TAWHARANUI REGIONAL PARK OPEN SANCTUARY VISITOR SURVEY:

A study of visitor characteristics, their knowledge of and attitudes towards the proposed open sanctuary

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WENDELL HUMARIRE COOKE

01223674

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ABSTRACT

The loss of biodiversity has been described as the most pervasive environmental threat facing New Zealand today. The significant historical losses of native flora and fauna, and ongoing losses which continue to occur, are being addressed through ecological restoration efforts carried out on offshore islands, and on the mainland ('mainland islands' or 'open sanctuaries'). Such restoration projects aim to restore native habitat and populations of indigenous species through targeting the biggest threat to our native species' survival: introduced pests such as possums, rats, mustelids and others.

For conservation efforts such as mainland islands to succeed in the long term, having community understanding and support is invaluable. It is becoming more and more recognised that these 'social' aspects to conservation are as important as their biological counterparts. Research in this area is known as Human Dimensions Research, which is designed to not only educate and inform, but also to allow stakeholders and resource managers the opportunity for dialogue and understanding. The Tawharanui Open Sanctuary Visitor Survey was research designed on this basis, to ascertain what visitors to the park knew about the proposed open sanctuary at Tawharanui, and to gauge their level of understanding and attitude towards it. In addition, relative levels of support for the pest control methods proposed were investigated.

The survey method involved 302 structured face-to-face interviews carried out over a six-week period. The results showed that only a small percentage of visitors to Tawharanui knew about the plans for the open sanctuary, but that a vast majority supported the proposal. A number of useful trends were identified, such as the result that although people supported the proposed open sanctuary at Tawharanui, their support appeared to be reliant upon the continued open access to Tawharanui and freedom for recreational activities. Secondly, visitors to Tawharanui appeared to be relatively uninformed about conservation issues, thus the need for education about and advocacy for conservation, in particular the open sanctuary, was recognised.

In addition, people's concerns about aspects of the proposal were also highlighted. These included a fear by some that the open sanctuary would attract greater numbers of visitors to the park, which might negatively impact upon the scenic nature and feeling of remoteness that many visitors go to Tawharanui to enjoy. A further concern identified was the strong aversion in a large segment of the population towards aerial drops as a means of pest control. This result also signifies the need for a greater focus on educating the public about conservation, and the methods employed for reaching those objectives.

Plate 1. The researcher standing with Rob the Park Ranger, at Anchor Bay carpark.

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CHAPTER ONE

INTRODUCTION

Biological diversity (biodiversity) refers to the general health of an ecosystem in terms of its richness genetically, by the number of different species present, and ecological systems or processes contained therein (Taylor & Smith, 1997). New Zealand's biodiversity is significant because it has evolved over millions of years separated from the rest of the world, and largely in the absence of humans and other animal predators. Since the arrival of humans in New Zealand however, first with the Maori and then Europeans, the last one thousand years have witnessed catastrophic losses of native plants and animals (Taylor & Smith, 1997; Hackwell & Bertram, 1999; Tong & Cox, 2000).

To help prevent further losses of native plants and animals, and also to restore ecosystems as much as possible to their pre-human influenced state, 'mainland islands' were introduced as a conservation method. This concept developed from successful conservation efforts on offshore islands, where the focus was on freeing those islands of introduced predators, and creating safe havens for endangered wildlife. Examples include Kapiti Island and Little Barrier Island, where Kiwi, Tuatara, Kokako and other vulnerable native species are regaining numbers because of the absence of predators (Hackwell & Bertram, 1999).

In the mid to late 1990s the concept of mainland islands began to be implemented more widely in New Zealand; initially with six Department of Conservation run projects, and also increasingly, by private organisations and concerned individuals. Some of these projects involved the construction of elaborate and expensive 'predator proof' fences, which effectively sealed off an area from the outside and prevented the re-invasion of animal pests once they had been removed (Campbell-Hunt, 2002). Mainland islands were also possible without fences, and could instead rely upon extensive trapping and poisoning programmes, designed to control and keep pest numbers low rather than completely eradicate them from an area (Robinson, 2002).

One important aspect of conservation management that has received belated attention, is the importance of social factors that can advance or hinder conservation programmes. Investigation of these social factors has become known as "Human Dimensions Research" (Ewert, 1996; Decker & Goff, 1987). Today greater numbers of people are taking an interest in environmental matters, whether they relate to economic growth, species conservation or an interest that stems from an ethics point of view. For this reason resource managers need to consider the opinions and attitudes of the public, and in particular affected stakeholders, in their decision making. While it is not necessary to base decisions solely on the results of such research, information gained in this way can at least promote dialogue and understanding, and perhaps help avoid potential conflict and delays to a project (Towns, Daugherty, & Atkinson, 1990).

The Tawharanui Open Sanctuary Visitor Survey is research that proceeded on the basis of the importance of social aspects to conservation. A mainland island, known in this case as an 'open sanctuary', is currently being planned for Tawharanui Regional Park, managed by the Auckland Regional Council (ARC). This project will see the park, situated on a peninsula (see Appendix H), cut off from the mainland by a two-metre high, 2.6 kilometre long fence. Extensive pest control programmes involving bait stations, hunting, aerial drops and trapping will take place, followed by widespread replanting of native trees, and the eventual introduction of endangered native animal species (Ritchie, 2000). While a large amount of planning and fundraising for this project has already taken place (as well as consultation with local iwi and neighboring landowners), no such work has previously been undertaken to gauge actual park users' attitudes and understanding of the project.

The visitor survey reported in this thesis highlights visitor knowledge of and attitudes towards the open sanctuary and predator fence. It also explores people's attitudes towards pests and pest control methods. The survey was also useful to highlight who uses the park, what they do there and their reasons for coming. An added benefit of the survey was that it was educational for the park users interviewed. In addition, the research presented in this thesis demonstrates the ARC's commitment to incorporating the views of park users in decision making concerning management of natural resources.

In terms of previous research, park visitor surveys are carried out annually by the ARC, however these only occur over the busy summer months, and generally focus on issues surrounding visitor satisfaction, and the kinds of activities undertaken by visitors (Auckland Regional Authority, 1988; ARC, 2000; ARC 2001/2002b). This previous research has provided opportunities to compare demographic information with the research presented in this thesis.

Further research, completed by Fraser (2001) examined the New Zealand public's knowledge of and attitudes towards introduced animals. Fraser's research found that for some people, New Zealand was approaching a time when certain introduced animals could be considered part of the native fauna. This research was also useful in highlighting people's attitudes towards different methods of pest control, and how the acceptability of these methods varied for different pests. For example, the larger the physical size of the pest animals, the less acceptable it was seen to be to use poisons for number control. Fraser's research provides some information pertaining to pest control methods, which can be compared with the current study.

The Tawharanui Open Sanctuary Visitor Survey sets out to describe the public's knowledge and attitudes regarding the sanctuary proposal. In coming years the survey should be replicated to gauge changing attitudes and characteristics of visitors over time. In this way Human Dimensions Research can assist the ARC combine their roles of promoting conservation at the same time as continuing to provide recreational opportunities for people.

This thesis consists of six chapters. Chapter two focuses on environmental legislation, government agencies with environmental mandates, and the most pressing environmental issue facing New Zealand, loss of native biodiversity. Chapter two also introduces the historical reasons for the decline in biodiversity, and the methods being used to help restore ecosystems. The importance of the social aspects to conservation known as Human Dimensions Research are discussed, as well as research relevant to the current study. Finally the ARC parks network is introduced, including a description of the proposed open

sanctuary project at Tawharanui, and the need for the Tawharanui Open Sanctuary Visitor Survey.

Chapter three introduces the methodology employed in this research, beginning with the main research objectives. The advantages and disadvantages of the survey method are discussed, as well as the pre-tests that were undertaken, and the sampling frame for this research. Also mentioned are the techniques used in analysing the results from the interviews, the ethical issues, and finally the limitations of this research are considered.

Chapter four summarises the results from the interviews using the format in which the research objectives appeared in chapter three. This chapter provides frequency responses, percentages, and cross tabulations of socio-demographic variables with visitor responses. Where there are apparent relationships between variables, chi-squared tests of association are run to test for statistical significance.

Chapter five then discusses the results in the same format as in chapter four, providing greater insight into the results obtained, and comparing results where possible with results from ARC research and Fraser (2001). This chapter also discusses the qualitative results and trends that appeared while collecting the data.

Chapter six summarises the important points arising from this research, and provides recommendations for the ARC and the Tawharanui Open Sanctuary Society Incorporated based on these results. Finally the limitations of this research are discussed, together with ideas for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

> *People have acquired, often for the first time in history, both an idea of their relative poverty and a desire to emerge from it and improve the quality of their lives. As people advance materially, and eat and live better, what were once luxuries tend to be regarded as necessities. The net result is that the demand for food, raw materials, and power increases to an even greater degree than the population. As demand increases, a greater and greater strain is put on the finite area of the world's land to produce the products needed*
> (Garbouchec, 1986, p. 53).

The continual decline in the state of the Earth's environment is matched by humans' desires for accumulation of material wealth and rise in standards of living. Ross McDonald (1999) uses the allegory of a spaceship and its passengers to depict humans' relationship with the Earth. In the spaceship, a leader is bent on achieving 'progress,' and scuttles the farthest areas of the spacecraft for resources to use in the foremost quadrant. His actions condemn first the third quadrant and then the second quadrant's passengers to a resource deprived death. Eventually the life supporting capacities of the ship are depleted to the extent that none can survive save the leader (Monin, Monin & Walker, 1999). The metaphor highlights, among other things, the ultimate futility of mining a set of limited resources necessary for the survival of all passengers.

On Earth, the situation is not altogether dissimilar. As a result largely of human actions we are faced with ever increasing erosion of fertile soils, and biodiversity losses are occurring more and more frequently with the wholesale destruction of forests worldwide. The Earth's ozone layer is being depleted through greenhouse gases produced by burning fossil fuels,

and our oceans are being plundered of their animal life and polluted with human waste (Sitarz, 1994). It is now an undeniable fact that the environment, of which humans are a part and on which they depend wholly for their continued existence, is being negatively affected by their actions (Beston, 2002). Compounded by this is the fact that little is known about the long-term consequences for the Earth, and humans, of such environmental disturbances.

The deep history perspective holds that the past is the key to the present, and human existence is only a very short part of this story.

> If Earth's time were compressed into a single year, our ancestors would only have parted company with the chimpanzee at about two in the afternoon on the last day of that year. Modern humans would have evolved just 15-20 minutes before midnight. On this timescale, civilisation and agriculture are barely one minute old and the era of mass production and consumption is a mere second – so brief and unprecedented that its sustainability cannot be taken for granted, however 'natural' it may seem to us now (Taylor & Smith, 1997, p.1:5).

In other words, we are now faced with environmental problems to such a degree that we can only guess at the long-term consequences. What is being done to address these issues? Which are the most important to New Zealand? The first section of this chapter considers sustainable development and how it relates to the main cause of these environmental problems: unsustainable growth. Following is a discussion of New Zealand's obligations in terms of the international agreements it has signed to address such issues. The governmental structures in charge of implementing environmental agendas is described, followed by a look at New Zealand's foremost environmental issue: loss of native biodiversity. The worldviews of those who were mainly responsible for such biodiversity losses is also looked at, as well as how these worldviews have changed over time and are now contributing to native biodiversity gains. Practical methods of conservation and ecological restoration are then discussed, such as those pioneered on mainland islands, followed by the social aspects of conservation, which now play just as important a role in

conservation as do their biological counterparts. Finally the regional and local authorities responsible for combining conservation and recreation needs in New Zealand are explained, leading in to the description of a mainland island project underway in Auckland, for which this research is being carried out.

2.2 International environmental agreements and sustainable development

This section examines an idea that has major implications for how humans deal with the issues referred to in the previous section. The term 'sustainable development' arose during the late 1980s after a decade of perhaps the worst environmental excesses, but also at a time of burgeoning widespread environmental awareness. It is a term that since the "Earth Summit" in 1992 (Sitarz, 1994) has steadily gained attention, and found its way into international conventions as well as national law. The discussion here will focus on how sustainable development fits into international agreements to which New Zealand is a signatory nation, and then look at some of the difficulties in defining 'sustainability' in terms that are satisfactory to all.

In terms of international obligations, New Zealand is signatory to nearly 50 international environmental agreements (as at 1997). The first was The Antarctic Treaty of 1959, ratified one year later, and grew to nine in 1972 at the time of the first Earth Summit in Stockholm – the United Nations Conference on the Human Environment. The environmental agreements New Zealand has signed to this day address the following areas: Antarctica, Atmosphere and Space, Protection of the Marine Environment and Resources, Fishing, Whaling, Hazardous Substances, Conservation of Natural Resources, and Arms Control and Nuclear Pollution (see Appendix B for list of agreements).

After the 1992 United Nations Conference on Environment and Development (UNCED, or the "Earth Summit"), New Zealand became signatory to five additional environmental agreements. These were the Convention on Biological Diversity, the Framework Convention on Climate Change, the Rio Declaration on Environment and Development, Agenda 21 and the Forest Principles. Within these five environmental agreements, the first

two are legally binding conventions, also known as 'hard-law,' that specify particular actions to take with regard to the objectives of sustainability. The remaining three agreements are 'soft-law' and are not legally binding. New Zealand's progress in implementing sustainable development in the decade since the Earth Summit will be discussed after looking closer at what 'sustainability' actually means.

The most well known and widely accepted definition of sustainable development has been that which appeared in the report by the World Commission on Environment and Development (1987), also known as the Brundtland Report: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). The focus of this definition is on 'needs' and 'limitations.' The objective of development and growth should be to enhance living standards for *all*, while not exceeding the Earth's carrying capacity in terms of finite physical resources.

Where do these needs and limitations lie however? For ecologists, needs have not been as important as biological limitations, and the continuing existence of a functioning biospheric system has been their main concern (Common, 1995). One can contrast this with the economist's conceptualisation of sustainability, which has been concerned more with maintaining constant levels of human consumption than the state of the biosphere per se. According to this view, as long as consumption levels remain constant, and GDP continues to rise, sustainability is present (Selman, 1996). This argument does have some merit, for without a functioning biosphere continued material consumption would be impossible. However, this view fails to consider the overall quality of life in general, or the long-term effects on the environment of actions carried out. While it may be possible to sustain excessive consumption of natural resources for prolonged periods, the environmental devastation would be such that human quality of life, in terms of access to places of natural beauty, as well as biodiversity of species, would ultimately deteriorate.

The ecological view of sustainability is more abstract, and as little is known about the functioning of ecosystems, precise prescriptions for how to implement 'sustainable

development' are extremely problematic. Conway (1985) suggests that it is the ability of systems to withstand large shocks which determines their sustainability. This is a resilience concept, and matches the ecological approach to sustainability. It is however also a vague concept, and a system may remain relatively stable and productive right up to the time it collapses under the strain of unsustainable management.

Common (1995) discusses the problem as being one of economists being overly concerned with human well being and not enough with biospheric functions, and ecologists emphasising ecosystem functions but neglecting human well being and issues of inequality. This kind of dualistic thinking has given fuel to the 'development versus conservation' debate, resulting in many environmental issues being ignored in favour of short term economic goals. Selman (1996, p. 5) writes that this polarised debate has been "disastrous for effective environmental management". Common (1995) suggests that what is necessary is a systems approach that incorporates both economic and conservation viewpoints. "The sustainability problem can be stated as that of managing human affairs so as to address the problems of poverty and inequality while also minimising threats to ecological sustainability" (Common, 1995, p. 55). Unfortunately no one has a precise idea of where the limits to 'ecological sustainability' lie, which makes things difficult for politicians and legislators to act effectively to address these issues in any meaningful way.

Selman (1996) argues that there are three fundamental principles that have to be met in order for development to be sustainable. He cites 'inter-generational equity' as the first of these three principles. In other words, one generation should leave the Earth to the next generation in as good a condition or better as when they inherited it. Secondly, there should be 'intra-generational equity', or social justice. This means that the needs of the world's poor should be given immediate attention, as one cannot expect people to behave sustainably when they lack the very basics of human needs such as clean water and sufficient quantities of food. Thirdly, there needs to be 'transfrontier responsibility', which means "sustainability in one locality...cannot be achieved at the expense of environmental conditions elsewhere" (Selman, 1996, p. 11). Ecosystems are inter-connected, and therefore environmental impacts in one place can produce unexpected effects elsewhere due to the

complexity of the relationships involved. This is known as the 'butterfly effect', where it is hypothesised that a butterfly flapping its wings in the Amazon rainforest might cause a tornado in Texas.

From this discussion it is seen that sustainability is a difficult thing to pin down, and hence the confusion regarding its implementation. This confusion is reflected in the lack of progress New Zealand has made to date in developing a sustainable development strategy. The recent report from the Parliamentary Commissioner for the Environment (June 2002) criticises New Zealand's progress since the 1992 Earth Summit. The report states that not only have recent governments been slow to educate and raise awareness of sustainable development, but that there has been a continued emphasis on economic growth. This emphasis

> has the potential to accelerate us towards unsustainability if it simply means escalating energy and materials consumption, waste and pollution problems....Current trends in consumption of energy and natural resources, production of waste, growth in urban areas, biodiversity losses and biosecurity threats, land-use and water issues in both rural and urban areas, and air quality in urban areas are all signs that New Zealand is not functioning in a sustainable manner (Parliamentary Commissioner for the Environment, 2002, p.10).

This section has looked at New Zealand's mandatory and non-mandatory obligations according to the international environmental agreements it has signed. The concept of sustainable development was discussed, along with some of the problems inherent in defining and implementing this term in a meaningful way. Finally the place of sustainable development in New Zealand was looked at, and included the important observation by the Parliamentary Commissioner for the Environment that New Zealand is not functioning in a sustainable manner.

2.3 New Zealand government environmental agencies

The previous section focused on the international agreements New Zealand became signatory to at the 1992 Earth Summit, and the importance of sustainable development to these agreements. This section will briefly outline the structure of governance in New Zealand, and some of the responsibilities of agencies as they relate to the environment. Protection of biodiversity on private land will also be considered.

In New Zealand, environmental administration occurs at three levels. One is at the level of central government, and involves agencies that have responsibility for resource management under legislation, for administration of laws, and for responses to issues of national concern. The ongoing campaigns to control the Varroa Bee Mite and the Painted Apple Moth are two such examples of national concern, addressed at the central government level through the Ministry of Agriculture and Forestries (MAF). The second level is of regional councils, whose responsibilities lie in setting policy for and coordinating resource management, such as water and soil conservation, and transport. The third is territorial local authorities, which are made up of district and city councils. Their main roles are in carrying out the local service requirements such as "water supply, control of land development, recreational facilities including parks and reserves, local roading and transport activities, sewerage and stormwater drainage, community development, and other public works" (Taylor & Smith, 1997, p. 4:7). Unitary authorities, of which there are four in New Zealand, the Gisbourne, Marlborough and Tasman District and Nelson City councils, possess a combination of regional and territorial authority functions. (See Appendix C for a comprehensive list of environmental legislation in New Zealand).

The Department of Conservation (DOC), established under the Conservation Act 1987, is the most significant central government department in terms of protecting native species and habitat in New Zealand. Recreation in DOC managed areas also plays a part, but is secondary to these areas' conservation function. DOC's mandate is for the protection of natural and historic resources in New Zealand, involving the management of areas that span almost a third of New Zealand's land area (DOC, 2001-2004). DOC is responsible for the

management of 13 national parks, 20 conservation parks, and as many as 3,500 reserves as well as other categories of protected land. "In the marine environment, the Department manages almost 7% of the territorial sea (less than 1% of the area within the Exclusive Economic Zone): 1.1 million hectares have some form of protection in 16 marine reserves, two marine mammal sanctuaries, two marine parks and one specially protected area" (DOC, 2001-2004, p.11). DOC is a major player in restoring indigenous biodiversity to New Zealand; its major functions include research, pest control, protecting endangered species, and management of visitors and conservation areas. Conservation methods utilised by DOC are discussed in further detail in section 2.5, and the roles of regional authorities in conserving natural and historic resources in section 2.8.

The Ministry for the Environment (MFE) is another important player in the advocacy of environmental protection. Unlike DOC, which manages conservation on the ground, the MFE is involved in the planning of policy directives and guidelines. The MFE "coordinates development of environmental standards and guidelines to help local authorities and resource users implement their responsibilities under the Resource Management Act 1991" (Taylor & Smith, 1997, p. 4:15). The MFE was established along with the Parliamentary Commissioner for the Environment, an independent environmental watchdog, under the Environment Act 1986.

Outside conservation on public lands, it is the responsibility of regional and/or territorial authorities, under the Resource Management Act 1991, for the protection of biodiversity, as well as management of pest control, air and water quality and tourism impacts, on private lands. This has been the subject of much discussion in recent years, particularly during the process of developing the Biodiversity Strategy, of how to protect indigenous species and habitats on private land. As Morgan Williams, Parliamentary Commissioner for the Environment states, "biodiversity gains takes much more than environmental policies, legislation and extensive reserves. A nation's will, and hence families' and communities' abilities, to deliver on biodiversity goals has to be deeply embedded in the cultural and economic, as well as environmental heart" (Williams, 2000, p. 2).

One of the main issues of the debate concerning conservation of species and habitats on private lands, is who is ultimately responsible for their protection. Williams (2000) considers that the emphasis is currently on landowners to bear the burden of conservation on private lands, when it is actually everyone who benefits from their conservation. Solutions will involve further dialogue between the landowners, communities, businesses and local government, and perhaps, some kind of incentive scheme, such as one based upon tax relief. Society as a whole needs to realise the true value of our biological resources, which are currently vastly undervalued (Williams, 2000).

The MFE State of the Environment report 1997 states that due to New Zealand's relatively large size and small population we have been able to "have our environmental cake and eat it too. In effect, the environment, particularly the indigenous wildlife...has partly subsidised our economic development by providing a succession of quarried resources and plentiful energy resources to use, and abundant land, water and fresh air to absorb our wastes" (Taylor & Smith, 1997, p. 3:45). As Williams (2000) points out, we need to place a real ecological value on the resources we use, which would make indigenous habitat and species destruction not just morally wrong but also not economically defensible. Thus, the aims of sustainable development in New Zealand, as discussed in the previous section (2.2) will continue to be unmet while natural resources remain exploited and their real values ignored.

This section has discussed the central government agencies with environmental agendas, and introduced one of the critical challenges to effective resource management – conservation of native biodiversity on privately owned land.

2.4 The historical decline of New Zealand's biodiversity

Biological diversity refers to the variety of life. It is most often measured as "*species diversity* (the number of different species in a given area), but can also be measured as *genetic diversity* (the variety of genes within a population), or *ecological diversity* (the

number of different ecosystems or ecological processes in an area)" (Taylor & Smith, 1997, p. 9:10).

Biodiversity loss has been described as "New Zealand's most pervasive issue" (Taylor & Smith, 1997, p. 10:6). This section begins with a discussion of how important New Zealand is biologically, and then describes the decline in New Zealand's indigenous flora and fauna as a result of the arrival of first Maori and then Europeans. It concludes with a discussion of the reasons for such changes in the environment, such as the backgrounds and worldviews of the first arrivals.

New Zealand is significant biologically for two main reasons. The first is that it is the largest landmass to have been separated from the rest of the world for such a length of time (the past 80 to 100 million years) (Diamond, 1990; Hackwell & Bertram, 1999).This separation has allowed its wildlife to evolve *in situ*, and Diamond compares studying New Zealand biota with being able to study life on another planet – or the next best thing. In fact the only native mammals to New Zealand, three species of bat, arrived in just the last fraction of that period. This means that the role of mammals elsewhere, such as rats, pigs, deer, goats and so on were originally taken up by other species, such as birds, giant snails and giant insects (Hackwell & Bertram, 1999). Taxonomic diversity amongst terrestrial biota is low to average, but in some species, such as lizards, there is surprising richness, even many times greater than Australia which has a land area 29 times New Zealand's size. This, combined with the significant number of endemic plants and animals makes certain groups of New Zealand biota highly unique (Daugherty, Towns, Atkinson & Gibbs, 1990).

The second reason for New Zealand's biological uniqueness is the relative newness of human occupation – between 800 and 1,000 years ago. When Polynesians arrived in New Zealand they would have found a land "almost completely forested below the snow line – save for the wetlands, the wide, braided channels of the eastern South Island rivers, and a few areas in the central North Island and central Otago" (Hackwell & Bertram, 1999, p. 18).

The profusion of wildlife at the time when the Maori arrived meant that there would have been little need for agriculture, and hunting would have been almost a leisurely activity (Flannery, 1994). While the Maori brought with them pigs and chickens, it appears that these were quickly abandoned in favour of a much larger food source – moa. The New Zealand moa was the largest bird in the world, standing up to three metres high and weighing as much as 400 kilograms (Hackwell & Bertram, 1999). Excavation sites found throughout New Zealand suggest that the populations of moa could have numbered 70,000 at any one time, yet within about 300-400 years of the arrival of Maori they became extinct. The reasons for this are most likely that they were simply hunted to extinction, with remains of 9,000 moa found at a single site near Wairau Bar in the north of the South Island, and 30,000 to 90,000 found at Waitaki Mouth in Otago. From the remains found archeologists can tell that only about a third of the moa's body was actually eaten, which suggests that not only were moa easy to hunt, but that they were plentiful. The wastage of meat at these sites has been described as "astounding" (Flannery, 1994).

