic and ever changing. It also has national park and UNESCO World Heritage status, which reflects its highly significant natural, cultural and ecological values.

The site lends itself to the mainland island concept – with the combined efforts of community, business and iwi partners helping to create a wilderness sanctuary that has worldwide appeal. The site would be an outstanding addition, in full or in part, to the adjoining Paringa – Haast site.

Site size: 132,000ha all on public conservation land.

Proposed Haast – Makarora site

Biodiversity Values

- Diversity of ecosystems – alpine, forests, grasslands, valleys and braided river
- Range of habitats – dry east to wet west
- Beech forest is the predominant vegetation
- Large braided river valleys with grassland and scrub communities
- Supports 59 bird species (13 threatened)
- Supports 600 plant species (16 threatened)

Key Pressures

- Introduced browsing animals such as tahr, deer, chamois, possums, rabbits and hares
- Predators such as mustelids (mostly stoats), hedgehogs and rodents (rats and mice)

Upper Wilkin valley *Photo: DOC*

Focus for investment

- Increase the scale and intensity of pest and predator control
- Reintroduce locally extinct species (e.g. kiwi, weka, robin)
- Ecological research to develop effective management practices
- Create a nature based education hub at Makarora

Tools and learning opportunities

Tools

- Wide scale landscape aerial pest control (1080) – rat and/or possum triggered)
- Biodiversity hot spot focus – intense predator control and species management
- Tahr control (using 'Judas' goats)
- Develop control methods for deer and chamois with hunter groups
- Trap lines – new and extensions of existing to protect species (rock wrens) and support re-introductions (mohua, tokoeka, weka)
- Species translocations

Learning opportunities

- Predator control in the alpine zone, with particular focus on protecting rock wren
- Understanding the impacts of mice and hares and developing control methods

Value for others – flagship opportunities

The project will be the key linkage for developing the community and the industries that have a stake in it.

Ecosystem services will be enhanced as a result of the project, including reduction of nutrient flow into the water supply.

Sited on a major tourism route with increased quality of visitor experience throughout the region the project has potential to reach thousands of people and in return create local economic and community growth.

Future-proofing through education

Development of a nature based education hub will include partnership with iwi and attract primary through to tertiary and corporate participation.

There is potential to build on links with international education and corporate partners.

We propose developing family based education resources to increase the involvement of visitors in the project and help them develop transferable conservation skills.

A variety of channels, touch points and LEARNZ modules will complement education on site.

Risks and barriers

- Recreational hunter / community tension - deer, chamois, tahr control
- Lack of effective control for mice and hare
- Possible opposition to increased aerial 1080 operations
- Self-sustaining model requires ongoing partner buy-in and involvement

Murchison Mountains

Project vision

The Murchison Mountains is a fortress naturally protected from invaders on three sides where highly sensitive wildlife and plants flourish; the national stronghold for flightless birds, an iconic conservation site attracting and inspiring both New Zealanders and visitors from all over the world.

Introduction

Home to the only population of takahē in the world, the Murchison Mountains forms a peninsula on the western side of Lake Te Anau in effect offering a naturally protected fortress. These mountains are located in the centre of Te Wāhipounamu, the South West New Zealand World Heritage Area and Fiordland National Park. The proposed site encompasses the whole of the Takahē Specially Protected Area which lies directly across the lake from the tourist hub of Te Anau.

The Murchison Mountains is unique in New Zealand as since its exploration and mapping, almost all human activities have been limited to wildlife management and protection.

With access by permit only, this site presents an exceptional opportunity to engage communities directly in the site, managed to a level that the site can sustain.

Proposed Murchison Mountains site

Site size: 50,000ha all on public conservation land.