The moa were only one species on which the Maori had such a devastating and final effect, but there are many others, known and unknown, to have perished as well. Early Maori used fire to clear a third of the country's forest cover, significantly altering much of the habitat for wildlife. See Appendix F for a diagram of the changes in forest cover since human arrival.

Maori also brought with them the *kuri* (Maori dog) and *kiore* (Polynesian rat) that played giant roles in the extinction of ground-dwelling animals. "Lizards and tuataras, insects and birds, including huge seasonal mainland populations of breeding seabirds would have fallen victims of the massive plague of rats" (Hackwell & Bertram, 1999, pp. 18, 19). Estimates put the losses from around this time at a quarter of endemic land based birds, a fifth of endemic seabirds, three frogs and an unknown number of invertebrates. Tuataras and many lizard species vanished to offshore rat-free islands (Taylor & Smith, 1997, pp. 9:28, 9:29).

By the time Maori had come to learn from their environmental mistakes and develop customs to limit access to and preserve resources, much of the damage had already been

done. "(T)hey were living in a depleted landscape where competition for food resources had become a fact of life...The same process has been recorded from Hawaii, Easter Island, Henderson and Pitcairn Islands and other parts of the Pacific, as well as Madagascar, the Mediterranean (e.g. Cyprus and Crete), mainland Europe, North and South America and Australia" (Taylor & Smith, 1997, p. 9:29).

Yet, the environmental destruction of New Zealand's flora and fauna had only just begun at this stage. Following the arrival of Captain James Cook in 1769, pigs and goats were released, and black rats and cat populations were also established (Hackwell & Bertram, 1999). With the en masse arrival of immigrants from Britain and Ireland in later decades, about half the remaining forest, as well as wetlands, dunes and estuaries were quickly converted to towns and pasture land. The vast habitat destruction perpetrated by the new European arrivals, combined with the introduction of foreign mammals and subsequent effects upon wildlife, meant that native biodiversity loss has continued to the present day. "Since European settlement, 16 land birds...have been driven to extinction, together with a native bat, 1 fish, at least a dozen invertebrates and possibly as many plants" (Taylor & Smith, 1997, p. 9:30). Today, approximately 73 percent of New Zealand's land ecosystems have been disturbed by human activities such as mining, logging, roads, farming and settlements. This compares with 52 percent for the Earth overall (*ibid*).

The New Zealand Biodiversity Strategy states that introduced pests and weeds are "the greatest single threat to our remaining natural ecosystems and habitats and threatened native species (MFE & DOC, 2000, p. 6). Introduced mammals that have established populations in the wild include "the possum, six species of deer, five species of wallaby, Himalayan thar, chamois, the hare, the rabbit, three species of mustelid (stoat, weasel, ferret), four species of rodent (Norway and ship rats, kiore, and house mouse), the hedgehog and feral populations of domestic animals including goats, cattle, horses, sheep, pigs, dogs, and cats" (Hackwell & Bertram, 1999, p. 19). Such animals damage habitats and important ecosystem processes, as well as compete for food with and prey on native species. The Biodiversity Strategy goes on to mention that information concerning the state of New Zealand's biodiversity is still far from complete. While there might be as many as

80,000 indigenous species, only around 30,000 have been described so far. At this stage, we still do not know how many extinctions are occurring, or at what rate.

At this point a very bleak picture has been painted of New Zealand's environmental past, one which contrasts starkly with the image promoted overseas of New Zealand as 'clean and green', and "100% pure" (Tourism New Zealand, 2002). It should be recognised however that both the Maori and early European arrivals were products of their time, and it was simply the prevailing idealogies that allowed this wholesale destruction to have occurred. In their defence, both cultures have since altered (in most cases) their worldviews, and the latter part of this section will be devoted to considering the momentous changes in terms of environmental awareness and perspective that have evolved. These perspectives are examined not just because they are relevant in explaining the environmental changes brought about in New Zealand, but also because their significance has grown in recent decades and the implications for resource managers are now recognised.

Little is known about the culture and customs Maori people brought with them when they arrived in New Zealand 800 to 1,000 years ago. Based on the archeological evidence however it is likely that they began to form their traditional beliefs and practices as seen today sometime around and after 1350 AD, after experiencing the same 'boom and bust' cycle that had occurred elsewhere in the world (Puia, 1990). When resources began to dwindle, Moa had largely disappeared, and destruction of significant portions of habitat and pest invasions had caused less and less stocks of wildlife to exist, Maori also began to change their behaviour towards the environment. It is perhaps at this time that Maori began to adjust to their new land and develop their understanding with it. The concept of *tapu*, or that which is 'sacred' or 'prohibited' was used to protect resources from human exploitation or pollution. As kaitiaki, or guardians of the land, Maori recognised their integral relationship with the land, and their responsibility to preserve resources for future generations. In this way they began to harvest only those resources necessary for well being in the short term (*ibid.*). Park (2000, p. 26) writes that "(l)and, people, forests, birds, rivers, sea and sky all had a spiritual source in nature gods and other beings....(and) the Maori

relationship with nature was a familial one; people as part of nature's systems". As other indigenous peoples around the world had also done before them, Maori came to understand the meaning of 'sustainability' in their relationship with the land.

James (1990) notes there are four main perspectives that characterise European actions toward the environment, which are useful in explaining not just settler behaviour but action taken today as well. Exploitation/domination is the first and historically most important perspective, one which has grown out of Judaeo-Christian tradition and western philosophy and science. "This belief hinges on the notion that nature is non-sacred, and thus inferior to 'man' who is made in the image of God" (James, 1990, p. 262). This notion supports the idea that the Earth and all its resources exist in order to satisfy humankind's needs and desires, which justifies their exploitation. The story of Robinson Crusoe gives an insight into seventeenth and eighteenth century European attitudes towards nature:

> Crusoe's arrival on a pristine tropical island was in no way portrayed as a ticket to paradise and plenty. Rather, his arrival on the island was interpreted as a horrid punishment for his sinful youth. He managed to survive his ordeal, and actually reach some degree of prosperity, but only because enough gunpowder, tools, grain seeds, and other necessities could be salvaged from the civilized world (represented by the shipwreck) to allow him to tame the wilderness and become master of his environment. Not so coincidentally, he was also able to exploit the "native" knowledge of an indigenous visitor to the island, Crusoe's "Friday," whom he enslaves (Booth & Kessler, 1996, p. 232).

This worldview as demonstrated by the story of Robinson Crusoe is consistent with the first and second perspective, that of the views of the scientific establishment post Middle Ages and the time of the onset of the Scientific Revolution. The 'Baconian spirit' (Capra, 1983) changed the nature of scientific inquiry from that of seeking to work and live in harmony with the natural order, to that of seeking to understand and subjugate the workings of nature for humankind's benefit. Nature, in Bacon's view, "had to be 'hounded in her wanderings,' 'bound into service,' and made a 'slave.' She was to be 'put in constraint,' and the aim of

the scientist was to 'torture nature's secrets from her.'.... The ancient concept of the earth as nurturing mother was radically transformed in Bacon's writings, and it disappeared completely as the Scientific Revolution proceeded to replace the organic view of nature with the metaphor of the world as a machine" (Capra, 1983, pp. 40, 41).

European settlers in New Zealand came from highly developed and urbanised settings, and at a time when the above worldviews were predominant. It is little wonder that when they did come they brought with them an attitude of wishing to change and 'tame' the natural environment. They also brought with them exotic plants and animals so New Zealand could become more like what they were used to at home.

The third perspective is that of aesthetics, which is to appreciate the beauty of nature but as something separate from humans. "One example is the seventeenth century formal garden where the raw materials of nature were 'civilised' and 'perfected' by the imposition of human order. Bushes were clipped, water channelled and landform changed to bring out nature's hidden beauty" (James, 1990, p. 263).

The fourth perspective is one that has gained in popularity since the onset of the environmental movements, largely beginning around the late 1960s and 1970s, and is known as the ecological perspective. It includes the following main principles:

(1) All aspects of the environment are interrelated.
(2) Human beings are part of the environment. They both depend on it and influence it.
(3) Change in one part of the environment brings about change in another part.
(4) The population of any organism is limited by the availability of resources. Many resources are non-renewable and, therefore, sustainability must be achieved.
(5) Resources must be carefully managed and future use planned (Simpson, 1983).

These four perspectives have been simplified, but they provide a good insight into the forces that have shaped European behaviour towards the environment. When contrasted with the Maori perspective they reveal a significant difference in terms of how humans

view and interact with nature. Maori came to see themselves as part of the 'natural environment', and Europeans have grown to see themselves as outside it. While historically both worldviews have allowed for damage to natural systems to occur, they are now both focussed on sustainability, the Maori through their traditional culture and customs, and Europeans through science based knowledge of ecosystems.

This section has described the actual decline in New Zealand's biodiversity, the causes of the decline, and the human perspectives that have contributed to its destruction but are now also playing a part in saving it.

2.5 Offshore island and mainland island conservation efforts

Conservation is *"the preservation and protection of natural historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations"* (Conservation Act 1987, 2(1)).

The previous section discussed the historical reasons for the continued decline in New Zealand's indigenous biodiversity. This section will detail important methods employed to deal with this problem, including restoration of offshore islands and more recently the development of 'mainland islands.' Solutions implemented to address conservation issues consist of passive solutions such as legislation, and active solutions such as pest eradication, management and ecosystem restoration (Tong & Cox, 2000). Legislation has already been touched on, and therefore the focus here will be on the practical methods used to achieve the objectives set out in legislation.

Most people living in New Zealand would be familiar with conservation campaigns to save an endangered species, such as efforts to save the kiwi, yellow-eyed penguin or kokako (Williams, 2000, 437). These campaigns have been useful to the extent that they attract media attention to a conservation issue, and allow the public to focus on the plight of certain species in the face of threats from predation and/or habitat destruction. What these

campaigns do not generally highlight is the need for protection of entire ecosystems rather than just one or two species within those ecosystems.

Park (2000, p. 21) writes that the continuation of species-specific conservation efforts means that we continue to deal in "half-truths". Conserving the health of ecosystems is now considered the best way to preserve biodiversity, thereby eliminating the need for individual attention to single species. The reason for the single species focus to date has been partly because understanding of ecosystem processes in general is very limited, and also because it is extremely difficult to physically delineate ecosystems (if indeed it is possible). An added difficulty is where ecosystems cross over legal boundaries between public and private land, and the ensuing problems associated with protection efforts over these boundaries (Park, 2000), also see section 2.3.

One piece of evidence that explains the need for protection of ecosystem processes and not single species, comes from the Biosphere II experiment in the US.

> In 1991, eight people entered a sealed, glass-enclosed 3-acre living system, where they expected to remain alive and healthy for two years. Instead, air quality plummeted, carbon dioxide levels rose, and oxygen had to be pumped in from the outside to keep the inhabitants healthy. Nitrous oxide levels inhibited brain function. Cockroaches flourished while insect pollinators died, vines choked out crops and trees, and nutrients polluted the water so much that the residents had to filter it by hand before they could drink it. Of the original 25 small animal species in Biosphere II, 19 became extinct....Of course, design flaws are inherent in any prototype, but the fact remains that (US)$200 million could not maintain a functioning ecosystem for eight people for 17 months. The lesson of Biosphere II is that there are no man-made substitutes for essential natural services. We have not come up with an economical way to manufacture watersheds, gene pools, topsoil, wetlands, river systems, pollinators, or fisheries (Williams, 2000, p. 7).

This experiment shows us that natural processes are unable to be effectively replicated by humans, if indeed it should prove desirable or necessary to do so. This example supports the idea of conservation of ecosystems *in situ* and not merely the preservation of certain species.

The underlying requirement of the International Convention on Biological Diversity, to which New Zealand is a signatory, is the *in situ* conservation of ecosystems and habitats. Just how we define ecosystems and habitats though continues to be a problem, and it is for this reason that the convention is difficult to implement. Advocating conservation of ecosystems and habitats, where ecosystem means "the individuals, species, populations and the interactions between them and their abiotic environment '*in a defined area*'"(italics in original), boundaries are assumed to exist where they do not (Park, 2000, p.45).

To further highlight the importance of ecosystem conservation, as well as the difficulty in delineating ecosystems for conservation, research in the United States has shown that in some cases ecological processes such as floods or fire are necessary for the survival of certain species. This research showed that without periodic disturbance, certain species in "stream and grassland ecosystems, namely those that are specially adapted to colonise disturbed sites (e.g. short grasses, mayflies) and those that prey on the colonisers (e.g. grazing animals, fish) would become extinct" (Taylor & Smith, 1997, p. 9:10). The implications of this research are that in order to protect certain species entire ecosystems must be set aside from human use or influence, and 'natural processes' allowed to occur.

One place where it has been easier to define ecosystems physically and legally has been on offshore islands. Probably the earliest form of island conservation in New Zealand was in the 1890s, when Richard Henry transferred flightless birds, the kakapo and kiwi, to Resolution Island near Fiordland (Saunders & Norton, 2001). DOC now administers around 220 of the over 600 larger islands lying off the coast of New Zealand, and these have become invaluable refuges for many of New Zealand's endangered species (DOC, 1999a). Habitats on many of these islands were once modified by human settlement, but have since been allowed to regenerate, made easier by the eradication of feral cats, possums, rats and

mustelids. On many of these islands landing is strictly by permit, these islands include Little Barrier, Hen and Chicken and Mercury Islands, the Mokohinau and the Poor Knights Islands (DOC, 1999a).

A well known exception to this is Tiritiri Matangi in the Hauraki Gulf, where up to 150 visitors are allowed per day. Tiritiri Matangi has been called one of the most successful conservation projects in the world, where its objectives of ecosystem restoration and breeding of rare birds has been combined with an experiment in bringing together people and rare species. There has been a large volunteer component to the development of Tiritiri, who have helped plant 280,000 trees over a ten-year period. Biologically the island has been a success, with successful introductions of the rare takahe, thought to be extinct until found in Fiordland in 1948, as well as the little spotted kiwi, saddleback, North Island robin, stitchbird and brown teal. There are now plans to introduce tuatara and the Little Barrier island giant weta to Tiritiri (DOC, 1999b). The island has been a success for conservation awareness and support as well, the implications of which are discussed in the following section.

Another success story of restoring habitats and eliminating pests from offshore islands has been on Kapiti Island, off the Kapiti coast near Wellington. This 1,968 hectare island is home to many endangered species, such as the little spotted kiwi, but until recently was also home to vast numbers of possums and rats. These pests were seriously affecting the native vegetation and wildlife, until a restoration project involving trapping, aerial poisoning and trained dogs was begun in 1980. By 1986 possums were successfully eradicated from the island, and by 1999 rats, including the brown rat and *kiore* (Polynesian rat), were eradicated as well. Forest regeneration as a result has been profound, and the dawn chorus of native bird species, compared with the mainland, is "stunning" (Hackwell & Bertram, 1999, p. 26). An interesting 'side-effect' of eliminating rats has been the increase of some weeds on the island, which highlights the current lack of knowledge of the functioning of ecosystems, and the need for integrative planning and pest management (*ibid*).

From the successful conservation efforts on offshore islands, and the pioneering of new techniques of pest control, the concept of 'mainland islands' as a conservation tool arose, beginning with successful habitat restoration of a 1,400-hectare forest block at Mapara in 1989 (Saunders, 1990). The Mapara project had great success at restoring kokako populations, particularly because pests such as domestic stock, feral goats, possums, ship rats and mustelids were targeted. As a result of the achievements on the mainland, the idea of further 'islands' gained popularity. Subsequently DOC developed six further mainland islands in 1995 and 1996: Trounson Kauri Park, Northern Te Urewera Ecosystem Restoration Project, Boundary Stream Mainland Island Project, Paengaroa Reserve, Rotoiti Nature Recovery Project and Hurunui Mainland Island Project (Saunders, 2000a).

These DOC managed mainland islands have been followed by many other similar projects, albeit on different scales, such as the Karori Wildlife Sanctuary in Wellington, and "The Working Man's Mainland Island" in Eastbourne. The difference with these last two mainland islands is that they are the result of local initiatives and not solely DOC, though there has been input from DOC and other parties of interest such as the Royal Forest and Bird Protection Society of New Zealand ("Forest & Bird"), the Ornithological Society, and Wellington Regional Council. The objectives of both projects are similar, which are to restore native forest habitat and increase native biodiversity, but the methods are radically different. Karori Open Sanctuary is a highly funded enterprise, involving the construction of a nine-kilometre predator proof fence around a 250-hectare valley, just three kilometres from the centre of Wellington. Membership of the Karori Wildlife Sanctuary Trust numbers close to 7,000 people, and funding received for the project has been around $9 million. The long term goal of the project is to become a financially viable enterprise capable of self-funding (Campbell-Hunt, 2002).

The mainland island underway in Eastbourne is an attempt at restoring 120 hectares of native rata/kamahi/hardwood forest, involving control of such pests as deer, possums, rats and stoats. Membership of the Mainland Island Restoration Organisation (MIRO) numbers between 10 – 20 people, almost all Forest & Bird members, and who are mostly retired. In contrast with the Karori Sanctuary there will be no predator proof fence, instead MIRO will

have to rely on pest control methods and regular monitoring of the state of biodiversity and habitat (Robinson, 2002). It is hoped by members of MIRO that theirs is a model of a 'working man's island' that can be emulated elsewhere in New Zealand in conjunction with efforts from regional and national authorities.

This section has looked at the growing awareness that conservation needs to focus on protection of entire ecosystems, and not solely on the preservation of key species. There are difficulties associated with delineating ecosystems; knowledge about their functioning is far from complete, and there are problems with ecosystems crossing public/private boundaries. The places where it has been possible to protect and allow for restoration of ecosystems, and as well the transfer of key endangered species, is on offshore islands. These have led to the development of mainland islands, a relatively recent phenomenon in New Zealand, but a management concept that is rapidly gaining in popularity.

2.6 The social aspects of conservation

For any conservation effort to succeed, whether it be a DOC administered mainland island or a local initiative, there needs to be understanding and support from the community. Previously this was not always the case. The term "iron triangles" was used "to describe the patterns of political relationships that involved agencies, their relevant legislative subcommittees, and interest groups representing commodity, development, and business interests. Agency communication...was marked by one-way communication flow; its purpose was largely educational and informational, designed to sell plans and gain local support (Cortner, 1996, p. 168). Times have changed however, and (especially) post Resource Management Act 1991 public participation and consultation began to be an aspect to conservation just as important as the biological components on which decisions were generally made. This section introduces the theory behind the social aspects of conservation, giving examples of how it is useful to the implementation and management of conservation programs. This theory is used as the main justification for the Tawharanui Open Sanctuary Visitor Survey reported in this thesis.

In the United States the social aspect applicable to resource/wildlife management is known as Human Dimensions Research (HDR), or Ecosystems Management (Ewert, 1996; Decker & Goff, 1987). These theories are based on the idea that as more and more public pressure is put on government agencies to solve environmental problems, whether they be deforestation, ocean pollution or urban growth, good decisions cannot be made without reference to what the public thinks and believes. By identifying stakeholder motivations, beliefs, attitudes and their acceptance (or lack thereof) of particular practices, better decisions can be made. That is not to say that the resource manager will always do what is in the interests of the greatest number of stakeholders, but at least the information taken from the research can assist in identifying what the community thinks of a particular management option.

A frequent reluctance from resource managers stems from fear of HDR for the perceived loss of decision making power, and that it will remove their discretionary abilities to make decisions. In this way they may feel that management of resources is by public survey, however this need not be the case, and HDR findings are highly case specific. They may be necessary at times to justify making a decision, or they may highlight the need for wider public education. In any case, they are seen as a way of resolving conflict, advocating a decision based on biology, and gaining acceptance for management actions (Manfredo, Vaske & Sikorowski, 1996).

HDR should not be seen as a panacea to all resource management decisions. The value of HDR is that it "provides for cross-fertilization between the biological and social sciences to strengthen the ability of each to address fish and wildlife [ie 'resource'] management issues" (Lyons, 1987, p. 293). The following list shows where some of the limits of HDR lie:

i) HDR provides one type of information to resource decision-makers. Decisions should not be made solely based on biological reasons, but neither should they be made solely on the findings of HDR.

ii) HDR will not always make decisions easier. It may identify different stakeholder groups with preferences at odds with the public at large, as well as the resource management agency itself.

iii) HDR may not always show the best course of action, and it could be that there simply is no socially and biologically palatable decision.

The relative strengths of HDR can be described as follows:

i) HDR can improve fairness and balance in decision-making, providing a better understanding of public values and attitudes.

ii) Providing an understanding of public viewpoints can assist in anticipating issues, and therefore reducing potential conflict.

iii) HDR can sometimes provide justification for resources decisions when and if there are social concerns.

iv) HDR demonstrates that resources agencies are attempting to be responsive to the public.

v) HDR can be cost effective. Although consulting with the public can be expensive in terms of time and money, "the failure to engage the public early, honestly, and in an on-going fashion will merely delay these costs. It will likely increase them as well not only in higher financial terms, but also in terms of increased cynicism, heightened frustrations and distrust and increased public reliance on alternative decision-making venues, notably the courts and legislature" (Federal Ecosystem Management Assessment Team, 1993, pp. VII-102).

The key word in HDR based decision-making is collaboration. This involves building and maintaining long-term relationships with a wide variety of stakeholders, such as landowners, members of the public, government agency personnel, businesses, conservation groups and others, and encouraging dialogue and learning. This is through understanding stakeholders, their issues and concerns, building and maintaining relationships with these stakeholders, avoiding polarisation, and collaborative problem solving (Driver, Manning & Peterson, 1996).

Driver *et al* (1996, pp. 124, 125) list some general principles that increase the effectiveness of collaborative efforts:

1. Start involvement early and make it continuous.
2. Have clearly stated goals and objectives
3. Be as objective as possible
4. Allow enough time for the stakeholders to prepare for and respond to specific questions and issues
5. Never surprise the public
6. Be open, honest, and responsive
7. Emphasize fairness
8. Try to understand the stakeholders' beliefs, values, and reasons; try to understand "why" as well as "what"
9. Be respectful
10. Admit your mistakes and try not to be defensive
11. Develop and focus on your listening skills
12. Be tolerant; it is a virtue
13. Use skilled mediators if necessary

HDR in resource decision-making therefore is not merely a technical exercise or a meeting of legal requirements, but a genuine coming together of concerned parties, "an ongoing political experiment in democratic governance" (Cortner, 1996, p. 176). Humans need to be considered just as important as plants and animals when it comes to effective resource management.

In order to emphasise how HDR has worked in practice overseas, it is useful to consider the following example: In 1984 the deer population at two reserves in Massachusetts was estimated to be at 350 to 400, when the biological carrying capacity for deer was 60. As a result there was severe vegetation destruction, high deer mortality due to starvation, and widespread cases of Lyme disease, which comes from a bacterium present in deer ticks.

Deer hunting was prohibited at both reserves up until 1985, and when hunting was first proposed as a method to reduce the deer population there was widespread opposition. Affected stakeholders, including veterinarians, biologists, anti-hunting activists and local citizens then formed a committee to address this problem. It was decided that a controlled hunt with special rules and regulations would be appropriate, with the objectives of eliminating starvation of the deer, reducing browsing rates on vegetation, and reducing the human risk of Lyme diseaese. The restrictions consisted of choosing hunters with appropriate ability and experience, educating the hunters about the objectives of the hunt, and some further rules and regulations beyond those normally required by the State of Massachusetts for deer hunting.

When a joint biological-social research program evaluated the hunt, it found that the biological objectives had been met, and participating hunters found the hunt to be safe, challenging and enjoyable despite the regulations. Furthermore, public disapproval for the hunt changed to support as the program's objectives were met, and hunters and communities agreed that the controlled hunt was a management option preferable to other options (Manfredo *et al*, 1996).

Sometimes it is not always possible to find a solution acceptable to all stakeholders, and this account of a successful biological – social program contrasts nicely with the DOC possum culling efforts on Stewart Island. On Stewart Island, as in many other parts of New Zealand, sodium monofluoroacetate ("1080") is the preferred method of pest control, however its by-kill of deer populations is something that is strongly opposed by many of the island residents. The residents have concerns regarding the effects of 1080 on other birds and animals, water supplies and people, but DOC denies that these are a problem and says they are just excuses of the hunting lobby to continue to allow them unlimited access to deer.

A North and South magazine article (Roger, 2002, p. 70) quotes Greg Lind, DOC's southern islands area manager as saying:

> We consult and then we go ahead and do what we bloody well like. In this instance we've asked the local community what its concerns are and we're working through them with a public liaison group made up of anyone who wants to be involved. A lot of them are pretty naïve about what 1080 can do and what effect it has, but we're not going to take it out of our arsenal. While there are about 28 options for possum control, it's about the most effective we've got.
>
> There's been a public opinion survey carried out on the New Zealand population's attitude to introduced pests and it showed that with anything 'below' a deer you could do anything you like to eliminate them. You could virtually napalm them. But Bambi has produced this reaction to deer. You can only shoot deer. You're not allowed to poison them.

In a later edition of North and South, a letter from Lou Sanson of DOC said that Mr Lind meant that there was a *perception*, generally by hunters, that DOC's position was pre-determined, and that Mr Lind was only stating what other people thought of the department (Sanson, 2002). Whether or not Lind did preface his comments in this way is difficult to know, but at least from Lind's account it is clear that both sides are severely entrenched in their positions. That is not to say that there cannot be a solution, however it does appear that DOC may not be inspiring the confidence it needs to negotiate more effectively with the island's residents. As pointed out above, there needs to be honesty, openness and trust for collaborative partnerships to work, and only then can public consultation start to be more than just a technical exercise.

In New Zealand there is a perception that DOC is too heavy handed in its approach to conserving New Zealand's natural and historical resources, especially with regard to offshore island management where DOC's role is not just ecological restoration and pest control, but also regulation of visitor access. Edmonds (1990) writes that there are many who see DOC as a "big brother", who is unwilling to involve the public. If this is the case, as guardians of these islands a real opportunity for advocating conservation is lost, and there needs to be more of a balance between the biological needs of conservation estates and the public's own needs as well.

Alan Saunders (1990) puts it in even more absolute terms by saying that success of future (mainland island) projects is dependent on the support and understanding of the community. He also writes of the three limiting factors to pest control: technology, resources and community acceptance. While there is plenty of information concerning technologies, there is a dearth of information concerning community attitudes. For conservation initiatives to proceed there must be a greater focus on gathering public acceptance of and attitudes towards conservation and pest control methods (Saunders, 2000b).

In summary, this section has discussed the necessity for assessing public attitudes and allowing community input into conservation decision making. Public negotiation should be approached honestly and openly, without trying to enforce a pre-determined position. While unnecessary to base conservation decisions entirely on HDR results, it is wise to consider the implications carefully so as to avoid future conflict and delays to the project. One should begin from the point of view that a project will succeed or fail on the strength of its community understanding and support. The Tawharanui Open Sanctuary Visitor Survey is research that proceeds on this basis.

2.7 Discussion of relevant research

This section gives consideration to prior research that relates to the current study. Thus far the discussion has centered on the factual and theoretical bases for the Tawharanui visitor survey, and this section looks at three items of research carried out that support and put in context the current research. The conservation benefits of public access to protected lands, in terms of awareness of conservation issues is discussed, which is followed by a look at research that discusses the New Zealand public's knowledge of and attitudes towards introduced pests and pest control methods. Finally a summary of previous Auckland Regional Council (ARC) visitor survey results are discussed, which sets a general background for the types of information collected in past years from the target population for this research.

Gordon Cessford of DOC (Cessford, 1995) has completed research aimed at assessing people's attitudes and awareness of conservation issues, with the objective of highlighting conservation benefits of public access to conservation lands. This research was carried out by surveying visitor attitudes to Tiritiri Matangi and Little Barrier Island before and after their visit to these islands. The results of his research showed that there had been some increases in conservation learning, in terms of how visitors understand the role of DOC, and greater awareness of the need for restoration and pest control. Attitudes towards conservation management were also affected, in that people became more aware of and tolerant towards the need for restricting access to certain areas. Conclusions to be drawn from the study were that there are significant benefits to be drawn from allowing public access to protected islands, especially where there are informed interpretation guides.

One of the things that remains to be known is how these attitudes are translated into action over time, if at all (Cessford, 1995). Cessford's research is mentioned here because the Tawharanui Open Sanctuary (see section 2.9) is a conservation project similar to Tiritiri Matangi in ecological terms, but also because large numbers of visitors go there each year. The benefits to conservation described in Cessford's research, attitude change, increased learning and awareness, are also likely to accrue from visitor contact with a successful conservation project on the mainland.

The second item of research relevant to the Tawharanui visitor survey, is that referred to previously by Greg Lind, southern islands area manager for DOC. This research was a survey of adults' (people aged 20 years and over) knowledge and attitudes towards introduced pests and pest control methods. The survey was based on 849 responses returned from a randomly selected sample of people from the (then) 99 electoral districts in New Zealand. The following is a summary of some of the relevant findings:

- A low number of people are aware of regional councils' roles to play in controlling introduced pests (only 25%). This reflects a general confusion in the public about what regional councils do.

- A relatively high number of respondents thought that Forest & Bird (25%) and the NZ Deerstalkers Association (14%) were responsible for controlling wild animals, which again reflects people's lack of understanding of organisational agendas and responsibilities.

- As mentioned by Greg Lind, a large proportion of respondents were opposed to poisoning of larger species such as deer, thar and chamois (only 2-5% were in favour). Poisoning was seen as more acceptable for smaller pests such as possums, rabbits and feral cats (44-52%).

- When asked how long does an introduced species need to be present in New Zealand before it can be considered a part of the "natural" fauna, 30% of respondents specified a number of years (as opposed to "never" or "don't know"). The mean number of years specified by this 30% was 200 years, which suggests that for some people we may be approaching a time when introduced species can be considered part of the "natural" environment (Fraser, 2001).

The third item of research to be looked at is a summary of results from surveys carried out with visitors to ARC parks in recent years. The surveys record demographic information, activities undertaken by visitors, awareness of parks and ARC function, and primarily satisfaction of visitor experience at the parks. Sample sizes are generally around 1100, and are administered at 17 of the regional parks. Surveys take place over the summer months of December through to February, and are carried out on weekends, plus on one weekday which is rotated each week.

The following are summaries of some of the findings from surveys undertaken on regional parks in the last 10 years, which have some relevance to the Tawharanui visitor survey and provide a general background for this research:

- Annual growth rates indicate number of visits to parks to total around 9.2 million per year;

- 80% of people know about regional parks, but only 5% can name more than two. Most of these can only name three or four;

- Numbers of visitors to parks as well as people's knowledge of parks is likely to be affected by the considerable confusion people have regarding differences between park systems. In other words, people confuse DOC, ARC and locally managed parks with each other, and accordingly this must affect visitor responses and apparent visitor numbers (this is consistent with Fraser's research above);

- Most people are unaware the ARC manages 22 Regional Parks;

- People are generally unaware of the conservation functions regional parks serve;

- Conservation and heritage issues are not the reasons why people choose to go to Regional Parks (this does not include volunteers). This conclusion has implications for the future management decisions made by the ARC and the Tawharanui Open Sanctuary Society Incorporated (TOSSI – see section 2.9), which are discussed in further detail in the Discussion chapter.

- Visitor satisfaction within the parks, measuring a visitor's "total experience" not aspects of the park, is high:

  1996/97 – 76%

  1997/98 – 85%

  1998/99 – 83%

  1999/00 – 86%

  2000/01 – 87%

  2001/02 – 90%

(ARC, 2001/2002a).

Some of the analyses drawn from the ARC surveys appear to be purely for the sake of drawing statistical analysis, and it is difficult to imagine any real-world use these results might have. For example, when analysing activities participated in across all regional parks, some of the conclusions drawn are that respondents more likely to mention 'walking' are "respondents who say the park is not their main destination that day (51%)". Two further conclusions equal in irrelevancy are that those more likely to mention 'swimming' are "respondents with an annual income of more than $50,000 (35%)", and "respondents who say that weather that day was very hot (47%)" (ARC, 2000, p. 39). Although HDR advocates understanding stakeholder characteristics and motivations, one would perhaps not expect taken to this degree.

Fraser's research (2001), and certain ARC survey results may be compared with the current survey results. See the Discussion chapter for more details.

This section put in a research context the current survey, and provided background information that will be useful for comparing and contrasting results. Cessford's (1995) research highlighted the conservation benefits of public visits to protected islands. In this way his research supports Human Dimensions Research, which is that involving the public leads to more positive outcomes. Both Fraser's (2001) research and the past ARC surveys were useful in that they provided some general and some statistical observations that may be used for comparison by the current study.

2.8 Regional and local authorities - Auckland Regional Council

As was discussed in a previous section, central government is one level where environment and biodiversity protection occurs. This section discusses the role of regional and local authorities in providing space for conservation and recreation, with a focus on ARC, the agency responsible for the management of Tawharanui Regional Park.

At regional and local levels conservation takes place with differing emphases from those of the central government. DOC is focused on protecting larger areas of native flora and fauna

away from built up urban areas, such as in national parks, and manages them under the Conservation Act 1987. Territorial local authorities (city and district authorities) manage much smaller reserves close to or in the centre of urban areas, primarily for recreational needs, and operate these under the Reserves Act 1977. Regional Councils, such as the ARC, are in-between national and local authorities. They manage larger areas of land for both conservation and recreation, and are generally located not more than 90 kilometres away from the urban centre. These sites are not as developed as local reserves, and serve as useful interpretation and educational tools for conservation.

The ARC is charged with managing the Auckland area's environment in ways that protect and preserve that which Aucklanders value – coasts, beaches, the natural environment. The Maori name adopted by the ARC, *Te Rauhitanga Taiao*, translates as "the gathering place for a collective of things environmental" (ARC, 2002b, p. 5), which reflects the ARC's own values. Their mission, as stated in the 2002/2003 Annual Plan, is "Working in partnership with our regional community to achieve social, economic, cultural and environmental prosperity and well-being" (*ibid*, p. 5).

Part of the ARC's role is to manage a network of parks throughout the Auckland region (see Appendix H for map of ARC parks). These 22 parks cover 37,000 hectares, from the east coast of the Auckland isthmus to the west, and include sandy beaches, native forest, botanic gardens, as well as Ericsson Stadium which hosts national and international sporting and cultural events. These parks have previously been managed under the guidance of individual management plans, however currently there is a Countryside Parks Management Plan in development, due for release in early 2003. This plan will supersede previous individual plans for all the parks, save possibly for the Botanic Gardens and one or two other parks.

Each park is classified based on the kind of visitor experience on offer, and this affects the level of development allowed, provision of recreational facilities, and management of each park. Under previous park management plans the classifications ranged from 'remote', to 'basic', to 'managed.' At this stage the future classification of Tawharanui Regional Park,

under the new parks plan, is unclear, and could be either 'remote' or 'basic', re-named as classification I or II. An example of the difference between these classifications could be the discontinued allowance of vehicles in the campground if Tawharanui was classification I.

This section has introduced the role of the ARC and put in perspective some of its main responsibilities. In terms of regional parks, the ARC's role is to combine conservation of flora and fauna together with meeting the recreational needs of Aucklanders – a combination that requires careful and ongoing management. The following section will discuss how Tawharanui fits into the parks network, and the proposed plans for Tawharanui that necessitate the current study.

2.9 Tawharanui Regional Park and Open Sanctuary project

Currently there is a proposed mainland island site at Tawharanui Regional Park, situated on an eastern peninsula north of Auckland (see Appendix G). The mainland island, or 'open sanctuary' as it will be referred to, will involve the construction of a predator proof fence across the peninsula, approximately 2.6 kilometres in length, which will be followed by the intensive targeting of possums, rats, weasels, stoats, feral cats and other such pests (Ritchie, 2000).

The open sanctuary will also include a buffer zone outside the park, extending to a line between Omaha Beach and Baddeleys Beach, which will assist in preventing re-invasion of animal pests. Once these pests have been eliminated from the park, or at the very least significantly reduced, re-introduction of native species such as kiwi, brown teal, weka, bellbird, robin, as well as missing reptiles and invertebrates can begin (*ibid*).

The intentional use of the label 'open sanctuary' as opposed to 'mainland island' reflects that the park will be run much as before in terms of recreational activities and open access to the public, with an increase in conservation function. Whereas 'island' suggests exclusivity, 'open' implies inclusivity, and this is an important distinction to be made.

Whether or not these two functions can continue to be combined successfully however remains to be seen.

The open sanctuary will be managed and run as a joint effort between the ARC and the Tawharanui Open Sanctuary Society Incorporated (TOSSI). In this way not only is action on the ground able to take place potentially more flexibly than if the project was solely ARC managed, but the Society is also able to access charitable trust funds which are not directly available to the ARC (Thompson, 2002).

The original timeline for this project was to allow for construction of the predator proof fence in 2002, however due to funding shortages as well as ongoing discussions with neighbouring landowners regarding the exact positioning of the fence this has been delayed until early 2003. Funding to date has come from the Lotteries Environment and Heritage Fund, the ARC, the World Wide Fund for Nature, as well as from various donations and sponsorships.

Contact with the Project Manager for the Tawharanui Open Sanctuary project, Jo Ritchie, has revealed that in terms of consultation with iwi, landowners and the public, significant arrangements have been and are continuing to be made. Letters were sent to Kawerau a maki and Ngatiwai - iwi who claim manawhenua (ancestral ownership) at Tawharanui. Kawerau a maki have been interested in interpretation structures, and will be liaising with the coordinator of park signage and interpretation for assistance and input.

> Ngatiwai on the other hand have been heavily involved - they have a representative on the Technical Working Group and have been down to training sessions and most of our workshops - they have also been involved with the development of the operational plan. Most recently they have been involved with the development of a funding proposal to establish a pa harakeke (flax garden) which we were unsuccessful with, the development of a cultural materials plan and an archaeological survey to define the effects of the predator fence (Jo Ritchie, personal communication, September 2002).

Meetings have been held with adjoining landowners and they have been involved with commenting on the operational plan draft.

> We have an annual cricket match in January between Waikauri Bay residents and Tawharanui staff and adjoining landowners - a good but very competitive get together. In December with ARC Biosecurity Unit I sent out a letter to 240 landowners from Tawharanui to the Leigh Road to get support for an ARC driven possum and cat control programme on all the private land in that area to support the sanctuary so most landowners in the area will know about the sanctuary. This has had a lot of support and the control programme has now been running since April. I sent out a follow up letter in March and am due to do another one at the end of this month [August]. I have also formed a good relationship with Matakana Primary - one class has a display in the information shelter at Anchor Bay now so all the kids will have told their parents! And then we also have TOSSI - the Inc. Society which is spreading the word (*ibid*).

This section has introduced and described in general terms the plans for the open sanctuary at Tawharanui, as well as the kinds of consultation with community and stakeholders completed thus far. The importance of the implied difference between the terms 'mainland island' and 'open sanctuary' was also explained, a difference which optimistically will contribute in some way towards the success of this project.

2.10 Summary of Literature Review

The literature review has discussed the potential need for further mainland islands in New Zealand due to the loss of indigenous biodiversity and habitat destruction that has occurred since the arrival of humans. The Tawharanui Open Sanctuary project is one of many worthwhile efforts around the country to preserve and regenerate ecosystems *in situ* for conservation, while at the same time continuing to provide a recreational space for visitors. The bulk of work has already been undertaken for the open sanctuary project in terms of

planning, funding and consultation with residents and iwi potentially affected by the project, but recreational visitor views and knowledge of the open sanctuary has until now been an unknown. It is important to fill this gap for several reasons:

1) From the viewpoint of Human Dimensions Research, which advocates the understanding of and genuine need for input from affected stakeholders so that future conflict can be avoided. It is hoped that the survey can help highlight what kind of an understanding of conservation and pest control methods visitors to Tawharanui have. This could be important for future advocacy campaigns and interpretation at the park, which are useful from an educational perspective and helping ensure the continuance of public support for the project.

Also related to this, the research is useful from a management perspective, to know who visits the park, what activities they undertake, and what are their reasons for visiting. This information can be used in the future to justify decisions made about the park and recreational services and facilities provided. The survey is also one way of demonstrating that the ARC want to hear what rate-paying and non-rate-paying visitors to the park think of the conservation decisions made on their behalf, and has therefore also become something of a public relations exercise.

2) The survey has an educational role to play in telling people about the open sanctuary, and explaining what it involves and what it hopes to achieve. While 302 visitors is not an enormous number of people to have been informed about the project, of those a certain percentage also knew about the project beforehand, it is still a worthwhile function of the survey. It is hoped and expected that those visitors who came to the park but did not know about the plans for the open sanctuary will inform others of the plans for the open sanctuary.

3) The Tawharanui Open Sanctuary Visitor Survey took place over winter months, while the past visitor surveys administered at ARC parks have taken place during summer. This has the potential to highlight different park user groups and activities at Tawharanui.

For these reasons the Tawharanui Open Sanctuary Visitor Survey is a necessary piece of research for the ARC, and it is hoped that the same survey can be replicated again in future to assess the public's knowledge of conservation issues and their changing attitudes.

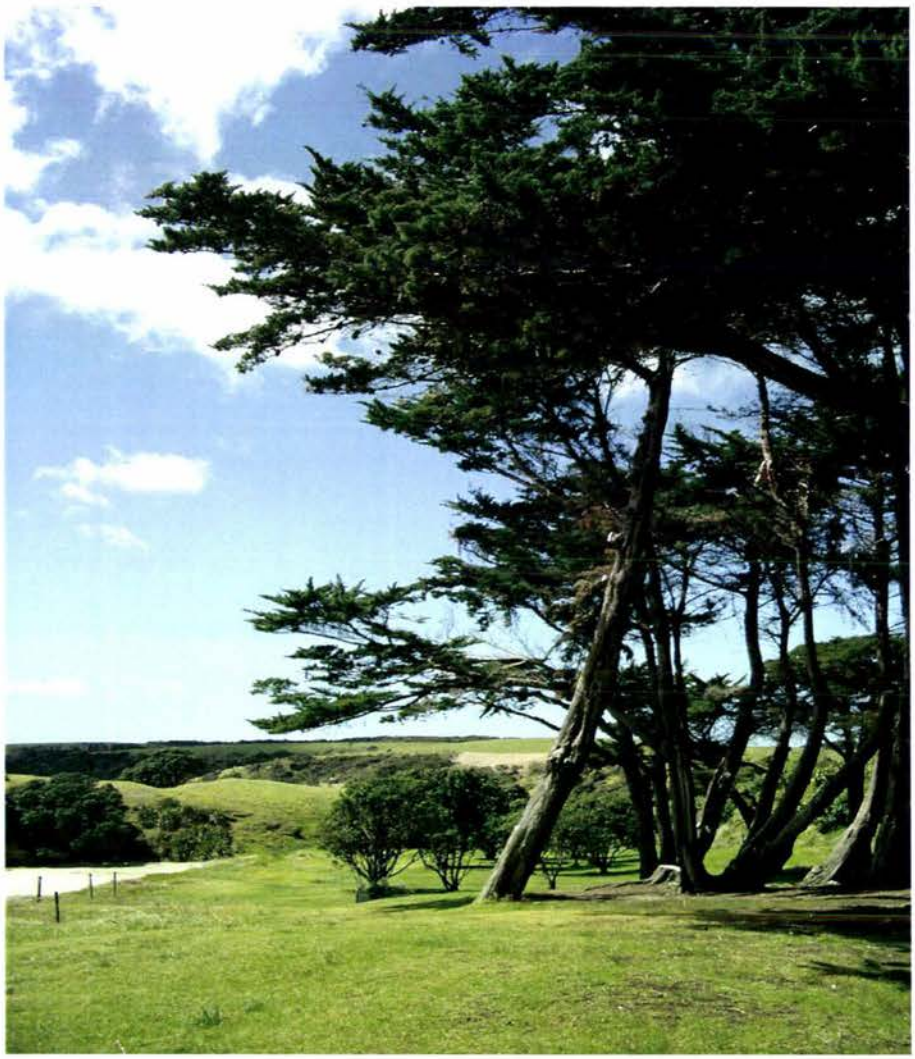

Plate 3. Trees at roadend at Anchor Bay. This is the site where many of the interviews took place.

CHAPTER THREE

METHODOLOGY

3.1 Aim of research and questionnaire design

The Tawharanui Open Sanctuary Visitor Survey was exploratory research, intended to provide the Auckland Regional Council (ARC) with accurate and up to date information about recreational visitors to Tawharanui Regional Park. The survey's main purpose was to highlight visitor knowledge of and attitudes towards the open sanctuary project underway at Tawharanui, and has had the added benefit of informing visitors of such plans. Visitor demographic details such as age, sex, and type of activities undertaken within the park were also recorded, information which is useful for the future management and provision of interpretation and recreational services at Tawharanui.

Specifically, the research aimed to highlight and obtain the following:

- demographics of visitors, such as age, sex, ethnicity, where they came from, how often they visited the park;
- visitor activities in the park, reasons for choosing Tawharanui, whether there was anything unsatisfactory about their visit or the park itself;
- visitor knowledge and attitudes towards the proposed open sanctuary at Tawharanui;
- visitor attitudes towards the proposed predator fence at Tawharanui ;
- visitor attitudes towards animal pests and pest control methods;
- visitor attitudes towards continued land for farming sheep and cattle;
- what level of involvement visitors would like with Tawharanui. This included volunteering occasionally, paying a small donation at the park entrance, and receiving newsletters about the park.

Meeting these objectives will include the testing of socio-demographic variables and the knowledge/attitudes of respondents for the statistical probability of relationships.

The questions in the research instrument were constructed on the basis of what the ARC wanted to know about recreational visitors, with input from Jo Ritchie and Tim Lovegrove of the ARC, as well as members of the Tawharanui Open Sanctuary Society Incorporated (TOSSI). Questions relating to visitor activities and reasons for visiting Tawharanui were developed from previous research into outdoor recreation in Auckland Regional Parks, as were several of the demographic questions (Auckland Regional Authority, 1988).

3.2 Method

The method chosen for this research was structured face to face interviews. The following is a discussion of the potential disadvantages of this method, how such drawbacks were addressed, and the comparative advantages of this method.

Potential disadvantages with personally administered questionnaires are the cost, possible occurrence of interviewer bias, and inability of the respondent to recall all information (Frazer & Lawley, 2000). Quite often respondents can be keen to finish interviews as soon as possible in order to go home or continue with their recreational activities, and such outside factors can also potentially influence a response (personal observation, researcher). These factors were addressed in the following ways:

Cost was addressed by a grant made available from the ARC for research expenses, as well as the provision of accommodation at the park for field workers. Given that this research was designed, implemented and results analysed by university students the costs were significantly lower than if the ARC had carried out this research themselves or contracted out to a professional company.

Interviewer bias was one important aspect of face-to-face administered interviews that needed to be addressed properly in order to ensure the rigour of the research being carried out. People bring with them individual personalities, beliefs and attitudes, as well as differing abilities, and care needs to be taken that these are not factors that could influence

the interviewee's response in any way. Kelsey and Gray (1986, p.33) instruct that interviewers should bear in mind the following attitudes:

1. Be Neutral: record information without suggesting an answer or inferring judgements.
2. Be Impartial: record information without showing or causing the respondent to feel different than any other respondent.
3. Be Casual: record information without acting overly concerned or at the same time uncaring or uninterested.
4. Be Conversational: record information without talking too much or too little. Maintain the appropriate amount of conversation.
5. Be Friendly: record information while placing the respondent at ease so the respondent will feel comfortable in providing information.

The potential difficulty of interviewer bias was reduced as much as possible by ensuring that each interviewer followed the above techniques when carrying out an interview. On three separate occasions for each, interviewers were supervised to ensure that the surveys were being carried out in the same manner and in accordance with the above attitudes.

In addition to this last point, it was almost certainly an advantage that 227, or 75% of the surveys, were carried out by the author, as this not only allowed the administration of questionnaires to be in the exact same manner, but also for the immediate identification of trends. This also provided a high degree of continuity with other aspects of the research, and Hill (1987) writes that where possible "survey design, field work and report writing should be done by the same person" for this very purpose (Hill, 1987, p. 71).

The third difficulty with personally administered questionnaires concerns outside factors beyond the control of the interviewer, such as the weather being cold, or the respondent wishing to leave and/or carry on with their recreational activities. These factors can lead to the respondent wanting to rush through the interview and not give well thought out answers that truly represent their thinking on the topics in the survey. In cases where it was felt that

the interview was going to become an intrusion or annoyance for the visitor, they were asked for a second time whether they wanted to complete the survey, thereby giving them an easy way to politely refuse. This was seldom necessary however, and apart from the people who declined to answer the survey (10 people) most visitors were extremely receptive to being approached. Information about the park's facilities and surroundings was passed on where the respondent was interested, and aside from being educational this had the added benefit of establishing a rapport between the interviewer and visitor. As a result visitors were put more at ease and potentially gave more thoughtful answers to the questionnaire, which also helped with the last difficulty, inability of the respondent to recall all information.

The advantages of personally administered questionnaires outweigh the above disadvantages. This kind of questionnaire is useful because it is has a very high rate of response and allows for immediate data collection (Booth, 1991). In addition, questions may be more complex than in other kinds of surveys due to the ability of the interviewer to explain if something is not understood properly (Frazer & Lawley, 2000). Furthermore, face-to-face administered interviews is the method of data collection utilised by the ARC for similar research, such as the visitor surveys referred to in section 2.7, and for these reasons was felt to be the most suitable way to collect data.