Biodiversity values

- Lakeshore to mountain top – the site encompasses 23 ecosystems
- Home to the only wild population of takahē
- The alpine herbfields are one of the best representations of this habitat in New Zealand due to sustained deer control
- The site contains ten 'nationally threatened' species
- Whio recovery is occurring at site is part of a national recovery programme for this species
- At least eight 'at risk' endemic species are known to be present
- A number of threatened plant endemics associated with limestone are present

Lake Eyles, Murchison Mountains *Photo: James T Reardon*

Key pressures

- Stoats and possums are both key threats to the forest and alpine areas. Rats (in alpine areas) and mice (in forest areas) also have significant impacts.
- Deer are another key threat in the alpine, shrubland and forest ecosystem.
- Other animal pests present include weasels, chamois and hare. These threats along with potential future invaders that are known to exist in other areas of Fiordland National Park including cats, pigs, ferrets and hedgehogs would need to be managed as part of the biosecurity plan for the peninsula.
- Trout are present in alpine lakes, however once removed they would not re-colonise
- Didymo is spreading into fresh water habitats and requires biosecurity measures to prevent its spread.

Focus for investment

- Pest management and monitoring to produce and maintain national strongholds for sixteen nationally threatened species. Key animal threats; stoats, deer, possums, rats and mice will be suppressed to near zero densities.
- Recovery of existing species and the re-introduction of species highly vulnerable to predation by introduced predators.
- Restoration of alpine lakes
- Development of service tracks to create additional recreational opportunities

Tools and learning opportunities

Tools

- Predator control, some at other sites (possums, rats, stoats, deer)
- Species management and translocations
- Adaptive management and research track record
- Infrastructure – 300km service tracks, 20 small huts

Learning opportunities

- Suppression to near zero density of possums, rats and stoats to enable successful translocations of tieke and snipe
- Mice impacts in the alpine system and potential control methodologies
- Suppression of deer at a landscape level to a level that enables forest understory to re-establish
- Understanding the impacts of trout in alpine lakes and eradicating them if appropriate

Value for others – flagship opportunities

International recognition for leading edge conservation will spark further research partnerships for transferable knowledge and skills

The project will become a leading site for ecotourism and 'voluntourism', creating benefits for iwi and community (economic, employment, cultural and social cohesion)

The project will contribute to further development of Fiordland as a conservation tourism destination and produce flow-on benefits for regional tourism, and the wider community

The project offers a unique opportunity for science and research partners such as Crown Research Intitutes and Universities to engage with applied conservation over a meaningful timescale and an ecologically robust spatial extent.

The community and New Zealand will benefit from increased recreation opportunities developed within the access permitting system and through the development of access opportunities, concessions, institutional relationships and access infrastructure.

Future-proofing through education

We propose developing the Murchison Mountains into a flagship 'Centre for Education Excellence' which combines research, school and adult interactive education tools and acts as a model for others.

Building on the success of 'Kids Restore the Kepler' we propose an education approach that is about integrating opportunities for involvement in, and learning from, what is happening in the Murchison Mountains into the curriculum as a context for daily learning.

The lifelong learning approach we propose will support progression across the generations. The project will develop valuable knowledge, values and skills throughout the community which will provide a catalyst for interest and involvement in other conservation projects.

We propose developing a symbiotic approach that integrates recreation, biodiversity and education programs, where the community has a voice in the direction of the project.

Risks and barriers

- Lack of known tools to suppress predators to near zero densities at the scale proposed (however even reducing pests to a lesser degree will create a high value site).
- An adaptive management approach will be integral to maximising the success of the multi pest suppression programme. Scientific and technical experts should be imbedded in the management team.
- The challenging access conditions (boat, helicopter) and changing tourist markets pose the main barriers to success for education and tourism benefits.
- Specially Protected Area status which requires entry by permit only for non-management activities is a constraint. However, it also presents an opportunity for tailored community and education engagement.