Before the surveys took place an attempt to inform recreational visitors of the survey was made by attaching six A-4 sized posters to notice boards around Tawharanui. It is unclear how many visitors actually read the posters, but some obviously had as they were aware of the research being done prior to being surveyed, and the researcher also received two emails of interest from members of the public. A copy of one of these posters is attached in Appendix E.

3.3 Pre-tests

Prior to surveys being carried out a lengthy process of "desk evaluations" and "user studies" took place. Desk evaluations involve checking the research instrument for any

errors, inconsistencies or inappropriate language, and that all objectives are being met (Cook, 1995). The questionnaire was reviewed by three Massey University staff as well as four Massey University masters students, who all gave suggestions for improvements such as the re-wording of certain questions. There was also input from four ARC personnel, including Jo Ritchie the Tawharanui Open Sanctuary Project Manager, and several members of TOSSI. After this had been completed a user study took place, which involved testing the research instrument on-site with 14 park users. This resulted in some further minor changes being made, but on the whole the instrument proved satisfactory and worked as intended. A copy of the research instrument is included as Appendix A.

3.4 Sample

As discussed in the literature review, adjoining landowners and iwi have already been and are continuing to be consulted over the open sanctuary. It was therefore deemed necessary that the user groups of the park should be surveyed for their knowledge and attitudes towards the planned project. Time was also a limiting factor in choosing the target group for this research, in that a completed thesis had to be finished by December 2002 to meet Massey University guidelines, and therefore other groups, such as nearby residents, were unable to be surveyed. This section discusses which park users were targeted, the timing of questionnaire administration, how many respondents were sought, and how respondents were approached to answer the survey.

The number of visitors to be interviewed was settled on beforehand at 300 (the actual number was 302). It was not feasible to survey many more than this in the timeframe available, however this sample is large enough to perform some statistical analyses. These surveys were carried out over 29 days between July 16 and September 1, resulting in an average number of approximately 10 interviews being completed per day.

The actual number of visitors to Tawharanui during the time of the survey (July, August and September), is estimated to be around 14,450. This figure is based on the number of whole trips over the vehicle counter at the entrance to the park, and multiplied by the

estimated number of vehicle occupants. In the case of Tawharanui this figure is currently 2.89 (Neil Olsen, ARC, personal communication, 23 October 2002), and takes account of visitors entering the park by other means, such as boat, kayak or by foot.

Because weekends were seen as the busiest time an effort was made to be at Tawharanui on those days. The number of survey days that fell on which days of the week were as follows:

Monday = 1
Tuesday = 3
Wednesday = 2
Thursday = 5
Friday = 5
Saturday = 7
Sunday = 6
Total = 29 days
Number of interviews completed on weekdays = 122
Number of interviews completed on weekend days = 180

Weather was a big factor in deciding how many respondents were able to be interviewed on any given day. When weather was poor (cold, windy, and/or rainy) there were markedly less people, save when the surf conditions were good which proved to be a big drawcard for many of the visitors surveyed despite the weather. An example of how the weather can affect park numbers can be seen in table 3.4a. A further example of this is in the fact that in the final weekend, 31 August and 1 September, when the weather was at its warmest, 63 people were able to be interviewed in only two days. This compares with just 10 for some other two-day periods. An even mixture of good and poor weather days was had throughout the time of the survey.

Table 3.4a Number of interviews completed on different weather days

	Very poor weather	moderate and/or changeable weather	very fine weather
Number of interview days	8	13	8
Interviews completed	55	129	118
Average no. of interviews completed per day	6.88	9.92	14.75

It was originally intended that each user group within the park would be surveyed according to the proportion those groups made up of all park users. This was not possible however, as the existing information about park users taken from previous park surveys was only relevant to user groups in summer (ARC 2001/2002b; ARC 2000), and therefore it was not realistic to try and gain a specific proportion (or percentage) of respondents from each group. Even so, it was possible to look at the main user groups of the park, decide what would be the best way to approach those users, and focus efforts on targeting those groups. The following is a discussion of the methods used to target the main user groups at Tawharanui Regional Park.

Walkers, picnickers and sightseers were approached as one group, and it was decided that the best way to obtain their response was as they were sitting down enjoying the scenery, resting, or walking back towards the carpark but still some distance from it. Rarely were people from this user group approached in the carpark as by this stage they were more likely to want to pack up and go home.

Surfers were approached only after they had been in the water and were relaxing on the beach, or were about to pack up their gear and leave the park. Often the interview was carried out as the surfers were changing and putting their gear into their vehicles, and in this way all surfers approached were happy to respond to the survey.

Campers were approached either in the morning before they left the park, or in the afternoon around 4:30 as they were starting to prepare for dinner. The small number of campers in the park meant that they could be found relatively easily, and in all cases were happy to respond to the survey.

Fishers were approached as they were fishing or packing up to go home. It was not possible to obtain as many responses from this group as was intended, because of the location of fishing spots. Most of the time interviewers would stay around Anchor Bay, which is the site of the main carpark, and where the marine park is located (see Appendix G for map of Tawharanui). Because Anchor Bay is where the majority of park users go that is where the majority of time was spent interviewing respondents. Traveling over to the other side of the park at low tide, which is when fishers were most likely to be present, was undertaken 22 times. However, some fishers also walked to the end of Tokatu peninsula and were therefore too far away to be interviewed. Some of these were able to be intercepted though as they returned to the carpark at Anchor Bay. This user group produced the biggest number of refusals to participate in the survey. A good reason for this is that a large Asian, particularly Korean, contingent make up this group, and they were seldom able to understand the questions. It is the researcher's understanding that their refusals to participate (five refusals, from 10 altogether) were because they felt their English to be poor, and they were too embarrassed to complete the interview.

In addition to the obvious difficulty of not being able to obtain a specific proportion of respondents from each user group, there was also the problem of not having enough visitors to the park when interviews were being carried out (this was true particularly on poor weather days). Despite these difficulties, it is believed that the 302 respondents to have taken part in the survey are generally representative of park users. Firstly because of the prior stratification of the main user groups of the park, which allowed for them to be especially targeted for interviews. Secondly because the interviews took place on a fairly even spread of weekdays as well as weekends, and thirdly because there was an even mixture of good and poor weather days throughout the study period. These have had the

effect of randomising the sample, giving each member of the sampling frame an equal chance of being represented in the sample (Page & Meyer, 2000).

Those visitors that displayed an interest in receiving newsletters about the park, and/or taking part in future volunteer activities, were given a subscription form (see Appendix I) to take away and fill in if they wished to become more involved in the open sanctuary.

3.5 Procedures for analysing results

The program for data analysis decided upon was the Statistical Package for the Social Sciences (SPSS), which was the program most familiar to the author and a good all round program for statistical analysis.

Many responses from the questionnaire had to be post-coded due to the open nature of many of the questions. This allowed for a certain amount of flexibility in dealing with people's responses when it came to analysing them, and it is thought that open questions produced more thoughtful responses from people than if they had simply been given boxes to tick. For example, question two, concerning visitors' main reasons for choosing to come to Tawharanui, provided a very wide cross section of answers. However in an earlier ARC visitor survey respondents just had selected options, such as, "the environment", "I always come here", "the facilities offered", and "peaceful" (Auckland Regional Authority, 1988). In the current survey, respondents also gave these answers, but probably not as frequently as if they had appeared in the survey as fixed categories.

Once the main categories for analysis had been decided upon, the data could be entered onto the spreadsheet. In most cases descriptive statistics and cross-tabulations were sufficient to explore the data and identify trends. Chi-squared analysis was also used where necessary to highlight a positive or negative relationship between variables. The P-values produced by this test signifies the probability that the relationship between variables is statistically significant (Page & Mayer, 2000). The value selection for establishing significance was 0.05. This follows widespread convention in statistical tests, and thus if

the resulting calculated figure was less than 0.05, it was concluded that a significant relationship existed with only a 5 per cent chance of a Type 1 error.

3.6 Ethical Issues

Because the questionnaire was administered using face-to-face interviews, there was a degree of lack of anonymity for respondents. However, no names or information were taken which could be used to identify respondents. Furthermore, respondents were told at the beginning of the interview who was carrying out the survey, what kinds of information would be taken and what the information would be used for. Visitors were given opportunity to refuse to take part in the survey if they wished, and only 10 people declined to be interviewed.

3.7 Limitations

This section discusses some of the problems with the survey and its overall limitations. This is a reflective analysis, and while it is easy with hindsight to identify how the questionnaire might have been improved, the fact remains that there was little time to include every possible question or idea that was of interest. Furthermore, time and resources were limited, and often new ideas and information became apparent only after the survey process was well underway.

It may have been better to structure the questionnaire more on the basis of current visitor research at regional parks that is carried out by the ARC, in order to produce more meaningful comparisons. An example of this is the way the age question (question 16) was framed. ARC surveys have recorded visitor ages in groups of 10 years starting at 15-24. This survey recorded ages in groups starting at 15-19 and then every 10 years. This has made meaningful comparisons of age groups very difficult.

A further item of past research from which some questions could have been usefully replicated is that of Fraser's research (2001) into the New Zealand public's attitudes

towards introduced pests and methods of pest control. For example, a question could have been included to ask visitors how long they thought it takes for an introduced animal to be considered part of New Zealand's fauna. Another question could ask why people hold preferences for certain kinds of pest control, such as trapping or hunting, and are against other kinds such as aerial baiting. Fraser's research was referred to in Chapter Two, and is mentioned again in Chapter Five.

The discovery that question seven on the survey was flawed, in that any given response to it could be interpreted in different ways, was only made after half of the surveys had been completed. When asked to rate how important it is that a particular pest be removed from the park, some people ticked all the pests as being very important even when they did not know the status of that pest. They seemed to assume that all the pests must be important to be removed simply because they appeared in the survey. The description of an open sanctuary in question four also told them that "possums, rats, stoats and other such pests will be targeted" and this could have influenced a person's response.

There was also some confusion inherent in this question because some people did not know whether they were saying that the pests were important to be eradicated from Tawharanui, or to be eradicated in general. It is possible for a pest to be a big problem at Tawharanui but not in general, or to be a big problem in general but not at Tawharanui. Therefore, it was impossible to determine whether this question measured a respondent's knowledge of pests at Tawharanui or in general. Further, it was difficult to determine how much this question measured attitudes towards a pest rather than respondent's knowledge of the pest. These problems with question seven were not apparent in the beginning, to either the researcher nor the people involved in checking the questionnaire. While it is interesting comparing people's responses for each pest, not too much should be drawn from the results because of the shortcomings of this question.

Finally, it is important to consider the occurrence of bias resulting from social desirability factors. Questions 21, 22 and 23 concerned visitors' future involvement at Tawharanui, specifically whether they would like to receive newsletters about the park, whether they

would pay a donation at the entrance to the park, and whether they would volunteer help with activities around the park. As will be discussed in the Results and Discussion chapters, positive responses for these questions were very high, and it is the researcher's feeling that had the survey been a more anonymous self-reply questionnaire these figures would not have been so high. The socially desirable nature of these questions is almost certainly a major factor in such high responses. This is not uncommon in surveys of this nature (Page & Meyer, 2000; Cook, 1995; Frazer & Lawley, 2000).

3.8 Summary

The Literature Review (Chapter Two) focused on the biological necessity for mainland islands in New Zealand, and the importance of social aspects to such conservation efforts. These social aspects, described as Human Dimensions Research, consist of efforts to understand and engender effective dialogue with affected stakeholders of resource management decisions. For the Tawharanui Open Sanctuary project this has involved the design of a survey that attempted to gauge recreational visitors' understanding and attitudes towards the proposed open sanctuary. This chapter has discussed the primary objectives of the visitor survey, and the methods employed in reaching these objectives. The following chapter discusses the results from this survey in the same format as the research objectives appeared above in section 3.1.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter will explore the responses for each question through descriptive statistics, and include analysis of data trends and relationships between variables. The results are arranged in the order the research objectives were laid out in the Methodology chapter (3.1). In most cases tables were considered the easiest way of presenting data, as these provide clear summations of results for each question.

When looking at the data it should be noted that in many cases respondents were able to choose more than one response, which had the effect of causing the frequency tabulation to total over 302, thus making it impossible to give an overall percentage for certain questions. In these cases each individual response should be considered seperately. For each open question there are additional responses that came through in the 'other' categories, and these responses appear in Appendix D together with people's final comments. Refer to Appendix A for the questionnaire itself.

4.2 Demographics of visitors

4.2.1 Gender (question 17)

This survey has recorded a higher number of males visiting the park, 58.9% (178), compared with 41.1% for females (124). This appears to be due to the number of good surfing days had during the winter months and at the time of the survey. As table 4.2b demonstrates, there were significantly higher numbers of males on weekdays, 67.2% (82), which is consistent with the findings that there were more surfers on weekdays – see section 4.3.1 for further details.

Table 4.2a Numbers of males and females recorded during survey

Sex	Frequency	Percent
Male	178	58.9
Female	124	41.1
Total	302	100

Table 4.2b Numbers of males and females recorded on weekdays and weekends

	Weekends		Weekdays	
Sex	Frequency	Percent	Frequency	Percent
Male	96	53.3	82	67.2
Female	84	46.7	40	32.8
Total	180	100	122	100

4.2.2 Age (question 16)

Table 4.2c Age of visitors to Tawharanui

Age	Frequency	Percent
15-19	22	7.3
20-29	89	29.5
30-39	69	22.8
40-49	55	18.2
50-59	39	12.9
60 and above	28	9.3
Total	302	100.0

On the whole a larger number of visitors to Tawharanui were young to middle-aged, with the highest single age group being those aged 20-29, with 29.5% (89) respondents in this category. Over half of all visitors were aged between 20 and 40.

4.2.3 Ethnicity (question 15)

New Zealand Europeans (including 'Pakeha', 'Kiwis' and 'New Zealanders') make up by far the largest ethnic group, with 80.8% (244). Asians are underrepresented here due to their higher rate of refusal to participate, and because many of them came to Tawharanui to fish. As mentioned in the Methodology chapter not as many fishers were surveyed due to their location in other regions of the park.

Table 4.2d Ethnic groups of Tawharanui park visitors

Ethnic Group	Frequency	Percent
NZ European/Pakeha	244	80.8
NZ Maori	14	4.6
Asian	12	4
Pacific Island	9	3
European	21	7
North American	4	1.3
Other	6	2

4.2.4 Location respondent traveled from to get to Tawharanui (question 13)

A high percentage of visitors came to Tawharanui from Rodney District, 41.7% (126), compared to other areas, which is perhaps as would be expected due to the proximity and convenience of the park for those people. For other visitors, coming from Auckland is a longer trip, but nevertheless the park still attracts quite high numbers from Auckland City, 27.8% (84) and North Shore City, 20.5% (62).

For 76.8% (232) of the respondents surveyed, the region they traveled from to get to Tawharanui on the day of being surveyed was also their place of residence. 23.2% (70) of respondents traveled from outside their normal place of residence.

Table 4.2e Location respondents traveled from to get to Tawharanui

Travel from today	Frequency	Percent
Auckland	84	27.8
Nth Shore	62	20.5
Waitakere	16	5.3
Rodney	126	41.7
Papakura	3	1.0
Manukau	5	1.7
Other North Island	6	2.0
Total	302	100.0

4.2.5 Normal place of residence (question 14)

Table 4.2f Place of respondents' residence

Place of residence	Frequency	Percent
Auckland	93	30.8
Nth Shore	60	19.9
Waitakere	22	7.3
Rodney	77	25.5
Papakura	3	1.0
Manukau	5	1.7
Other North Island	15	5.0
South Island	1	.3
Overseas	26	8.6
Total	302	100.0

Table 4.2f shows that fully half of all respondents came from Auckland and North Shore cities, figures slightly higher than for the previous question.

4.2.6 How often respondent has visited Tawharanui in the past year (question 12)

Exactly 50% (151) of respondents replied that they had visited Tawharanui 1-10 times in the past year. A quarter of respondents were visiting for the first time ever, 25.8% (78), and a quarter visited Tawharanui more than 10 times in the past year, 24.2% (73).

Table 4.2g Number of times respondent has visited Tawharanui

No. of times visit	Frequency	Percent
First time ever	78	25.8
1 to 10 times	151	50
More than 10 times	73	24.2
Total	302	100

4.2.7 How many people in respondent's group (question 19)

Table 4.2h Numbers of people in group visiting Tawharanui

Number of people	Frequency	Percent
1 person	51	16.9
2 people	134	44.4
3 people	45	14.9
4 people	26	8.6
5 people	19	6.3
6 people	12	4
7 and above	15	5
total	302	100

Table 4.2h shows that visitors traveled to Tawharanui in sometimes fairly large groups, though nearly half, 44.4% (134), came in groups of just two.

4.2.8 Occupation (question 18)

The largest occupational group to have visited Tawharanui during the survey was professionals/managers at 31.8% (96). Tradespeople, students and the retired were the next largest groups, see table 4.2i.

Table 4.2i Occupation of respondents

Occupation field	Frequency	Percent
Legislater/administration	3	1
Professional/Managers	96	31.8
Technician	14	4.6
Clerk	6	2
Service and sales	21	7
Agriculture and fisheries	6	2
Trades	45	14.9
Student	38	12.6
Unemployed	8	2.6
Retired	25	8.3
Homemaker	18	6
Other	11	3.6

4.2.9 Membership to a conservation organisation (question 20)

20.2% (61) of visitors surveyed replied that they belong to a conservation organisation. Crosstab analysis showed that a higher percentage of older people belonged to conservation organisations, 32.1% (9) for the age group 60 and over, compared with 18.8% (52) for the other age groups combined. A chi-squared test however showed that this relationship is not significant (chi-square = 4.727, DF = 5, P = 0.450).

Table 4.2j shows the two main conservation organisations that people belong to. The 'other' category includes infrequently mentioned and/or relatively unheard of organisations, including overseas conservation organisations.

Table 4.2j Membership of conservation organisations

Conservation Organisation	Frequency	Percent
Forest and Bird	22	7.3
Greenpeace	17	5.6
Other	33	10.9

4.3 Visitor activities and reasons for choosing Tawharanui

4.3.1 Visitor activities (question 1)

Walking was by far the most popular activity undertaken by visitors, with 61.6% (186) of respondents listing this activity. This was followed by sightseeing at 25.2% (76), surfing at 19.5% (59), and picnicking at 18.2% (55) – see table 4.3a.

Crosstab analysis between activities and gender showed that males were more likely to go to Tawharanui to surf, 27.5% (49), compared with females, 8.1% (10). When tested for significance this relationship was confirmed as being significant:
(chi-square = 17.613, df = 1, P = 0.000).

Crosstab analysis suggested that females were more likely to go walking at Tawharanui, 78.2% (97), compared with males, 50.0% (89). This relationship was also significant: (chi-square = 24.613, df = 1, P = 0.000).

A further relationship existed between walking and respondent age group. 75% (21) of people aged 60 and over went to Tawharanui for walking, compared with just 33.3% (7) for

the 15-19 age groups. A chi-square analysis confirmed a statistically significant relationship between age and walking (chi-square = 12.896, df = 5, P = 0.024).

As mentioned in the Methodology chapter, fishers had a higher rate of refusal to participate in the survey, which is thought to be because many of them did not understand English, or thought their English was not good enough. In addition, it was not always possible to intercept all fishers due to their location in other parts of the park. For these reasons fishers are underrepresented in table 4.3a.

Table 4.3a Activities undertaken by visitors

Activity	Frequency	Percent
Swimming	17	5.6
Mountain biking	6	2
Sightseeing	76	25.2
Surfing	59	19.5
Camping	16	5.3
Barbeque	3	1
Walking	186	61.6
Picnicking	55	18.2
Volunteering	13	4.3
Fishing	27	8.9
Photography	32	10.6
Boating	3	1
Other	20	6.6

4.3.2 Reasons for coming to Tawharanui (question 2)

Table 4.3b shows that the environment was by far the most popular reason for choosing Tawharanui as a destination to visit, with almost half of all visitors giving this reason.

Convenience and proximity were also popular reasons, nearly a quarter of respondents mentioned this as a factor.

As would be expected, a higher number of visitors from Rodney District mentioned that convenience and/or proximity were one of their main reasons for choosing Tawharanui, 32.5% (25), compared with about 18% (34) overall for other areas. Chi-squared analysis showed that this relationship was statistically significant (chi-square = 9.911, df = 4, P = 0.042).

Table 4.3b Reasons for visiting Tawharanui

Reason for visit	Frequency	Percent
Weather	49	16.2
Surf conditions	51	16.9
Convenience/proximity	73	24.2
The fishing	24	7.9
The environment	131	43.4
Peaceful	39	12.9
Never been here before	14	4.6
Wildlife/plants	7	2.3
Special occasion (eg birthday)	16	5.3
Uncrowded	23	7.6
Regularly come here	18	6
Walks	17	5.6
Recommended	21	7
Other	54	17.9

Weather and surf conditions were also relatively popular reasons for choosing Tawharanui as a destination, which was most likely due to the number of surfers visiting the park at this time.

On weekdays, 10.7% (13 out of 122) said that a major reason to go to Tawharanui was because it was uncrowded, whereas on weekends only 5.6% (10 from 180) gave this as a reason. This result is logical as there generally would be less people at Tawharanui on weekdays.

4.3.3 Points of dissatisfaction with visit or park in general (question 3)

77.5% (234) of people could not think of any reason to be unhappy with their visit to Tawharanui or the park in general. Of the 302 visitors surveyed, 5.3% (16) referred to the facilities on offer, 4.3% (13) to the access road to Tawharanui, and 11.6% (35) to 'other' reasons. Miscellaneous responses included (but with very low frequencies) 'farming', 'crowding' and 'untidy.' Appendix D includes people's comments and 'other' reasons for their dissatisfaction with an aspect of their visit or the park itself.

4.4 Visitor knowledge and attitudes towards the proposed open sanctuary

4.4.1 Knowledge of open sanctuaries (question 4)

Almost half of all respondents, 44.7% (135) had heard of open sanctuaries. Crosstab analysis comparing males' and females' responses to this question highlighted that overall females were more likely to have heard about open sanctuaries than males, with 49.2% (61) of females compared with 41.6% (74) for males. This difference was not statistically significant however (chi-square = 1.717, df = 1, P = 0.190).

Older visitors to Tawharanui were also more likely to have heard of open sanctuaries, and there is a noticeable trend in the increase of knowledge of open sanctuaries together with an increase in age. The 60 and over category had the greatest number, 64.3% (18), of people who knew what an open sanctuary was, see figure 4.4a. On this graph note the gap between the 'yes' and 'no' columns decrease as the age increases. A chi-squared test showed this difference to be significant (chi-square = 13.039, df = 5, P = 0.023).

A crosstab analysis of this question by ethnicity revealed that Maori were the most aware ethnic group of open sanctuaries, at 78.6% (11). New Zealand Europeans were next at 48.4% (118), followed by "other ethnic categories", a combination of North Americans, Europeans, Pacific Islanders and 'other' at 25% (10). Asians were the least aware at 8.3% (one person out of a possible 12 people). Due to insufficient numbers for the ethnic groups other than NZ Europeans, chi square tests were not able to be carried out to test any of the crosstabulation results.

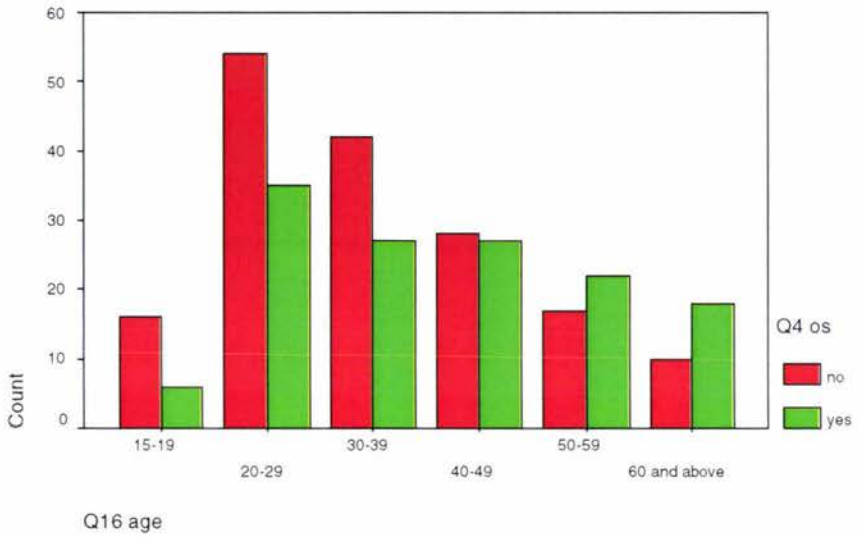

Figure 4.4a Percentage of visitors by age who know what an open sanctuary is

4.4.2 Awareness of plans for the open sanctuary (question 5)

Overall, only 22.2% (67) of visitors were aware of the plans for the open sanctuary. This number includes the 13 park volunteers who were interviewed, 12 of whom said they were aware of the open sanctuary. If the volunteers are removed from the group of 302 surveyed, the number of visitors aware of the plans for the open sanctuary decreases to 55, which is 16% of the total remaining. This signifies that a very low percentage of visitors to Tawharanui were aware of the plans for the open sanctuary.

Consistent also with the previous question, females were more likely to be aware of the plans for the open sanctuary, 25.8% (32), compared with males, 19.7% (35). Again however, this was not statistically significant (chi-square = 1.598, df = 1, P = 0.206).

As would be expected, a higher percentage of visitors from Rodney District were aware of the plans for the open sanctuary at Tawharanui, 36.4% (28), compared with an average of 18.0% (39) for other areas (these figures include volunteers). A further chi-squared analysis test showed this relationship to be significant (chi-square = 9.954, df = 3, P = 0.019). No visitors from Papakura, Manukau or the South Island knew about the plans for the open sanctuary.

As figure 4.4b demonstrates, there is an increase in awareness of plans for the open sanctuary at Tawharanui, together with an increase in age. This result is consistent with the previous question. (The percentages shown are for awareness of the open sanctuary plans overall. For example, while 25% of the respondents who were aware of the plans for the open sanctuary were aged between 40-49, a greater comparative percentage of respondents for the 60 and above age category were aware of the open sanctuary plans).

There is also a relationship, as would be expected, between awareness of having the open sanctuary at Tawharanui, and the frequency of a respondent's visit. Of those visiting Tawharanui for the first time 11.5% (9) were aware of the plans for the open sanctuary. Those who visited 1-10 times in the past year had a higher rate of awareness, 21.9% (33), and those who visited more than 10 times in the past year had the highest rate, 34.2% (25). A chi-squared test was run to test this relationship, which proved to be significant (chi-square = 11.283, df = 2, P = 0.004).

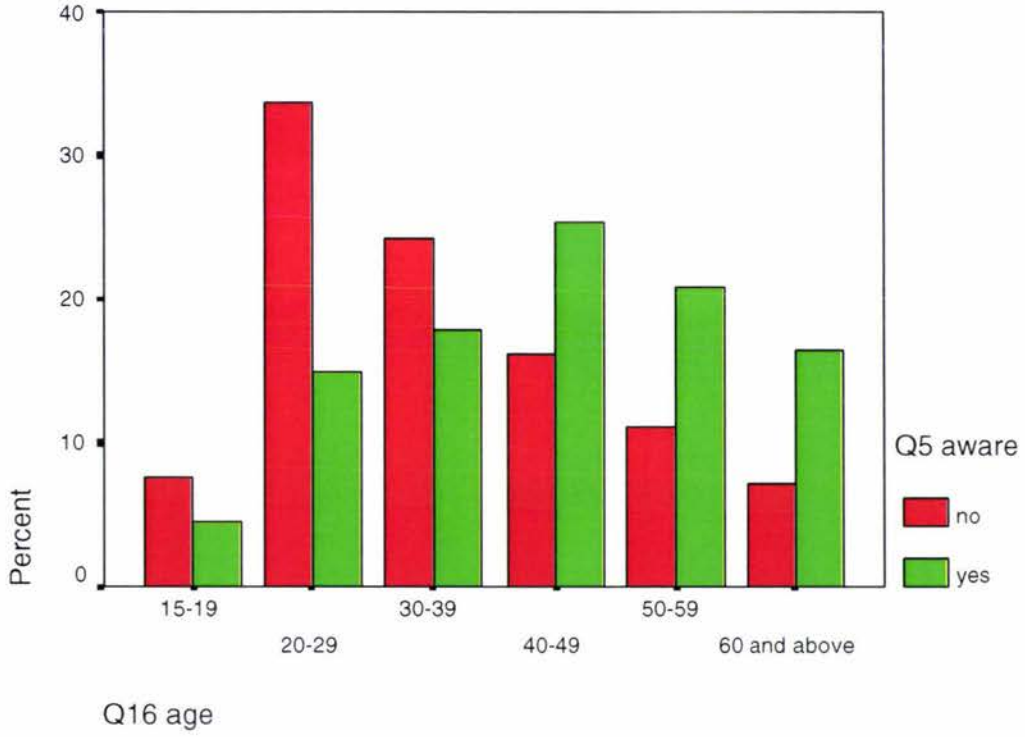

Figure 4.4b Percentages for awareness of plans for the open sanctuary by age

4.4.3 Drawbacks to having an open sanctuary at Tawharanui (question 5)

87.7% of people (265 respondents) could think of no drawbacks to having an open sanctuary at Tawharanui. Of the drawbacks that were mentioned, attracting more people to the park was the single largest reason mentioned, see table 4.4a.

Interestingly, several visitors who did mention drawbacks included visitors themselves as being part of the problem. The following are a selection of people's comments relating to this question (*numbers refer to each questionnaire number*): "Public awareness needs to be introduced and monitored" (138) (206) (247). "No, as long as people know what is expected of them" (121) (249). "OK as long as people don't disturb the wildlife" (63) (202)."Maintaining public interest in the project" (84). Further miscellaneous drawbacks are included in Appendix D.

Table 4.4a: Drawbacks to the open sanctuary

Drawbacks to sanctuary	Frequency	Percent
Drawbacks (yes)	37	12.3
Drawbacks (no)	265	87.7
Attracting more people	15	5
Non-pests harmed by poisons	3	1
Costs	4	1.3
Re-invasion of pests into park	2	0.7
Unsure	6	2
Other	17	5.6

4.5 Visitor attitudes towards the predator fence

4.5.1 Drawbacks to having a predator fence (question 8)

As demonstrated in table 4.5a, most people (82.8%, or 250 respondents) could not think of any drawbacks to having a predator fence at Tawharanui. While slightly lower than the figure for question six regarding the open sanctuary, this figure still shows that there is majority support for having a predator fence. Of those who did mention drawbacks to the predator fence, being visually unattractive was the most commonly given reason.

Of the 302 people surveyed, only one person was actually against the idea of having an open sanctuary and predator fence in the first place. This visitor stated "I don't like the fence and what it represents – too much tinkering with the environment (241). The same person also said in response to question 6: "Too many places are becoming protected to the point of loss of enjoyment. I like non-native plants and animals such as rosellas, loriqueets, wild ginger" (respondent 241). One other person expressed doubt that the project might work, and that the results from elsewhere were inconclusive (respondent 151). This person was not actually against the open sanctuary or predator fence however.

Similar to question six, visitors themselves were again thought to be a potential problem, this time for the fence itself. Eight respondents mentioned maintenance as a drawback because of the possibility of vandals harming the fence, and the costs involved in fixing it.

While not often thought of by respondents (only three people mentioned it), bottlenecking at the entrance to the park is likely to become a significant problem. This is discussed further in Chapter Five.

Table 4.5a Drawbacks to the predator fence

Drawbacks to fence	Frequency	Percent
Drawbacks (yes)	52	17.2
Drawbacks (no)	250	82.8
Bottlenecking/crowding at the gate	3	1
Cost	6	2
Maintenance	8	2.6
Visually unattractive	27	8.9
Other	14	4.6

4.6 Visitor attitudes towards animal pests and pest control methods

4.6.1 Animal pests (question 7)

Visitors were asked to rank a number of animal pests on the following 6-point scale to determine how important each were considered to be removed from the park.

1 = very unimportant

2 = unimportant

3 = neither important nor unimportant

4 = important

5 = very important

6 = don't know (coded as 'missing' and not included in descriptive statistic analysis).

Table 4.6a shows people's mean ratings for each animal pest: possums, mustelids, mice/rats and cats score very highly as being important to eradicate from the park. Figure 4.6a shows these results pictorially.

There were large numbers of people who chose the "don't know" category in this question: as many as 29.8% (90) for argentine ants, 14.9% (45) for hedgehogs, and 12.3% (37) for magpies.

Table 4.6a Mean responses for evaluation of each animal pest

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.
MUSTELIDS	280	1.00	5.00	4.810	.5114
POSSUMS	289	1.00	5.00	4.757	.6589
RABBITS	279	1.00	5.00	4.154	.9528
MICE/RATS	287	1.00	5.00	4.578	.7479
CATS	285	1.00	5.00	4.438	1.017
HEDGEHOGS	257	1.00	5.00	3.268	1.364
MAGPIES	265	1.00	5.00	3.818	1.133
WASPS	277	1.00	5.00	4.050	1.193
ANTS	212	1.00	5.00	4.264	.9717
Valid N	180				

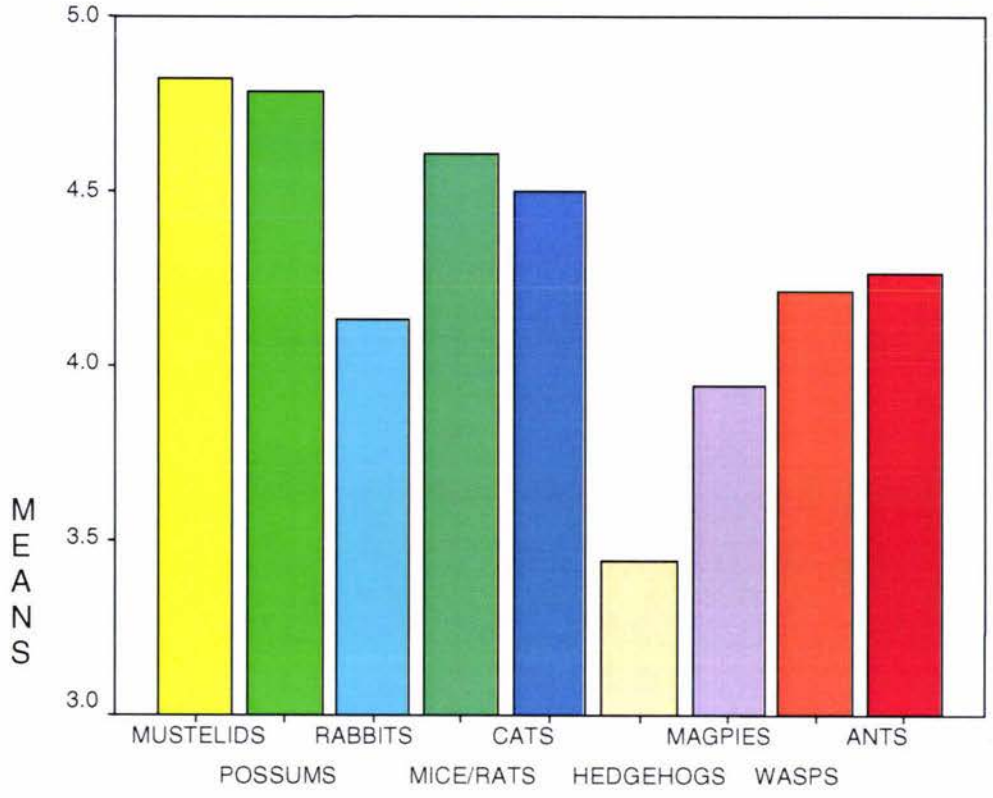

Figure 4.6a Mean responses for each animal pest

Also of interest in this question is the effect that membership of a conservation organisation had on pest ratings. Except for wasps, all pests were rated more towards the upper end of the scale (signifying that they are more important to be removed from the park) by those people who belong to conservation organisations, than by those who do not. Figure 4.6b shows a representative set of responses for most pests. Figure 4.6c, for wasps, is the only exception.

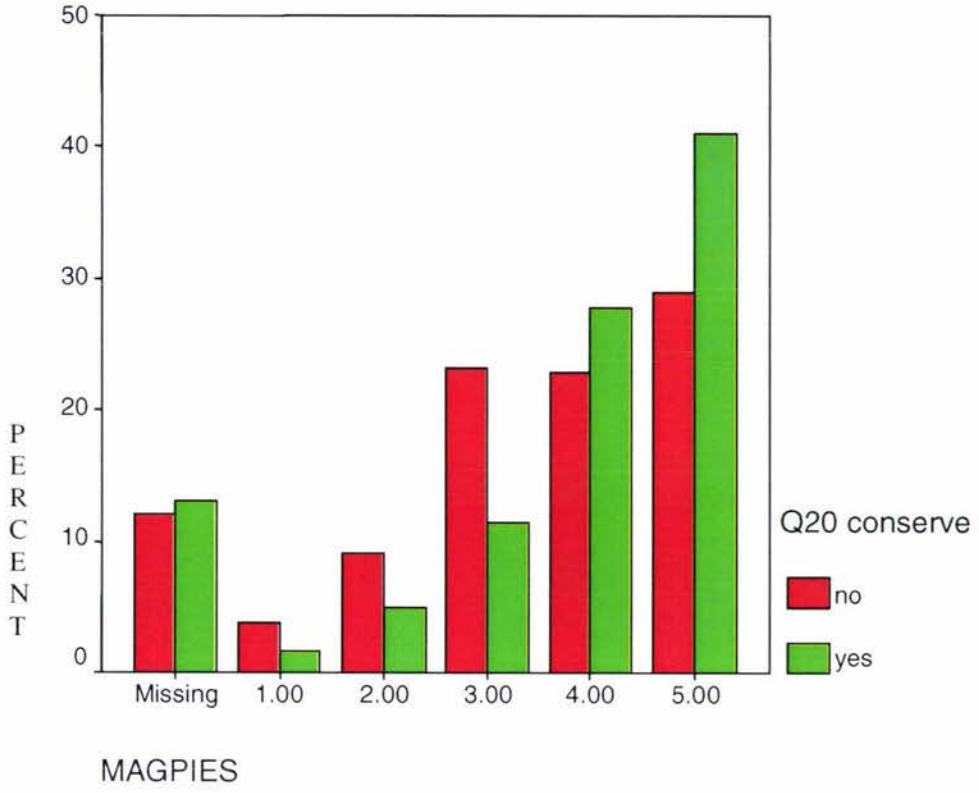

Figure 4.6b Importance of magpies to be removed from the park based on membership of a conservation organisation

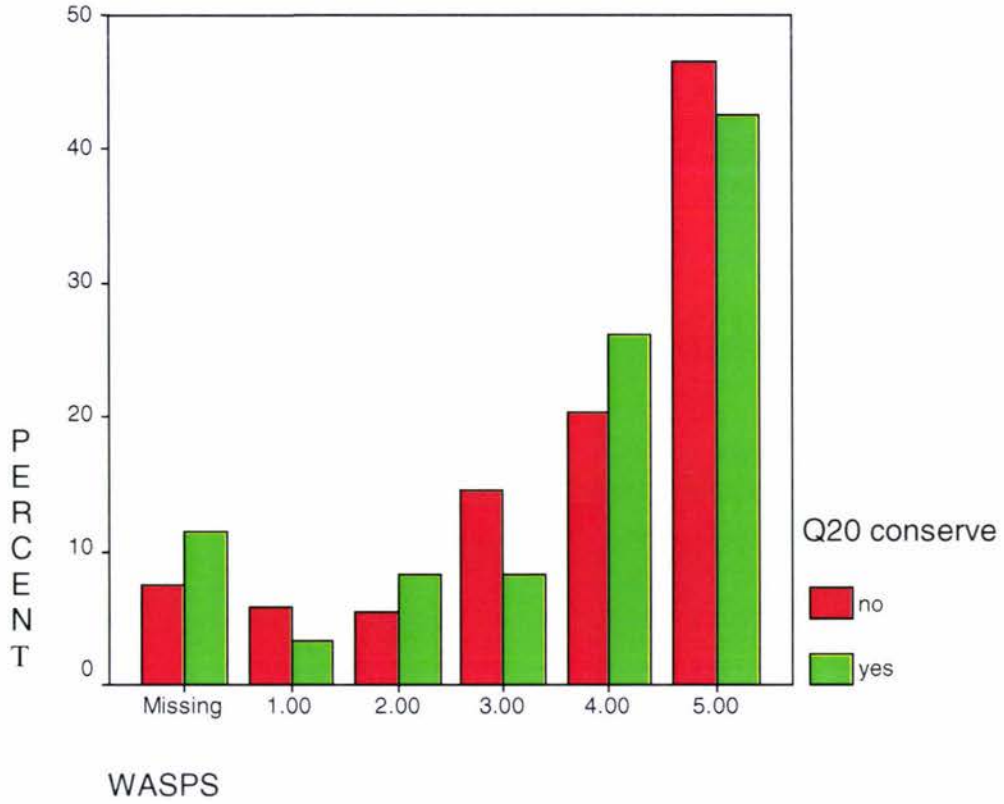

Figure 4.6c Importance of wasps to be removed from the park based on membership of a conservation organisation

4.6.2 Preferred pest control methods (question 9)

Question 9 tested for a respondent's preferred methods of pest control, and this produced a range of interesting responses. Most respondents were happy with trapping and bait stations, 73% (221) and 63% (193) respectively. For aerial drops however only 17.5% of respondents, or 53 individuals, thought this was an option for pest control. Responses to question 10 (section 4.6.3) also supported this trend.

Crosstab analysis suggested that people who belong to conservation organisations were more likely to say aerial drops are a suitable means of pest control, 32.8% (20) as opposed to those who do not belong to one, 13.7% (33). A chi-square test confirmed that this was a significant relationship (chi-square = 12.265, df = 1, P = 0.000).

Table 4.6b Suitable techniques for pest control

Suitable techniques	Frequency	Percent
Trapping	221	73.2
Hunting	156	51.7
Bait stations	193	63.9
Aerial drops	53	17.5
Don't know	10	3.3

There were also some differences in attitude towards methods of pest control between the sexes. Females were more likely than males to mention trapping, bait stations and aerial drops as being suitable methods, as shown in figures 4.6d, 4.6f and 4.6g. Males however were more likely to support hunting as a means of pest control, see figure 4.6e. Chi-square tests were conducted to ascertain whether these relationships were statistically significant. Results of these tests are included after each graph. (Note: In each graph 'yes' refers to those who think that the pest control method is suitable, and 'no' to those who did not choose this method).

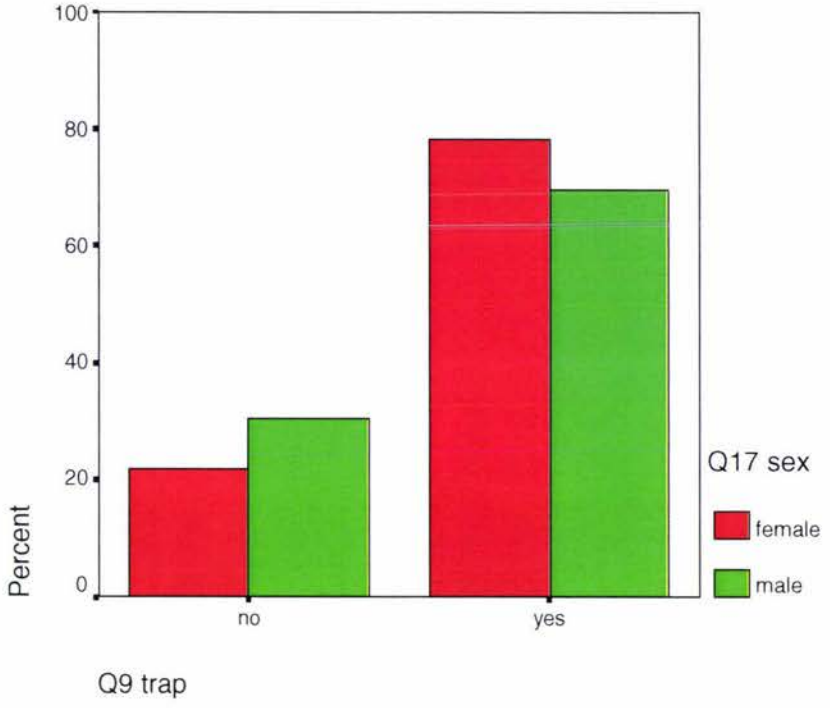

Figure 4.6d Male and female responses for suitability of trapping

Chi-square = 2.730, df = 1, P = 0.098. Relationship is not statistically significant.

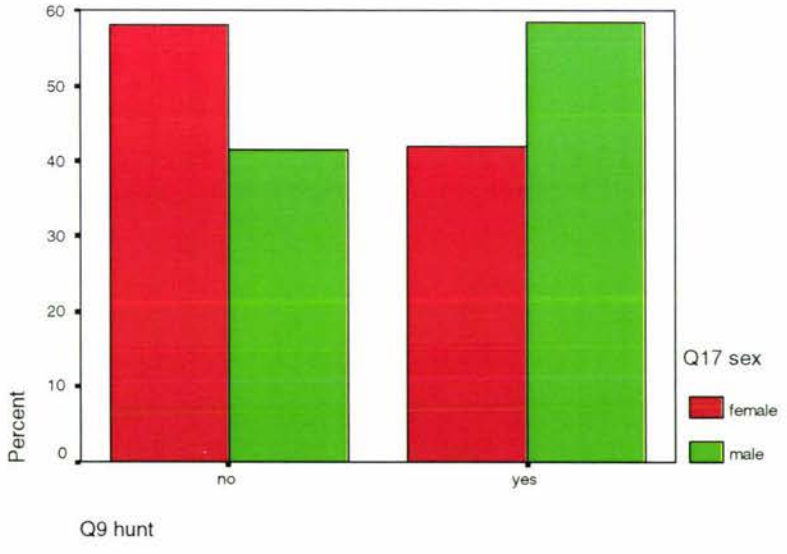

Figure 4.6e Male and female responses for suitability of hunting

Chi-square = 7.960, df = 1, P = 0.005. Relationship is statistically significant.

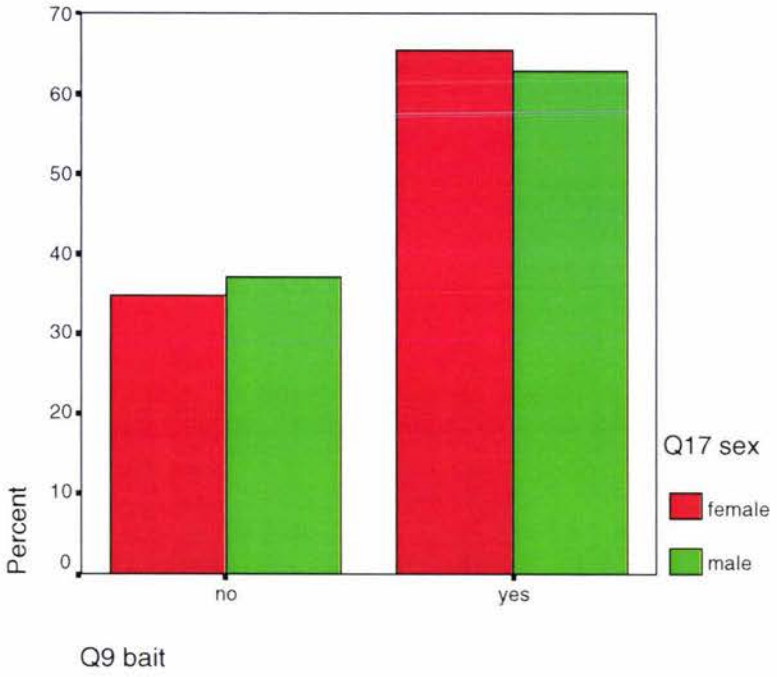

Figure 4.6f Male and female responses for suitability of bait stations

Chi-square = 0.183, df = 1, P = 0.669. Relationship is not statistically significant.

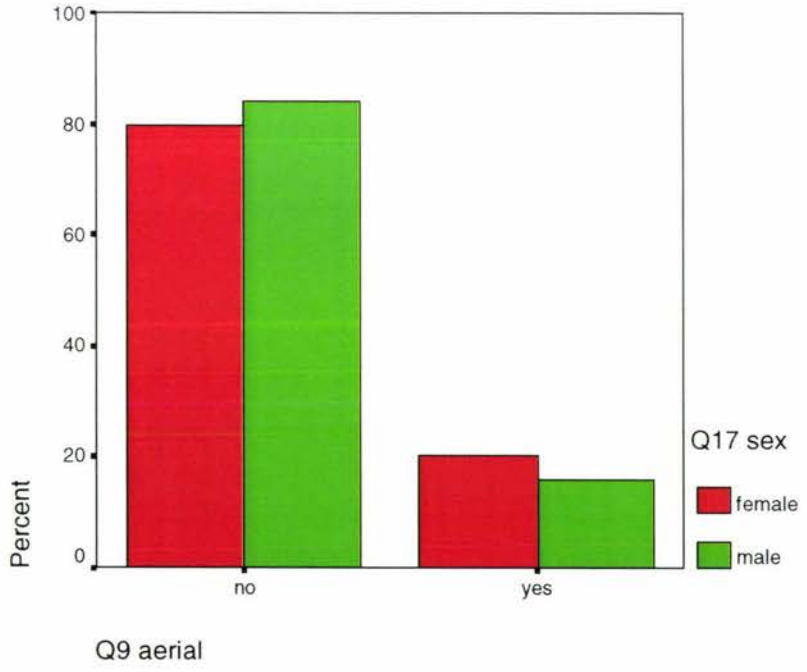

Figure 4.6g Male and female responses for suitability of aerial drops

Chi-square = 0.992, df = 1, P = 0.319. Relationship is not statistically significant

4.6.3 Least preferred pest control methods (question 10)

Table 4.6c shows that 39.7% (120) of respondents could not think of any unsuitable methods of pest control. The most striking result from this question is for aerial drops: 42.1% (127) of people were against using this method. This high figure has implications for the public acceptability of using aerial operations in conservation, which is discussed in more detail in the Discussion chapter (five).