Waikaia – Kopuwai – Remarkables

Project vision

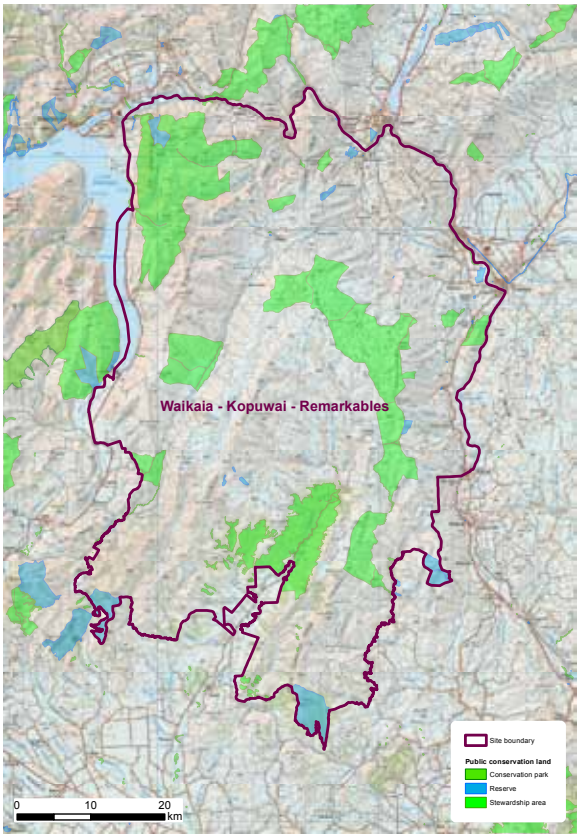
From arid downland to alpine tundra: upping conservation achievement in the big interior of southern Te Wai Pounamu

Introduction

This is an ecologically-distinct part of Aotearoa that spans the desert-like lowlands to the arctic-like alpine tops of Otago – Southland's block mountains.

The project aims to accelerate the healing of dryland, upland and non-forest ecosystems with community involvement, and explore new approaches to accepting and incorporating exotic plants in rebuilding dryland landscapes.

Site size: 92,000ha consisting of public conservation land, high country pastoral lease and conservation covenant area.



Proposed Waikaia – Kopuwai – Remarkables site

Biodiversity Values

- The site spans driest rain-shadow in New Zealand to coldest alpine tundra
- It contains 29 different ecosystems
- Impressive plant richness - over one-third of New Zealand's flora
- Woody communities include forest (Waikaia largest and most diverse, best examples of totara –celery pine remnant), shrublands and shrub tussockland
- Abundant arid lowland to mountain top wetlands - most extensive and diverse alpine wetlands in New Zealand
- Includes Central Otago and Northern Southland endemic plants

Key Pressures

Pressures have arisen from the gross transformation of vegetation in the last 700 years – much of the structurally-dominant trees, shrubs, and lianes are gone or relict - and introduced pest animals and weeds have compromised ecosystem integrity and its potential rebuilding.

Cirque basin lakes, Garvie Mountains *Photo: DOC*

Focus for investment

Rebuilding key dryland and upland ecosystems to create richer gene pools for returning the late-successional shrubs and trees to completely cleared catchments. This includes developing science models to predict successional change timeframes with and without enhanced gene pools.

Build a best practice model for heritage management, over this extensive area that others will find exciting. Greater community engagement will be at the core of the model, and the model will include education opportunities for the community.

Development of all-season recreational opportunities.

Tools and learning opportunities

Tools

- Landscape scale pest animal control using relevant best practice (aerial and ground)

Learning opportunities

- Facilitation of native forest regeneration through broom, sweet briar, and thyme
- Hare control at landscape scales
- Predator-prey relationships for invertebrates and predator sensitive species

Value for others – flagship opportunities

The proposed project will become a focus point for collaboration between Ngai Tahu, farmers, local authorities, recreation users and conservation science communities.

Principles of the Ngai Tahu Deed of Recognition will be better respected as a result of the project.

Economic opportunities will be developed for local and adjoining communities through engagement in historic and biodiversity heritage.

Future-proofing through education

Project site will develop educational engagement with schools, iwi, research partners, concessionaires, gold miners and recreational users.

The extensive history (both māori and pakeha) for this site combined with its unusual ecosystem will create unique educational packages that appeal to many new audiences.

Risks and barriers

- Tenure review of key sites – 'Broom block' agreement with Glenroy Station for the management of broom
- Hunter conflict
- Uncertainty that appropriate tools can be developed
- Incomplete understanding of community values and benefits
- Fire does not present an overall risk since the site is so large