An interesting result from this question is the greater likelihood of people who belong to conservation organisations who say that there are no unsuitable techniques for pest control, 50.8% (31) compared with 36.9% (89) for people who do not belong to a conservation organisation. A chi-squared test showed that this was a statistically significant result (chi-square = 3.992, df = 1, P = 0.048).

Table 4.6c Unsuitable techniques for pest control

Unsuitable techniques	Frequency	Percent
Unsuitable (yes)	182	60.3
Unsuitable (no)	120	39.7
Trapping	8	2.6
Hunting	28	9.3
Bait stations	23	7.6
Aerial drops	127	42.1
Don't know	13	4.3
ten 80	20	6.6
Poison	36	11.9
Other	5	1.7

Also interesting is the difference in attitude towards aerial drops amongst different age groups. For people 50 years and over, only 25% (17) were against the use of aerial drops, compared to 63% (14) for the 15-19 age group. People aged 20-29, 30-39 and 40-49 also

had a higher percentage of opposition to aerial drops, 44% (39), 48% (33) and 44% (24) respectively. A chi-square test showed this relationship to be statistically significant (chi-square = 12.972, df = 5, P = 0.024). The higher percentage of older people belonging to conservation organisations helps explain this trend, see results to question 20 (section 4.2.9).

4.7 Visitor attitudes towards land for farming (question 11)

Table 4.7a indicates that most people, 81.8% (247) support the continued use of land for farming sheep and cattle, and do not see this as being inconsistent with the objectives of the open sanctuary. In some cases people approved (in principle) the use of land for farming on the basis of certain conditions being met; such conditions appear as additional comments located in Appendix D.

Of interest is the result that people who belong to conservation organisations have a higher level of disapproval of the continued farming of land, 18.0% (11), than people who do not, 11.6% (28). This result seems to imply that environmentally concerned people are less inclined to see the need for farmland on a conservation site. However, a chi-squared test analysis showed that this relationship was not significant (chi-square = 2.088, df = 1, P = 0.148).

Table 4.7a Opinions regarding the continued use of land for farming

Attitude	Frequency	Percent
Approve:	247	81.8
Disapprove:	39	12.9
No opinion:	10	3.3
Other:	11	3.6

4.8 Future visitor involvement

4.8.1 Receive newsletters about the park (question 21)

A large number of people, 54% (163), answered 'yes' to the question of whether they would like to receive newsletters about the park. 35.8% (108) said they would not like to receive newsletters, and 10.3% (31) said not-applicable.

Of those who said they would like to receive newsletters, 26.8% (81) would prefer by post, 19.9% (60) by email, and 7.3% (22) said they would like to access a Tawharanui Regional Park Open Sanctuary website (as is now possible for the Karori wildlife sanctuary, see : http://www.sanctuary.org.nz/index.html).

4.8.2 Pay a donation at entrance to the park (question 22)

A surprisingly large number of people said they would pay a donation to enter Tawharanui if there was a donation box, 65.9% (213). Of those who answered 'yes' or 'sometimes' to this question, 67.2% (203) said they would pay under $5, and 3.3% (10) said they would pay $5 to $10. No visitors would be prepared to pay more than $10.

Table 4.8a Visitors willing to pay a donation

Pay a donation	Frequency	Percent
Yes	119	39.4
No	80	26.5
Sometimes	94	31.1
N/A	9	3
Total	302	100

4.8.3 Volunteering (question 23)

48% (145) of respondents said they would be willing to volunteer with activities at Tawharanui. Crosstab analysis showed that respondents from Rodney district were more likely to offer to volunteer with activities around the park, 61.0% (47), followed by Auckland at 51.6% (48), Waitakere at 45.5% (10) and North Shore 45.0% (27). A chi-square analysis revealed that this difference was not statistically significant (chi-square = 4.196, df = 3, P = 0.241).

Also of interest is a crosstab analysis of this question by ethnicity. Maori were most likely to volunteer with 64.3% (9 people), followed by NZ Europeans at 50.8% (124 people), followed by "other ethnic categories" including North Americans, Europeans, Pacific Islanders and other countries at 32.5% (13 people), and finally Asians at 25% (3 people). While the numbers for Maori, Asians and "others" are small, they do show differences which are interesting. In particular is the apparent lack of interest in volunteering shown by Asian respondents, which is consistent with the Asian response for questions four and five. The implications of this and related matters are explained further in the Discussions chapter.

Beach cleanups and tree planting were the most common volunteer activities selected by respondents, with a reasonable level of interest in trap laying and hunting.

Table 4.8b Popularity of volunteer activities

Volunteering activities	Frequency	Percent
Tree planting	105	34.8
Predator trap laying	46	15.2
Hunting pests	39	12.9
Beach cleanups	111	36.8
Other	7	2.3

4.9 Summary

This chapter has described the results obtained for the Tawharanui Open Sanctuary Visitor Survey, and explored the data through crosstabulations and chi-square tests. Several positive relationships were identified, such as that between respondents who are members of conservation organisations and attitudes towards pest control methods. The results have provided information about recreational visitor knowledge, attitudes and their characteristics. This information is useful from the standpoint of Human Dimensions Research, discussed in section 2.6, allowing resource decision-makers such as the ARC and TOSSI the opportunity to know more about stakeholders in the Tawharanui Open Sanctuary project. These results are discussed in more detail in the following section, their relevance and relation with other research will also be considered.

Plate 4. Facing west, looking back at Anchor Bay and the trees at the roadend.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

The Tawharanui Open Sanctuary Visitor Survey has been an exploratory study to highlight the characteristics of visitors to Tawharanui, and their knowledge of and attitudes towards the open sanctuary. This chapter will discuss the significance of the relevant findings in the same format as they appeared in the Results chapter. Where possible figures will be compared with the two items of related research discussed in the Literature Review (Chapter Two), Fraser's (2001) and the ARC 2001/2002(a) Findings to Date. Included will also be other ARC market survey findings (ARC 2000; ARC 2001/2002b). These findings appear as either figures taken for all of the ARC parks together, from a sample size of 1268, or just for those recorded at Tawharanui, from a sample size of 102. Comments of visitors that support main points will also be included in order to provide further depth to the analysis; the entire list of people's comments can be referred to in Appendix D. Following the analysis of the research objectives several of the general trends that emerged during the research will be discussed.

5.2 Visitor demographics

5.2.1 Gender

This survey recorded 58.9% (178) of visitors as male, and 41.1% (124) as female (see table 4.2a). These figures are comparable with those for visitors to regional parks overall, being 54% male, and 46% female for the year 1999/2000 (sample size = 1268) (ARC, 2000). Figures for Tawharanui from a sample size of 102 for the year 1999/2000 observed 46% males and 54% females. The smaller sample size and time of survey (summer) may help explain the differences in figures recorded for gender.

5.2.2 Age

In this study age was measured in groups starting at 15-19 years, with every 10 years after that. Previous ARC surveys measured age in groups of 10 years starting at 15-24 years. Therefore, the age question (question 16) was not structured in a way that makes the results comparable with previous ARC surveys. Unfortunately this was not apparent at the time of developing the survey, and neither did it come up as an issue until after the surveys were completed and comparisons with past research became desirable.

5.2.3 Ethnicity

It should be noted that the first four ethnic categories, NZ Europeans, NZ Maori, Asians and Pacific Islanders are in most cases New Zealand residents, whereas Europeans, North Americans and 'other' are more likely to be overseas visitors in New Zealand for a limited period of time. While there are likely to be exceptions to this, and no information was taken to confirm the citizenship status of respondents, this is the researcher's observation based on conversations with respondents.

There are small differences in the figures recorded for ethnic groups between the current study and previous ARC surveys. This study showed 80.8% (244) of visitors to be European, with figures for Maori, Asian and Pacific Islanders at around 4% (see table 4.2d). ARC research from all the parks for 1999/2000 recorded 76% for NZ Europeans, and higher figures (around 8%) for Maori, Asians and Pacific Islanders. The breakdown for Tawharanui from the 1999/2000 survey however is closer to the current study, with 86% Europeans recorded, 2% for Maori, and 5% each for Pacific Islanders and Asians (note: this was from the smaller sample size of 102).

The lower numbers recorded at Tawharanui for Maori and Pacific Island visitors is most likely best explained by considering that south Auckland is where large populations of these ethnic groups reside (ARC, 1999).

5.2.4 Normal place of residence

The figures from past ARC surveys for respondents' place of residence are significantly different from those for the current survey, which is as expected because the ARC figures are for all of the parks, and cover a very diverse and geographically vast area. For this reason only the figures from ARC surveys for Tawharanui will be compared with this study.

For the 1999/2000-year survey, 16% of the visitors to Tawharanui came from Rodney district, compared with 25.5% (77) for this survey. North Shore and Auckland cities in 1999/2000 had 29% and 25% respectively, compared with 19.9% and 30.8% from the current study (table 4.2f). The relatively low numbers surveyed in 1999/2000 at Tawharanui, and the difference in survey times most likely best explains these slight differences. For example, it would be expected that in summer there would be greater numbers of visitors from Auckland and the North Shore as they visit Tawharanui for camping and/or holiday breaks. There are also many holiday baches around Tawharanui, such as at Christian Bay, which are more likely to be used in summer.

Both the past and current surveys recorded 8% of respondents as being from overseas.

5.2.5 Occupation

There are no figures for occupations from previous ARC surveys for comparison with the current study. Past ARC surveys have recorded income levels, but for this survey it was decided not to include an income question because this kind of information is usually sensitive and the question may irritate respondents.

The figures for this question, as listed in table 4.2i, do not total 100% because some respondents chose more than one occupation, and the occupations of the 14 respondents used in the pre-testing of the questionnaire were not recorded. This question was only added after the pre-testing of the research instrument, and has not proved to be a substantial

indicator for predicting people's responses. It has shown however that the most common occupational groups for visitors at Tawharanui during winter are professionals/managers, tradespeople, students and the retired.

The relatively high number of professionals/managers, 31.8% (96), appears to be significant, in that it suggests that a fairly large percentage of visitors to Tawharanui are more likely to be educated, hold managerial positions, and as a result be higher wage earners. This is consistent with results from ARC research (ARC, 2000), that visitors to Tawharanui have a higher than average number of visitors in the $50,000 + income bracket, 26%, compared with 24% for the regional parks overall. As would be expected, those parks which are closer to Auckland, and for which public transport is available, for example Shakespeare and Wenderholm regional parks, record lower levels of income. In the $50,000 + age bracket these parks recorded 21% and 17% respectively.

These results suggest that Tawharanui is more likely than other parks to attract people with higher levels of education, and better employment in terms of remuneration. While this research has not been able to demonstrate any relationship between knowledge of and attitudes to conservation, with regard to a person's education and/or employment, there is likely to be a link between these variables. In Williams' (2000, p. 11) paper regarding conservation on private lands, he notes the truism that "it's hard to be green when you're in the red." Further research in alternative regional parks, across income brackets and/or kinds of employment, could be used to test the link between these and a person's knowledge/attitude towards conservation.

5.2.6 Membership to a conservation organisation

The results from this question suggested that older people were more likely to belong to a conservation organisation than younger people, but was not shown to be statistically significant. This result had an impact on the responses to other questions in the interviews that were carried out. Because age was an indicator of membership to a conservation organisation, it follows that older people appeared more often to be better informed about

conservation in general, in that more of them knew what an open sanctuary was, and were more accepting of certain pest control methods.

5.3 Visitor activities and reasons for choosing Tawharanui

5.3.1 Visitor activities

For this question respondents were able to list as many activities as they had taken part in at Tawharanui during their visit; some mentioned just one activity, usually those going to the park for surfing, and many others mentioned multiple activities.

There are some difficulties in comparing the results for this question with results from other ARC surveys. One reason is that the ARC survey results (2000) for activities participated in are for all of the parks not just Tawharanui. The significance of this difference can be seen for example by the percentage overall of visitors to parks who might go surfing, 2.4% (30), compared with the number of surfers recorded during the current survey at Tawharanui, 19.5% (59). Further differences can occur due to activities which are allowed in some parks, such as walking the dog, an activity undertaken by 7.3% (93) for parks overall (ARC, 2000), but which could not occur at Tawharanui because of a ban on dogs. (Some visitors did choose to walk their dogs at Tawharanui despite this ban, see visitor comments for question three, Appendix D).

Two results that were consistent with ARC survey results (2000) for all parks, was that walkers were more likely to be women, and older respondents were more likely to go walking (see section 4.3.1). Both of these results were shown to be statistically significant.

5.3.2 Reasons for coming to Tawharanui

This question was open-ended, and people were able to give 1-3 reasons for choosing to visit Tawharanui that day. Because the question was open-ended a substantial number of people answered this question in rather vague terms. Responses such as "I haven't been here in a while" or "I usually/always come here" were common. If respondents had been

given the option of choosing from a set of limited responses, such as 'the environment', 'peaceful', 'uncrowded', then these responses would likely have been chosen much more frequently than they were in the current study. As it was, 'the environment' was the single most popular reason people gave for choosing to visit Tawharanui, followed by convenience/proximity, and reasons relating to recreational activities such as there being good surfing/walking available, or because of the fishing.

According to past ARC research, people choose to go to the parks for the recreational space it provides them, to escape the city, mental renewal, and for a social time with family and/or friends (ARC, 2001/2002b). The ARC research also notes, that people are largely unaware of the conservation functions regional parks serve (ARC, 2001/2002a), and this low level of awareness has important implications for how the ARC chooses to balance conservation with recreation. This point is discussed further in trend one, section 5.9.1.

5.3.3 Points of dissatisfaction with visit or park in general

Question three was an open-ended question, asking respondents whether there was anything they were unhappy with about their visit or the park in general. The closest equivalent in ARC surveys are the visitor satisfaction questions, which tend to focus on specific park attributes, such as the facilities, and use 5-point Likert scales to produce a percentage of satisfaction for each attribute. The ARC surveys also produce an overall park satisfaction figure, which for Tawharanui was 88% in 1999/2000 (ARC, 2000). Although using an entirely different method and measuring slightly different attributes, this figure is not too dissimilar from the 77.5% (234) of respondents in this study who said that there was nothing they were unhappy with. Those who did find something to be unhappy about often referred to the access road and the facilities. Significantly, at least five people were unhappy with the Westpactrust sponsored picture frames, which are a feature at all ARC regional parks (see Appendix D for comments). This and several of the other comments are indicative of people's dislike of perceived 'developments' seen to be inappropriate at remote category regional parks.

Examining the comments that people did make in response to this question it becomes apparent that obtaining 100% satisfaction from all visitors for all aspects of regional parks would not be possible. Several opposing viewpoints came through, for example those that do support the ban on dogs at Tawharanui and those who do not. Also those who would like the access road to Tawharanui sealed, and those who would not like it sealed for fear of attracting greater visitor numbers. Judging by the current high levels of satisfaction currently enjoyed by visitors at Tawharanui however, it appears the ARC has about the right mix in terms of meeting people's expectations.

5.4 Visitor knowledge and attitudes towards open sanctuary

5.4.1 Knowledge of open sanctuaries

Almost half of all the visitors to Tawharanui knew beforehand what an open sanctuary or mainland island was. This is quite a high figure given that the concept of open sanctuaries and mainland islands has only been around since 1989, and only really became more visible to the public in the mid 1990s with the introduction of six DOC managed mainland islands (see section 2.5). An even greater number of people were aware of conservation/restoration efforts on offshore islands such as at Little Barrier and Tiritiri Matangi (personal observation, researcher), therefore it is perhaps not surprising that mainland islands are seemingly becoming more widely known. When thought about in terms of the New Zealand population however, the percentage of the public that are aware of mainland islands is likely to be significantly less than the percentage recorded by this research. It is estimated by the researcher that visitors who visit a remote park such as Tawharanui are more inclined than the general population to be aware of conservation matters, but further research, perhaps by interviewing non-users of parks, would be needed to confirm or deny this hypothesis.

A high number of Maori knew what an open sanctuary was, the highest of any ethnic group, but unfortunately only low numbers of respondents were obtained for Maori and other ethnic groups outside NZ Europeans, making generalisations difficult. Despite only having 14 Maori respondents and 12 Asian respondents, the difference between these

groups seems clear: only one Asian respondent (8.3%) had heard of open sanctuaries, compared with 11 for Maori (78.6%). See 5.9.2, trend two, for discussion on related matters.

5.4.2 Awareness of plans for the open sanctuary

In contrast with the previous question, the number of visitors aware of plans for the open sanctuary are extremely low, 22.2% (67). Subtract the volunteers who would almost certainly be aware of the plans beforehand, and this figure further reduces to 16% (55). This is an important issue, because when people who do not know about the open sanctuary arrive at the park entrance, and find things completely changed, they may resent the perceived 'developments' (predator fence and gate) that have occurred. Because of this, at the point of entry there needs to be high quality interpretation in place so that visitors coming to the park realise why there is a fence, and what the ARC is trying to accomplish. Another option might be to pursue a wider public education program in the Auckland area, though attracting greater numbers of visitors to the park should be anticipated (this potential problem is discussed in section 5.4.3).

From the standpoint of Human Dimensions Research (section 2.6), the low level of awareness of the plans for the open sanctuary is a significant issue. While considerable consultation and advocacy within the local community and with adjoining landowners has occurred, only now once the project has almost reached the point of construction of the predator fence, are visitors to the park having their views heard. Some might see this visitor survey as being too little too late, and resent the lack of consultation and/or further research being done into visitor views and attitudes regarding major changes to a once 'remote' regional park.

As would be expected, visitors from Rodney were more likely to be aware of the plans for the open sanctuary compared with visitors from other areas, and this result was statistically significant. This result is most likely due to the ongoing community consultation and public advocacy efforts, see for example the recent article in the Rodney Times about the open

sanctuary (Williams, 2002). However, many visitors to the park come from outside Rodney, where information about the open sanctuary is not as prevalent, and this explains the low level of awareness overall.

5.4.3 Drawbacks to having an open sanctuary at Tawharanui

When asked about possible drawbacks to having an open sanctuary at Tawharanui, a number of people displayed some hesitation before answering this question. They were reluctant to answer 'no' on the basis of a half page description appearing on the survey, and seemed to feel that it was possible that there were drawbacks they had not thought of. Some of these people opted for an "unsure" answer, 2% (6), and others said outright that they could think of no drawbacks, but indicated that there might be some nonetheless.

Visitor support for the proposed open sanctuary was very high, and only 12.3% (37) mentioned any drawbacks that they could think of. Of these, only one person was against the idea of having an open sanctuary. One of the more widely mentioned drawbacks was the possibility of attracting more people to the park, 5% (15), and several respondents mentioned people themselves as being potential drawbacks (see section 4.4.3 for some of their comments, also Appendix D). Visitor education was seen as a priority for ensuring understanding and support of the open sanctuary.

While there was a high level of support for having an open sanctuary at Tawharanui, prior to the survey only 44.7% (135) of people knew what an open sanctuary was. This means over half of the respondents were basing their viewpoints on a half page description of an open sanctuary that appeared in the research instrument. While this would not necessarily affect people's attitudes, it is something to bear in mind when considering this result.

5.5 Visitor attitudes towards the predator fence

5.5.1 Visitor attitudes towards predator fence

Visitor attitudes towards the predator fence were slightly less enthusiastic than those attitudes towards having the open sanctuary. While 17.2% (52) of people mentioned potential drawbacks, such as the possibility of maintenance difficulties due to vandalism, or the unappealing nature of the fence visually, only one person was actually against having a fence (see section 4.5.1). One person doubted whether the fence would in fact work, and one other person mentioned that in the future it might prove to be a problem if the ARC wished to expand the predator free area outside the fence boundary. Other than these comments there was obvious support for the predator fence despite the visual appearance and possible inconvenience for visitors.

An issue that the ARC should be aware of and monitor closely, is the potential problem with vehicular access through the predator fence. As many as 8,500 vehicles enter the park in one summer month (figure is for whole trips, taken from ARC vehicle counter for January 2001), and following construction of the fence cars will have to enter and exit through an automated gate. It is also possible that visitors will be expected to search their vehicles for pests before entering the park. Delays at the gate then are likely to be a significant source of irritation for park users in the future, and therefore if the ARC wishes to keep visitors on side with the open sanctuary project, this problem should be planned for.

Experience at Karori Wildlife Sanctuary found that certain segments of the population are unhappy with predator fence construction, and the restrictions on access to protected areas are unpopular, especially with recreational user groups such as mountain bikers and dog walkers (Campbell-Hunt, 2002). However, these groups are generally in a minority, and at Tawharanui access will still be open to most recreational users even if access is a little more controlled than was the case previously. This point supports the conclusion in this thesis that people are in favour of the open sanctuary and predator so long as it does not impinge on their rights to existing recreational activities.

5.6 Visitor attitudes towards animal pests and pest control methods

5.6.1 Animal pests

As noted in the Methodology chapter, question seven is intrinsically flawed, therefore one should be cautious in assuming that the results from this question are necessarily representative of wider recreational visitor views. Bearing this in mind however, this question did produce some interesting responses, and was able to generally highlight people's attitudes and/or knowledge about a particular pest.

One result was that people who were members of conservation organisations more consistently rated pests as 'very important' or 'important' to be removed from the park, which this is more or less consistent with intuition. The only exception to this trend was for wasps, which is also perhaps unsurprising given that wasps would not be perceived to be as great a threat to native species compared with possums, mustelids or feral cats. Despite there being some very good ecological reasons to remove wasps from the park, such as that they compete with nectar-feeding and insectivorous birds for food sources, prey on invertebrates and can pose a risk to humans in high numbers (Ritchie, 2000), these are less likely to be widely known, even among people with conservation organisation affiliations. For this reason desire to remove wasps from the park probably stems more from a personal dislike (personal observation, researcher). This would help explain non-conservation organisation members' greater desire to see them removed from the park, and is more likely to be the case than those respondents having greater knowledge about wasps' pest status than conservation organisation members.

Overall, most pests were seen as being important to be removed from the park (see table 4.6a). The two pests with the lowest ratings, in other words the pests that were seen as the least important to be removed from the park, were hedgehogs and magpies. Hedgehogs were thought by many to be beneficial, and people were very often surprised to learn that hedgehogs were a pest, because they eat slugs and snails and are commonly seen as good for the garden (personal observation, researcher). While many people did not like magpies for personal reasons, it appears that people were less likely to feel that this was a sufficient

reason to give them a lower number, hence the lesser degree of importance of removing them from the park.

Fortunately for those trying to eradicate pests at Tawharanui there are none of the larger species of pest that so often provoke opposition to culling from the public. Fraser's research (2001) found that fully 81% of respondents, and by extension the New Zealand population in general, were in favour of managing wild deer as a resource. Chamois, thar, feral pigs and feral goats were also popular species of pest, with 47-54% of respondents opting for them to be managed as a resource, and 24-35% to be controlled at low numbers (as opposed to exterminating these pests). Such figures lend weight to the situation DOC finds itself in with deer on Stewart Island, discussed in the Literature Review (section 2.6), and suggests that for certain species of pest, wide spread culling operations will always be met with opposition.

5.6.2 Preferred pest control methods

Question nine asked respondents to list the kinds of pest control techniques they thought were most suitable for use in the park. While on the surface this question may have been testing a respondent's understanding of pest control techniques, it also highlighted their attitudes towards such techniques. Most often people answered this question in terms of how they felt about a particular technique and its application, and whether or not it was either cruel to animals or dangerous to humans. Little thought was actually given to how to best remove from the park those pests that were mentioned in question seven (personal observation, researcher). This is consistent with an observation in Fraser's research (2001), which is that "[p]ublic acceptance of control technologies appears to be mainly related to ethical and historical considerations" (Fraser, 2001, p. 28). Fraser goes on to note that, "it is unclear whether the differing levels of acceptability of various control methods reflect a real knowledge and understanding of these methods or simply different levels of media attention about the methods" (*ibid*, p. 28).

In the current research the most popular techniques chosen by people were trapping and bait stations (see table 4.6b), but these figures (as well as those for hunting) would probably be even higher if public concerns about human safety and cruelty to animals were addressed.

The results from the current research can be compared and contrasted with Fraser's (2001) findings for a similar question relating to suitable methods of pest control. Fraser found that for smaller species of pest, such as possums, rabbits and feral cats, poisoning was the most commonly favoured method, 44-52%. Shooting was the next most popular method at 20-28%. Trapping and biological controls received lower, mixed levels of support. Rather interestingly, trapping was considered suitable for possums and feral cats by 18% and 20% respectively, and for rabbits by only 9%. In the current research however, trapping was seen as the most suitable form of pest control.

When looked at in terms of gender, females were more likely to favour three kinds of pest control techniques, trapping, bait stations and aerial drops, but did not favour hunting (see figures 4.6d – 4.6g). It was demonstrated that the relationship between gender and hunting was statistically significant, which conforms with research by Sandborn and Schmidt (1995) that males are more often disposed towards hunting than females (Fraser, 2001). As Fraser writes this is as expected, as females are generally perceived to be more compassionate.

Sandborn and Schmidt's research found females were more likely to be opposed to the use of poisons, a finding also made by Fitzgerald, Saunders, Wilkinson, (1994) in their research into public attitudes towards pest control (Fraser, 2001). Findings from this research did not find females to be more opposed to poisons, the reasons for which are unclear, but this was however only a small difference and was not statistically significant.

5.6.3 Least preferred pest control methods

The most significant result arising from question 10 was that people who belong to conservation organisations were more likely to say that there are no unsuitable forms of

pest control, and this was shown to be a significant relationship. These figures suggest that people who do belong to such organisations are more likely to be aware of conservation issues and thus sympathetic to pest control methods, including those methods less widely acceptable. For example, people with membership of conservation organisations were more likely to support the use of aerial drops, see section 4.6.2.

As older people were more likely to belong to conservation organisations, this also meant that there was a statistically significant relationship between the age of respondents and their attitude towards aerial drops. In other words, more young people than old people were opposed to the use of aerial drops as a form of pest control.

Overall, a large number of the respondents were opposed to the use of aerial drops, 42.1% (127). This has implications for the palatability of using brodifacoum in aerial drops, which is known to take a long time to break down, and builds up in liver and muscle tissue (Eason & Spurr, 1995; Booth, Eason & Spurr, 2001). It is also lethal to non-target species such as pukeko, harrier and morepork, amongst other species (Eason & Spurr, 1995). Given that the public are often wary of the use of 1080, which in comparison is an environmentally more benign form of pest control, it can be inferred that aerial drops of brodifacoum would be an even less popular form of pest control if the public were more aware of its drawbacks.

What would make a good subject for future quantitative/qualitative research, is why exactly so many people are opposed to aerial drops as a form of pest control? Fraser's research (2001) suggests that a major factor in people's attitudes to pest control methods is humaneness, and of 844 respondents surveyed, 88% felt that pest control methods should meet a minimum standard for humaneness. But is humaneness the only issue? The current intense public opposition to the painted apple moth campaign in Auckland suggests that there are a wide and varied number of concerns that should be addressed in aerial operations. These concerns include fears over aggravated allergies in humans, lack of spraying precision and effects on non-target species, as well as the increase in chemicals in soils, water supplies and the food chain (see The New Zealand Herald website's features/environment section for stories relating to the painted apple moth campaign:

http://www.nzherald.co.nz/storydisplay.cfm?reportID=162576). These are all valid concerns not just for inner city campaigns like the painted apple moth, but also aerial drops at Tawharanui. How best then to address the public's overall distrust and/or dislike of using aerial methods for pest control? The current spate of "wipe out painted apple moth" advertisements on television, blatant propaganda aimed more at convincing than informing the public, hardly seems the sensible option given the degree of concerns people have. Greater transparency in decision making and consultation with those affected would not go amiss in such cases.

This research did not consider suitable or unsuitable methods of pest control in relation to which pest is being targeted. Had it done so it would likely have revealed, as did Fraser's research, differing attitudes towards the suitability of pest control methods and different pests. This idea is supported by the current furore in Australia over the culling of feral cats. A suggestion by Field and Game's Graham Eames to introduce a bounty for feral cats by shooting has been met with intense opposition from cat lovers across Australia, including the RSPCA (Ansley, 2002). Despite the fact that (in Australia) feral cats are to native fauna what possums are to the New Zealand environment, efforts to popularise shooting of these pests is "anathema" to many (Ansley, 2002). This kind of opposition to a particular form of pest control for a particular pest species is the sort of problem Greg Lind (section 2.6) was referring to when he spoke of public opposition to the poisoning of deer. Such conflicts can only be resolved, or at the least be better handled, by reference to the social aspects of conservation, and in particular through Human Dimensions Research (section 2.6). Constructive and open dialogue with concerned and affected stakeholders should be considered a necessary component to the successful carrying out of conservation programmes.

5.7 Visitor attitudes towards land for farming

Most visitors, 81.8% (247), were satisfied with the continued use of land for farming. This result clearly supports the idea that in most people's minds farming and conservation are not incompatible, and are in fact desirable. While 12.9% (39) were against the use of land

for farming, most of these suggested that the farmland should be phased out slowly and replanted, rather than the immediate cessation of farming altogether. At least four respondents were concerned with chemical uses on farmland such as pesticides and fertilisers, and how the runoff is managed. Only one respondent mentioned that they felt intimidated by the livestock on walkways, given that cows are more likely to be aggressive towards humans around calving time (two people if the researcher is to be included!)

5.8 Future visitor involvement

5.8.1 Receive newsletters about the park

A surprisingly high number of respondents, 54% (163), said they would like to receive newsletters about the park. This figure is more than likely positively skewed due to the presence of the interviewer, as it is a "socially desirable" response. The researcher feels that this figure would be lower if the research method employed was a self-reply questionnaire.

5.8.2 Pay a donation at entrance to the park

Results for this question were also felt by the researcher to be skewed by a social desirability factor, and a total of 65.9% (213) of respondents claimed to be willing to pay a donation at the entrance to the park (figure includes those willing to pay "sometimes"). Nevertheless, there does appear to be a significant number of people who would be willing to pay a donation, even taking into account the social desirability factor in this question. This would suggest that a donation box placed conveniently at the entrance to the park might be an easy option for raising further funds, which could go towards the costs of the open sanctuary.

5.8.3 Volunteering

Results for this question were also felt by the researcher to be skewed by a social desirability factor, and 48% (145) of respondents claimed to be willing to volunteer at Tawharanui. Even taking social desirability into account, there are still seemingly many

more visitors willing to get involved with volunteer activities. If having small numbers of volunteers is indeed currently a problem, one way to attract more people might be to let other park users know of the volunteer opportunities available at the time of their visit. Advertising in local newspapers or through the northern parks' newsletter (Northern Exposure) is one way to attract volunteers, but this is only likely to attract those people already involved in volunteering, or are prepared to make a special visit to Tawharanui to volunteer. An alternative strategy might be to target visitors when they are already at the park, by erecting temporary signs in prominent places to inform visitors that they have the opportunity to volunteer, even if it is just for a short time. With such large numbers of visitors, in particular campers, at the park in summer this is one way to utilise a potentially vast resource of physical labour – not to mention the intangible benefits such as conservation education and public goodwill. The major foreseeable difficulty with this would be in coordinating the greater numbers of people, and this would likely need to be done with the help of existing volunteers.

The Partnerships for Parks program run by the ARC is currently looking for ways to expand its core volunteers. This program coordinated 30,000 person hours in 2000/2001, and 47,000 person hours in 2001/2002 (ARC, 2001/2002b). It has been identified in research done by the ARC that there exists a large pool of potential volunteers who would like to participate on a semi-formal basis, but with an emphasis on recreation not just on volunteering (*ibid*). The suggestion given above that visitors should have the opportunity to volunteer when they are already at the park is consistent with this result by inviting park visitors to participate at their leisure.

5.9 Trends

During the course of carrying out the 302 interviews, of which the researcher himself carried out 230, several trends appeared. These trends were comments or types of behaviour that were not part of the specific research questions, and therefore were not included as quantitative data. The following is a discussion of these trends and their significance for this research.

5.9.1 Trend one

From speaking to a great many people in the course of carrying out the interviews, it became apparent to the researcher that people's biggest concerns have generally been with the continued open access of Tawharanui to the public, and that free entry should be maintained in the future. Both of these fears are, for now at least, without grounds and the respondent was informed of this. The frequency with which these comments were made though is significant in that it shows the import attributed to parks such as Tawharanui, and suggests that any types of restrictions, in particular on recreational activities, in favour of conservation, would be very unpopular. Further numerous comments along the lines of "please keep this lovely park as natural and unspoiled as it is now" (135), and "Tawharanui is a beautiful place to bring our children" (145) demonstrate how much the park means to visitors (for further comments see Appendix D).

5.9.2 Trend two

An interesting trend to have appeared was the number of people who mentioned the incidence of Asians overfishing and taking more than they should from the seashore. It is difficult to give an exact number of people who brought this up as the trend only emerged after around 150 surveys had been completed, but the figure is likely to be more than 10 and less than 20. This appears to be significant however because visitors brought this up entirely of their own accord, and there is nothing in the research instrument itself to prompt this line of thinking. The conclusion to be drawn from this is that there is a lot of what could be described as anti-Asian sentiment, and this is quite likely to exist in a significant proportion of visitors to Tawharanui.

This has implications for how the Auckland Regional Council wishes to address the issue of (particularly Asian) immigrants' perceived (if not actual) disregard for the environment. One possible course of action for this would be to introduce multi-lingual signage around ARC parks, ensuring immigrant groups know exactly what is expected of them with regard to the environment. This action would likely be unpopular because of the number of people

who would not wish to see more signs erected due to the visual impact, especially those in another language.

This problem does not look as if it will go away soon though, and as early as 1996 inspectors from the Ministry of Fisheries noted the number of groups from Asia over harvesting shellfish in the Auckland and Wellington regions (Weatherley, 1996). Furthermore, in the year 2002 alone there have been at least two high-profile prosecutions made of (mainly Asian) poachers taking undersize paua and lobsters, and exporting them to the markets of Asia (MacLeod, 2002, 2002a). Events such as these tend to stick in people's minds and reinforce impressions gained about overseas' attitudes, in particular Asian attitudes, towards the environment.

Possibly one way to educate Asian, and other immigrant groups, about the necessity of respecting the environment and not overharvesting resources, is to run regular advertisements in foreign language newspapers in Auckland, and on the foreign language radio stations. Use could also be made of the foreign language TV stations that are now broadcast in Auckland. Together, these would provide a most effective avenue for contacting the 10% and growing segment of Auckland's population that is not Pakeha, Maori or Pacific Island (ARC, 1999).

Also a positive word about Asian efforts at conservation. A recent Forest & Bird magazine article describes how the Chinese community in Auckland has recently set up a conservation education trust, which has attracted over 300 members so far. Activities have included tree planting on Mototapu Island and beach clean-ups on Rangitoto Island, with a future goal of helping the Miranda Naturalists' Trust buy land to protect bird roosting areas (Oliphant, 2002). The Trust aims to be a model for other ethnic communities around Auckland, and would be a good partner for the Auckland Regional Council in their efforts for advocacy aimed at immigrant groups.

5.9.3 Trend Three

A large number of people, perhaps as many as a quarter of respondents (*researcher's own estimation*), thought that the open sanctuary referred to the marine park, and did not differentiate between differences in management systems between the land and the sea. This is consistent with the findings from previous visitor surveys carried out at ARC parks, that showed people on the whole to be unclear about differences in central, regional and locally managed areas. Section 2.7 in the discussion pertaining to previous visitor surveys at ARC parks mentions this. Fraser's (2001) research also refers to this phenomenon, with the result that people are unclear on what organisations in New Zealand are responsible for pest management. The interpretation and signage to be erected at the entrance to the open sanctuary at Tawharanui will be one opportunity to make clear in people's minds that the ARC are responsible for conservation as well as recreation.

5.10 Summary

This chapter has considered the results of the survey in the light of other relevant research, and attempted to provide another level of interpretation beyond that based on statistical analyses alone.

In sections 2.4 and 2.5 the biological necessity for conservation of native species in New Zealand was described. This was followed by a discussion of the importance of the social aspects to conservation, Human Dimensions Research, and how this relates to natural resource management. The Tawharanui Open Sanctuary Visitor Survey was research based on Human Dimensions Research theory, and focused on providing the kinds of information important to resource managers that are required to consider the social implications of their resource decisions.

The survey has showed that there is already a high level of support for having the open sanctuary at Tawharanui. While this is so, care needs to be taken that the three objectives for Tawharanui, conservation, recreation and farming (Ritchie, 2000), can continue to be

reconciled. Most visitors surveyed were content to have farming continued at the park, and this did not interfere with their activities or enjoyment. However, as the conservation functions of Tawharanui increase in the coming years, the ARC and TOSSI need to be aware that any increased restrictions to areas, or cap on visitor numbers because of damage to the environment or effects on wildlife, will likely be met with frustration and opposition. People are generally supportive of the open sanctuary and predator fence so long as it does not impinge on their recreational activities. If a decision came down to having more conservation but less recreational activities, or continuing to allow unrestricted recreational activities but a decrease in conservation, it is believed that a majority of visitors would opt for the latter. Further research would help clarify this.

Plate 5: Sign at Anchor Bay asking visitors to stay out of dune area

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This research began by describing the threats to New Zealand's native biodiversity, namely introduced pests, and discussed the importance of the social aspects to conservation that are now seen as necessary for the success of projects such as mainland islands. The Tawharanui Open Sanctuary Visitor Survey was research that took as its theoretical foundation Human Dimensions Research, and was intended to provide decision-makers within the ARC and TOSSI information concerning recreational visitor knowledge and attitudes towards the planned open sanctuary. While the survey took place specifically for the Tawharanui open sanctuary, other persons or agencies involved in separate conservation projects may also find some of the information useful, particularly that information pertaining to visitor attitudes to pest control. This chapter summarises the main findings that emerged from the visitor survey, and provides recommendations for the ARC and TOSSI, including some ideas for further research.

6.2 Conclusions

The most significant findings to have emerged from the research are that a majority of visitors were unaware of the plans for the open sanctuary, and that there appears to be only conditional support for the open sanctuary (and by extension conservation in general at regional parks). Nearly all visitors were supportive of the open sanctuary, but this seems to be dependent upon the continuance of the status quo with regard to access and freedom of recreational activities. This result is also hinted at in previous research by the ARC (2000/2001a, 2000/2001b), which found that visitors were unaware of the conservation functions of regional parks, and see parks purely for people's recreation, and the opportunity to 'get away from it all.'

On the whole people appear to be relatively uninformed about conservation issues, for example the pest status of less well-known animals such as hedgehogs, and are possibly, as a result, less accepting of certain pest control methods. In this instance aerial drops were seen by most as being an unacceptable form of pest control, though significantly, were seen as more acceptable by those who belong to conservation organisations. For this and other reasons, public education and advocacy through interpretation will play important roles in the success of the open sanctuary.

One of the biggest drawbacks for visitors to having the open sanctuary will be the possibility of attracting more people to Tawharanui. Many visitors to this park value it for its comparative isolation and unspoiled beauty, and should the open sanctuary begin to attract greater numbers of visitors and accompanied developments this would likely impact negatively on existing visitors' enjoyment. A further drawback mentioned by visitors was those people who lack understanding and/or support for the open sanctuary. This might translate into harmful effects on wildlife, vandalism of the predator fence and subsequent costly maintenance. For these reasons on-going monitoring of people's awareness and attitudes towards the open sanctuary will be required to minimise such impacts.

6.3 Recommendations

Public understanding and support is vital for the long-term success of conservation projects. This was discussed in detail in the Literature Review, and was also identified in the survey from people's comments of concern for public education and responsiveness of resource agencies. At the time of the survey few people knew about the plans for the open sanctuary, and although this survey has gone some way towards rectifying this situation there is still a long way to go in terms of advocacy for the open sanctuary project.

Part of an ongoing public education/advocacy campaign should include attempts to inform people more of the dangers introduced pests pose to New Zealand native flora and fauna. Public understanding of these threats is not overly developed, and outside of the well-known pests such as possums and rats, most people are not particularly aware of the extent

to which the other pests damage native biodiversity. This is reflected in people's attitudes towards different pests, as well as methods of pest control, in particular aerial drops. Given that aerial drops are the most effective and cost-efficient way of targeting a wide range of pests, people need to be made more aware of their benefits as well as having their concerns addressed properly.

Levels of concern over aerial drops are indeed significant, and suggest that most people are uncomfortable with the idea of spreading large amounts of poison over the land in a seemingly haphazard manner. Furthermore, people are mostly unaware of what exactly aerial drops would entail, in terms of the length of time brodifacoum takes to break down, the impact it has through secondary poisoning, as well as by-kill of other species such as paradise ducks and pukekos. Such drawbacks to the use of brodifacoum through aerial drops suggests that the public would be opposed to this method even more strongly if they knew more about the ARC's plans to use this poison in aerial drops. The public's would-be opposition in itself does not mean that alternative methods of pest control must be found, but the ARC and TOSSI need to be aware that this could be a potential problem, and efforts at education/advocacy should be carefully focused.

Despite the large amount of support for the open sanctuary and predator fence, it has been observed that people are in favour of these only in so far as they do not restrict or impinge upon current recreational activities available within the park. As the Discussion chapter noted, any increase in restrictions in favour of conservation is likely to be met with opposition, therefore the ARC and TOSSI must be aware of this, and continue to balance their plans for conservation with providing opportunities for recreation.

Another problem visitors might potentially have with the open sanctuary relates to access to Tawharanui through the automated gate in the predator fence. Given the vast numbers of visitors that enter the park in summer, and will be expected to do so through an automated gate, delays are likely to occur. If this happens, the problem will need to be managed so that frustration over access to the park does not become frustration towards the open sanctuary and predator fence.

The survey has shown that many visitors are interested in learning more about the open sanctuary at Tawharanui by receiving newsletters, and would be happy to make periodic donations and volunteer at the park from time to time. As the Discussions chapter pointed out, these results signify that a funding opportunity is available should the ARC and TOSSI decide to make use of it. In addition to introducing a donation box, visitors could also choose to sponsor a hectare for pest control and tree planting, and/or purchase a fence post similar to the funding efforts made by the Karori Sanctuary in Wellington. Extra labour for volunteering activities, such as beach cleanups and tree planting, also exists in the form of on-site park users, which could be utilised to the benefit of the open sanctuary.

The environment is the single greatest reason people gave for choosing to visit Tawharanu, and efforts should be made to preserve the wild and untouched nature of Tawharanui as much as possible. As noted in the Results chapter, the predator proof fence is going to detract from the overall pristine nature of the park for many people, and the necessity for interpretation and signage is also likely to add to this effect. Therefore, keeping developments to a minimum inside the park should be a key objective.

Furthermore, in terms of promoting Tawharanui Open Sanctuary, both TOSSI and the ARC need to consider the implications of attracting more people to the park once the open sanctuary is in place. Many visitors value the park for its remote setting, and greater visitor numbers to see the open sanctuary could spoil the very reason some visitors go there. While Tawharanui is a remote location, and because of this attracts less visitors than other parks such as Long Bay Regional Park, the very real risk of attracting too many visitors needs to be taken seriously.

Due to perceived if not actual negative effects Asian and other immigrant groups are having on the environment, efforts to educate these groups about conservation in New Zealand should be considered by the ARC, possibly by targeting them through foreign language newspapers, radio and TV. There are also opportunities for getting immigrant community groups together for volunteering, such as the Chinese Conservation Education Trust is currently doing with input from DOC. Optimistically this would have the effect of 'killing

two birds with one stone', through helping to prevent environmentally damaging practices and by the sourcing of extra labour for volunteer work.

6.4 Limitations and future research

The visitor survey took place over the winter months, the least busy time of year for Tawharanui. For this reason, the sample used may not adequately represent the characteristics/attitudes of the general population of visitors to Tawharanui. However, the survey has highlighted potentially different user groups and attitudes, and the same or similar research would ideally be replicated during summer. It is recommended that this occurs so that results may be compared; for example, it would be interesting to see whether there were significant differences in the attitudes towards and knowledge about the open sanctuary project between summer and winter visitors. One might expect recreational visitors during summer (during this year or in coming years) to demonstrate greater awareness of the open sanctuary. The survey would occur well after the completion of this survey, which has had a role (albeit a small one) to play in informing visitors of the open sanctuary plans, and greater numbers of park users would have had opportunities to hear about the open sanctuary. Further research would be necessary to confirm whether visitors are becoming more aware or not.

Future research could be undertaken that might help clarify to what degree people would still be positive about conservation if certain restrictions were introduced. This may or may not become necessary, but given that an increase in visitor numbers and disturbances to wildlife are foreseeable occurrences, how acceptable would a cap on visitor numbers be, and/or restrictions on access to certain areas (such as that currently exist along the sand dunes for protection of nesting dotterels)?

This research recorded low numbers of ethnic groups, such as Maori, Pacific Islanders and Asians, and further research might be better focused on obtaining larger numbers of responses from these groups. The Results chapter was able to hint at the potential differences that exist between ethnic groups, especially with regard to knowledge of open

sanctuaries, and by allowing for greater numbers of non-NZ Europeans to be surveyed these results could be better tested.

Fraser's research (2001) concerning public attitudes towards introduced pests provides some interesting questions that could usefully be replicated in a further survey at Tawharanui. Suitable additional questions might be used to gain people's ideas about how long it takes for an introduced animal to be considered part of the 'native' fauna, or which animals people consider to be 'pests' and which animals are considered to be 'resources'. On a similar theme, it would also be useful to not only describe people's attitudes towards different pest control methods, but find out the reasons for these attitudes. For example, why do people oppose poisons, hunting or trapping, and is this something education and dialogue could address? The answers to questions such as these, if they could be implemented, would be of much value to resource managers facing potential opposition to pest control operations.

6.5 Summary

The proposed Tawharanui Open Sanctuary project is one of many 'mainland islands' in New Zealand, and represents a cutting edge development in conservation through efforts to restore ecosystems *in situ*. Pest control techniques pioneered on offshore islands have provided the knowledge base from which to restore indigenous species populations, and these are now becoming more widespread on the mainland. What is different is that conservation efforts on offshore islands were able to be carried out without significant input from the public, whereas on the mainland these efforts are less likely to succeed without public understanding and support. This study has highlighted the difficulties, and the necessity, of consulting with the public about conservation. The need for education about New Zealand's biodiversity situation is now more apparent, as well the need for increased dialogue between the public and resource management agencies.

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Tawharanui Regional Park Visitor Survey

"Excuse me, my name is ....., I'm helping the Auckland Regional Council and Massey University to carry out research into characteristics of visitors to Tawharanui Regional Park, and their attitude towards the proposed Open Sanctuary and predator fence.

"Your response to this survey may be used in the future planning and management of the park, and therefore your assistance in completing the survey is greatly appreciated. Your responses will remain confidential and no information will be taken that could be used to identify respondents.

"To make sure that people are randomly selected for this survey, I need to speak to someone over 15 years of age, and with the next birthday". *(Explain if necessary)*

"If you have any queries about this survey, the contact person is Wendell Cooke. His contact details are ph. (09) 441 6212, or wendellcooke@yahoo.com".

The first section concerns your reasons for visiting Tawharanui, and your levels of satisfaction/dissatisfaction with your visit.

1. Which activities did you or will you undertake at Tawharanui today? *(show card with activities)*

swimming	☐	walking	☐
mountain biking	☐	picnicking	☐
sightseeing	☐	volunteering	☐
surfing	☐	fishing	☐
camping	☐	photography	☐
barbecue	☐	boating	☐

other:

2. What were your main reasons for choosing Tawharanui today? *(list 1 to 3 reasons)*

i.

ii.

iii.

3. Is there anything you were unhappy with about your visit, or the park in general? If so please explain.

This section concerns your attitude towards the proposed open sanctuary and predator fence at Tawharanui

4. Do you know what an 'open sanctuary' or 'mainland island' is?

Yes ☐

No ☐

For those who do not know what an open sanctuary is, the following explanation may be given:
The Tawharanui open sanctuary is a partnership between the ARC and the community to restore a range of coastal lowland habitats back to their original state or as near as possible. This includes restoring populations of native birds and insects as well as native trees and vegetation. At Tawharanui a predator proof fence will be put up at the western end of the park, and thereafter possums, rats, stoats and other such pests will be targeted. Once these pests have been significantly decreased in number, re-introduction of native species such as the kiwi, brown teal, bellbird, etc can begin.

People are an integral component of the Tawharanui Open Sanctuary as Tawharanui is a regional park first and foremost and is therefore open to the public. The open sanctuary will not limit visitor use to the park, rather it will provide additional opportunities for visitors to become involved in the restoration project or to simply enjoy a restored coastal environment.

5.Were you aware there are plans for establishing an open sanctuary at Tawharanui?
yes ☐

no ☐

6. Can you think of any drawbacks to having an open sanctuary at Tawharanui?

7. Having an open sanctuary at Tawharanui will involve the removal of all animal pests. From the following list of animals, please select those that you feel are most important to be removed from the park.

	1 Very unimpt	2 unimpt	3 neither impt nor unimpt	4 impt	5 very impt	6 don't know
-mustelids (stoats, weasels, ferrets)	☐	☐	☐	☐	☐	☐
-possums	☐	☐	☐	☐	☐	☐
-rabbits	☐	☐	☐	☐	☐	☐
-mice/rats	☐	☐	☐	☐	☐	☐
-cats	☐	☐	☐	☐	☐	☐
-hedgehogs	☐	☐	☐	☐	☐	☐
-magpies	☐	☐	☐	☐	☐	☐
-wasps	☐	☐	☐	☐	☐	☐
-Argentine ants	☐	☐	☐	☐	☐	☐

Comments:

8. Can you think of any drawbacks to having a predator fence at Tawharanui?

9. Regarding pest control at Tawharanui, what techniques do you think would be most suitable for use in the park?

trapping ☐ hunting ☐

bait stations ☐ aerial drops ☐

Other:

10. Are there any techniques you think would be unsuitable for use?

11. Given Tawharanui's potential status as an open sanctuary, what do you think of the continued use of some of the land there for farming sheep and cattle?

To help us understand more about visitors to Tawharanui, could you please tell us a little bit about yourself.

12. How often have you visited Tawharanui in the past year?

my first time ☐ 1 to 10 times ☐ more than 10 times ☐

13. Where have you traveled from today to get to Tawharanui?

14. Is this your normal place of residence? If not, where is?
-yes ☐

-no ☐

Normal place of residence:

15. Which ethnic group do you consider yourself to belong to?

16. Which age group do you belong to?

Show card = 15-19 ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 and over ☐

17. Sex
-male ☐

-female ☐

18. What is your occupation?

19. How many people in your group (total)?

20. Do you belong to a conservation organisation (eg. NZ Forest and Bird)

-yes ☐

-no ☐
If so, which organisation(s)?

I'm going to ask you a couple more questions about your involvement in the future of Tawharanui. Would you be happy to receive or take part in the following?

21. Receive newsletters about the park –yes ☐ no ☐ n/a ☐

If so, would your prefer newsletters in the post, by email, or on a website?

☐ ☐ ☐

22. Pay small donation at entrance to park – yes ☐ no ☐ sometimes ☐ n/a ☐

-How much?

23. Volunteer from time to time – yes ☐ no ☐ n/a ☐

If yes, what specifically?

tree planting – yes ☐ no ☐

predator trap laying – yes ☐ no ☐

hunting pests – yes ☐ no ☐

beach clean ups – yes ☐ no ☐

other –

Are there any additional comments you would like to make?

Thank you for your time and assistance in completing this survey!

Table 4.2

New Zealand's Multilateral Environmental Agreements (November 1996)

	year treaty entered into force	date of NZ's signature (S) ratification(R) or accession (A)	date NZ's S/R/A came into effect[1]	date treaty came into effect in NZ[2]
Antarctica				
The Antarctic Treaty 1959	**1961**	*R 1.11.60*	*1.11.60*	*23.6.61*
Convention on the Conservation of Antarctic Marine Living Resources 1980 [CCAMLR]	**1982**	*R 8.3.82*	*8.3.82*	*7.4.82*
Atmosphere and Space				
Vienna Convention for the Protection of the Ozone Layer 1985	**1988**	*R 2.6.87*	*2.6.87*	*22.9.88*
Montreal Protocol on Substances that deplete the Ozone Layer 1987 [Montreal Protocol]	**1989**	*R 21.7.88*	*21.7.88*	*1.1.89*
London Amendment to the Montreal Protocol on Substances that deplete the Ozone Layer 1990	**1992**	*R 1.10.90*	*1.10.90*	*10.8.92*
Copenhagen Amendment to the Montreal Protocol 1992	**1994**	*R 4.6.93*	*4.6.93*	*14.6.94*
United Nations Framework Convention on Climate Change [FCCC] 1992	**1994**	*R 16.9.93*	*16.9.93*	*21.3.94*
Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies 1967	**1967**	*R 3.5.68*	*31.5.68*	*31.5.68*
Protection of the Marine Environment and Resources				
United Nations Convention on the Law of the Sea [UNCLOS] 1982	**1994**	*R 19.7.96*	*18.8.96*	*18.8.96*
International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties 1969	**1975**	*A 26.3.75*	*26.3.75*	*6.5.75*
International Convention on Civil Liability for Oil Pollution Damage (as amended) 1969	**1975**	*A 27.4.76*	*26.7.76*	*26.7.76*
International Convention for the Prevention of Pollution of the Sea by Oil 1954 [OILPOL]	**1958**	*R 1.6.71*	*1.9.71*	*1.9.71*
Amendments to the International Convention for the Prevention of Pollution of the Sea by Oil 1962	**1967**	*R 1.6.71*	*1.9.71*	*1.9.71*
Amendments to the International Convention for the Prevention of Pollution of the Sea by Oil 1969	**1978**	*R 27.4.76*	*27.4.76*	*20.1.78*
Convention on the Continental Shelf 1958	**1964**	*R 18.1.65*	*17.2.65*	*17.2.65*
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 [London Convention]	**1975**	*R 30.4.75*	*30.4.75*	*30.8.75*
Fishing				
Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific 1989 [Wellington Convention]	**1991**	*R 17.5.91*	*17.5.91*	*17.5.91*
Convention for the Conservation of Southern Bluefin Tuna 1993	**1994**	*R 9.5.94*	*9.5.94*	*20.5.94*
Whaling				
International Convention for the Regulation of Whaling 1946	**1948**	*R 2.8.49*[3]	*15.6.76*	*15.6.76*
Protocol to the International Convention for the Regulation of Whaling 1956	**1959**	*R 21.6.57*[4]	*15.6.76*	*15.6.76*
Hazardous Substances				
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1989	**1992**	*R 20.12.94*	*20.3.95*	*20.3.95*
Conservation of Natural Resources				
Statutes of the International Union for the Conservation of Nature and Natural Resources 1948 (IUCN Convention)	**1948**	*R 6.5.74*	*6.5.74*	*6.5.74*
International Plant Protection Convention 1951	**1952**	*R16.9.52*	*16.9.52*	*16.9.52*
Amendments to the International Plant Protection Convention 1979	**1991**	*R 10.4.90*	*10.4.90*	*4.4.91*
Plant Protection Agreement for the South East Asia and Pacific Region 1956	**1956**	*A 17.12.75*	*17.12.75*	*17.12.75*
Amendment to Article I(A) of the Plant Protection Agreement for the South East Asia and Pacific Region 1967	**1969**	*A 17.12.75*	*17.12.75*	*17.12.75*
Amendments to the Plant Protection Agreement for the South East Asia and Pacific Region 1979	**1983**	*R 10.4.90*	*10.4.90*	*10.4.90*
Amendments to the Plant Protection Agreement for the South East Asia and Pacific Region 1983	**1990**	*R 10.4.90*	*10.4.90*	*23.5.90*
Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] 1973	**1975**	*A 10.5.89*	*8.8.89*	*8.8.89*
Amendment to the Convention on International Trade in Endangered Species of Wild Fauna and Fauna (Art XI) 1979	**1987**	*A 10.5.89*	*8.8.89*	*8.8.89*
UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage 1972	**1975**	*R 22.11.84*	*22.2.85*	*22.2.85*
Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 [Ramsar Convention]	**1975**	*S 13.8.76*	*13.12.76*	*13.12.76*
Protocol to the Convention on Wetlands of International Importance... 1982	**1986**	*S 9.2.87*	*9.2.87*	*9.2.87*
Amendments to Art.s 6 & 7 of the Convention on Wetlands of International Importance especially... 1987	**1994**	*R 7.7.93*	*7.7.93*	*1.5.94*
Convention for the Protection of the Natural Resources and Environment of the South Pacific Region 1986 [SPREP]	**1990**	*R 3.5.90*	*3.5.90*	*22.8.90*
Protocol [to SPREP] for the Prevention of Pollution of the South Pacific Region by Dumping 1986*	**1990**	*R 3.5.90*	*3.5.90*	*22.8.90*

SOURCE: Taylor, R. (Project Leader) & Smith, I. (Chief Editor) (1997). *The state of New Zealand's environment.* Wellington: Ministry for the Environment

	year treaty entered into force	date of NZ's signature (S) ratification(R) or accession (A)	date NZ's S/R/A came into effect[1]	date treaty came into effect in NZ[2]
Protocol [to SPREP] concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region 1986*	**1990**	*R 3.5.90*	*3.5.90*	*22.8.90*
Convention on Biological Diversity 1992 [CBD]	**1993**	*R 16.9.93*	*16.9.93*	*29.12.93*
International Convention for the Protection of New Varieties of Plants (as amended) 1978	**1978**	*R 3.11.80*	*8.11.81*	*8.11.81*
International Tropical Timber Agreement 1983	**1985**	*A 5.8.92*	*5.8.92*	*5.8.92*
Arms Control and Nuclear Pollution				
Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water 1963	**1963**	*R 10.10.63*	*10.10.63*	*10.10.63*
Treaty on the Non-Proliferation of Nuclear Weapons 1968	**1970**	*R 10.9.69*	*10.9.69*	*5.3.70*
Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction 1972	**1975**	*R 13.12.72*	*13.12.72*	*26.3.75*
Convention on Early Notification of a Nuclear Accident 1986	**1986**	*A 11.3.87*	*11.4.87*	*11.4.87*
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency 1986	**1987**	*A 11.3.87*	*11.4.87*	*11.4.87*
South Pacific Nuclear Free Zone Treaty and Protocols 1985 [SPNFZ]	**1986**	*R 13.11.86*	*13.11.86*	*11.12.86*
Convention on the Prohibition of Military or any other Hostile use of Environmental Modification Techniques 1976	**1978**	*A 7.9.84*	*7.9.84*	*7.9.84*
Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Sea Bed and the Ocean Floor and in the Subsoil Thereof 1971	**1972**	*R 24.2.72*	*24.2.72*	*18.5.72*

Source: Updated from Gurswamy et al, 1994 and Ministry of Foreign Affairs and Trade, 1994.

1 This was usually the date of ratification. In many cases, the Treaty did not come into effect until a defined period after the ratification or signing. In some cases, signing had the effect of ratification.

2 This was the later of either the date the Treaty came into force, or the date it came into effect in New Zealand.

** the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region – see* **Conservation of Natural Resources** *heading.*

3 ratified 2.8.49, withdrew 3.10.68, then rejoined 15.6.76

4 ratified 21.6.57, withdrew 30.6.69, then rejoined 15.6.76

Table 4.1
New Zealand's environmental and related legislation.

Key laws relating to the environment

Biosecurity Act 1993
Conservation Act 1987
Crown Minerals Act 1991
Environment Act 1986
Fisheries Act 1996
Forests Act 1949 (with 1993 amendment)
Hazardous Substances and New Organisms Act 1996
Ozone Layer Protection Act 1996
Resource Management Act 1991
Wildlife Act 1953

Other laws relating to the environment*

Agricultural and Pastoral Societies Act 1908
Agriculture (Emergency Powers) Act 1934
Animal Control Products Ltd Act 1991
Animal Identification Act 1993
Animal Remedies Act 1967
Animals Act 1967
Animals Protection Act 1960
Antarctic Marine Living Resources Act 1981
Antarctica Act 1960
Antarctica (Environmental Protection) Act 1994
Atomic Energy Act 1945
Building Act 1991
Continental Shelf Act 1964
Crown Forest Assets Act 1989
Crown Grants Act 1908
Crown Research Institutes Act 1992
Customs Act 1966
Dangerous Goods Act 1974
Dog Control and Hydatids Act 1982
Driftnet Prohibition Act 1991
Dumping and Countervailing Duties Act 1988
Electricity Act 1992
Energy Companies Act 1992
Energy Resources Levy Act 1976
Explosives Act 1957
Fertilisers Acts 1960 and 1982
Foreshore and Seabed Endowment Revesting Act 1991
Forest and Rural Fires Act 1977
Foundation for Research, Science and Technology Act 1990
Franklin-Manukau Pests Destruction Act 1971
Gas Act 1992
Harbour Boards Dry Land Endowment Revesting Act 1991
Harbours Act 1950
Historic Places Act 1993
Import Control Act 1988
International Energy Agreement Act 1976
Irrigation Schemes Act 1990
Lake Wanaka Preservation Act 1973
Land Act 1948
Land Drainage Act 1908
Land Transport Act 1993
Litter Act 1979
Local Government Act 1974
Manapouri-Te Anau Development Act 1963
Maori Fisheries Act 1989
Maori Land Act/Te Ture Whenua Maori 1993
Maori Reserved Land Act 1955
Maori Vested Lands Administration Act 1954
Marine Farming Act 1971
Marine Mammals Protection Act 1978
Marine Pollution Act 1974
Marine Reserves Act 1971
Maritime Transport Act 1994
National Parks Act 1980
Native Plants Protection Act 1934
New Zealand Nuclear Free Zone, Disarmament and Arms Control Act 1987
New Zealand Walkways Act 1990
Pesticides Act 1979
Plant Variety Rights Act 1987
Queen Elizabeth the Second National Trust Act 1977
Radiation Protection Act 1965
Rangitaiki Land Drainage Act 1956
Reserves Act 1977
Road User Charges Act 1977
Scientific and Industrial Research Act 1974
Soil Conservation and Rivers Control Act 1941
Southland Electricity Act 1993
Sugar Loaf Islands Marine Protected Area Act 1991
Synthetic Fuels Plant (Effluent Disposal) EMP Act
Taranaki Harbours Act 1965
Tarawera Forest Act 1967
Territorial Sea and Exclusive Economic Zone Act 1977
Toxic Substances Act 1979
Trade in Endangered Species Act 1989
Transit New Zealand Act 1989
Transport Act 1962
Treaty of Waitangi Act 1975
Treaty of Waitangi (Fisheries Claims) Settlement Act 1992
Waikato Raupatu Claims Settlement Act 1995
Wild Animal Control Act 1977

**A further 18 laws (along with their 40 amending acts) were repealed by the Resource Management Act in 1991.*

SOURCE: Taylor, R. (Project Leader) & Smith, I. (Chief Editor) (1997). *The state of New Zealand's environment.* Wellington: Ministry for the Environment

Appendix D: Visitor Comments

(Note: numbers where present refer to questionnaire number)

Question 1: Extra activities

Diving, collecting shells, wildlife watching, drawing/painting, relaxing in the sun

Question 2: Extra reasons for visit

Haven't been here in a while
Have been here before
Bringing a friend to see the park
A change of scene
To get out of Auckland
Usually come here
Because it is a marine park
For recreational activities
Because it is a regional park
Looking for a campsite
Nice place to come with family
Painting the scenery
Bird watching
Saw a pamphlet about the park
Followed the road signs here
Because no dogs allowed
For volunteering
For market research
For science based research

Question 3: Anything unhappy about your visit

Dangerous tree limbs at carpark (17)
Not enough signage and fencing to prevent dune erosion (43)
That I can't bring my dog (57) (147)
Couldn't see any skinks (74)
No rubbish bins (78) (147)
Trees at carpark are too shady, and they should be pohutakawas not macracapas (79)
Someone brought their dog (61) (225)
Offshore islands should be marked and named on park maps (80)
Didn't like the judder bars (111)
The lack of security for vehicles in the carpark (119) (135) (224)
Too many wasps! (132)
No showers at campsite (137)
The hand-painted map of Tawharanui on notice boards not very useful (139)
There needs to be more planting, more bush (143)
Didn't like the tape around the dunes (150) (241)

No seats for disabled visitors (158)
Didn't like the picture frames (161) (170) (171) (203) (279)
Stairs to beach need repair (161)
In some ways the park is becoming too developed (170) (180)
Don't like so many people coming in summer (179) (241)
Too many signs (180)
Not good access to the sea for kayakers at Anchor Bay (194)
The huge film crew (filming Team NZ ad) (214) (216)
Tracks could be better marked (220)
Our wedding party in summer was not allowed (239)
No barriers at the top of the sand dunes, just at the bottom (259)
The lack of birds (281)
Drunken people in the carpark (290) (302)
Needs to be more native tree planting (296)
People should clean up after themselves (296)

Question 6: Drawbacks to the Open Sanctuary

OK as long as people don't disturb the wildlife (63) (202)
The ability and commitment of doing it properly (84)
Maintaining public interest in the project (84)
Restrictions on bringing pets into the park (104) (147)
Certain kinds of pest control techniques (116)
Disturbances to the wildlife and low-level pollution from vehicles (120)
As long as people know what is expected of them (121) (249)
Public awareness needs to be introduced and monitored (138) (206) (247)
Will it work? Evidence is inconclusive after so much money and effort (151)
Road congestion and pollution (204)
Maybe other animals getting trapped or caught in the fence (210)
Too many places are becoming protected to the point of loss of enjoyment. I like non-native plants and animals such as rosellas, loriqueets, wild ginger (241)
Difficult to patrol (297)

Question 8: Drawbacks to the predator fence

Stopping the flow of native species into and out of the park (13) (280) (298) (136)
Access restricted for people with dogs (93)
Depends on the location of the fence (151) (167)
Will restrict people's movement and freedom within the park (157) (256)
People don't like change and added developments (176)
I don't like the fence and what it represents – too much tinkering with the environment (241)
Whether people can respect it (260)
Limits to cat owners on the boundary (270)
Predator fences don't always work, and may limit opportunities later on to expand the predator free zone beyond (302)

Question 10: Unsuitable techniques for pest control

Maybe children could eat poisons so need to take care (63) (109) (141)
I don't like brodificoum, but aerial drops ok (74)
Baits and traps not good if people mess with them (78)
Biological controls (120)
Anything cruel (like gin traps) (166)
Anything that kills the animals (against any form of killing) (195) (193)
Any dioxin combination that's passed down the food chain (229)
Long lasting toxins (302)

Question 11: Opinions regarding continued use of farmland

OK if cattle is restricted from wetlands (49)
OK if no fertilisers/pesticides on farm (62) (247) (258)
The farmland area should be reduced, but I understand that it needs to be there to turn a profit (66) (265)
Farming is ok in moderation (109)
OK as long as it allows the objectives of the open sanctuary to be met (110) (131)
I agree with the continued use of farmland, but am unsure as to the health risks for protected animals (126)
Keep it on unless it causes damage I am unaware of (138)
It depends on the runoff and how it's managed (158)
Fear of the cows prevented us from using the walking track to Tokatu Point (203)
OK, but keep livestock off walkways (227)
Should be phased out slowly, but keep a little on (250)

General comments

Beautiful – keep it this way (16)
Keep communication clear and consistent (27)
I enjoy Tawharanui especially in summer. Overseas visitors should be expected to contribute a larger donation at the entrance to the park (28)
Don't seal the road (30)
Use less poisons (31)
Put in more toilets and showers (36)
Don't allow the outdoor pursuits center or associated developments to happen (46)
If it was obvious to people how many activities were available here they would be willing to pay (62)
Mynas should be targeted (105) (144) (173)
Hope it all goes well (110)
A very enjoyable area and resource. I am happy to see an effort being made to conserve and protect wildlife, landscapes and ecosystems (126)
Please keep this lovely park as natural and unspoiled as it is now (135)
Tawharanui is a beautiful place to bring our children (145)
The marine park should be patrolled better to prevent poachers (162)

Create artificial reefs (164)
Tawharanui is a unique beach yet many beaches have those picture frames – touristy and yuck! (171)
I think Tawharanui is lovely and you guys are doing a good job (171)
As a ratepayer I really appreciate access t regional parks and acknowledge the work gone into them from park rangers/markers. Plus the marine reserve – very positive (243)
"No dogs" sign should be more obvious (246)
Too crowded in summer. Is it possible to control numbers? (250)
Rodney District Council should contribute financially to the park (258)
I'm very impressed with park cleanliness and control (262)
Please do not overdevelop the park, it is great as it is. Don't seal the roads, and no housing estates (264) (268)
It is most imperative that the area remain remote and free from any subdividing and housing. And also that signage and "info boards" and fancy facilities (toilets/showers etc) not be introduced (265)
Plant more native trees (268)
A very well run operation (269)
Tawharanui is the most beautiful place I've been to in New Zealand. Keep up the good work (196)
The speed at which surfers drive on the road is too fast! (234)
The thistles need dealing to (236)
I'm impressed with the variety on the Ecology Trail (237)
Educate people (about conservation) (281)
Put in proper toilets like at Wenderholm (284) (294)
Good idea spraying Kikuyu grass (289)
The signage at the lagoon, South Coast Trail and Tokatu Point is unclear (292)
I prefer it in summer when there is more people (294)
The Ecology Trail is very good. There should be no jet-skis allowed, and signs regarding the pack rubbish in pack out again policy, and no rubbish bins (300)

Massey University
COLLEGE OF BUSINESS

Coastal Marine Research Group
Department of Management
& International Business
Private Bag 102 904
NSh Shore Mail Centre
Auckland New Zealand
www.cmrg@massey.ac.nz
Ph: 64 9 443 9799 ext 9575
Fax: 64 9 441 8109

Tawharanui Regional Park Visitor Survey

When: July - September 2002

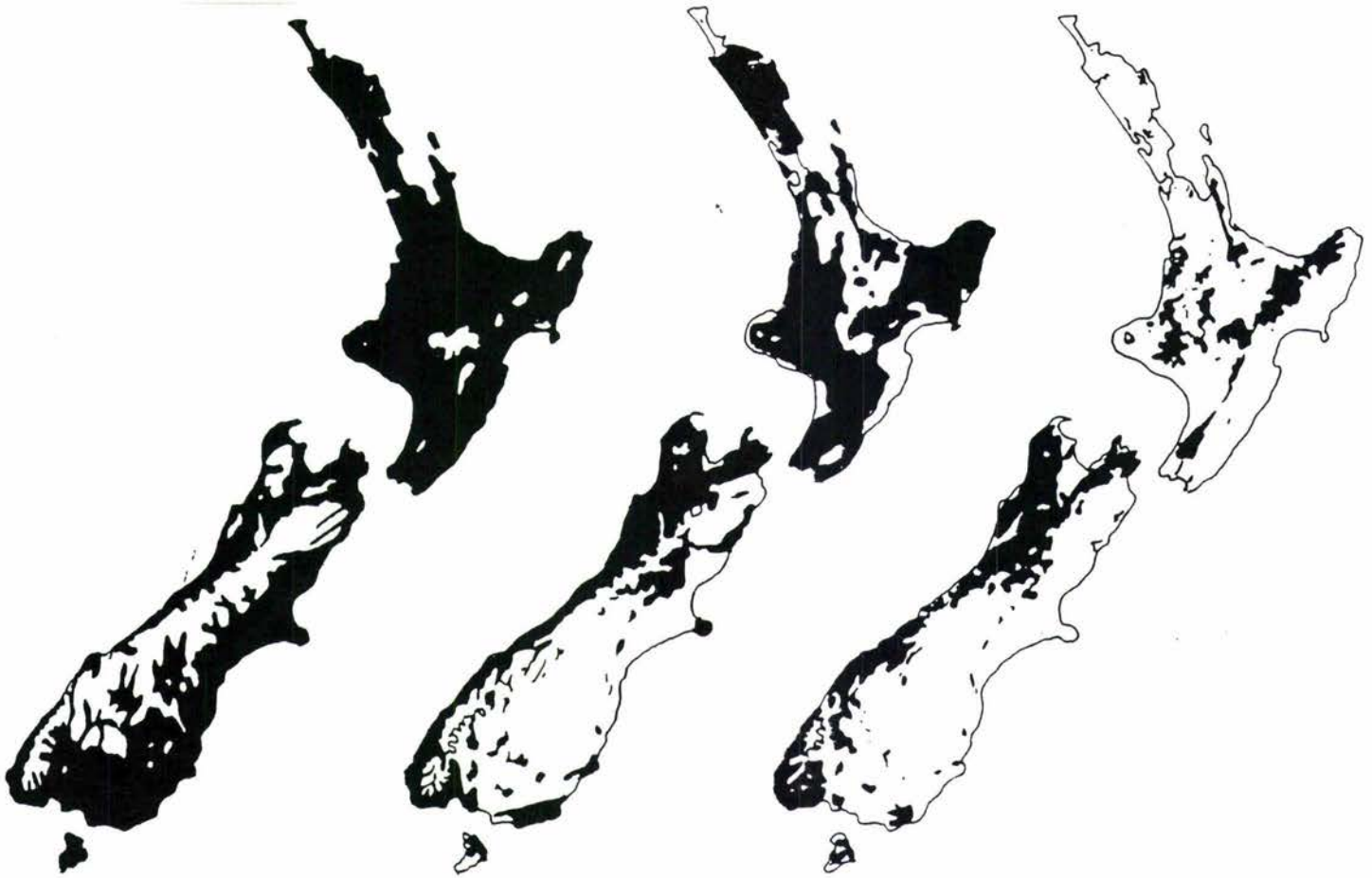
Who: Auckland Regional Council & Massey University

Contact person: Wendell Cooke, ph (09) 441 6212, Mb. 021 153 5933, wendellcooke@yahoo.com

This research focuses on the attitudes and characteristics of recreational visitors to Tawharanui. The results will go towards the future planning and management of Tawharanui Regional Park.

Visitor co-operation and support for this project is very much appreciated!

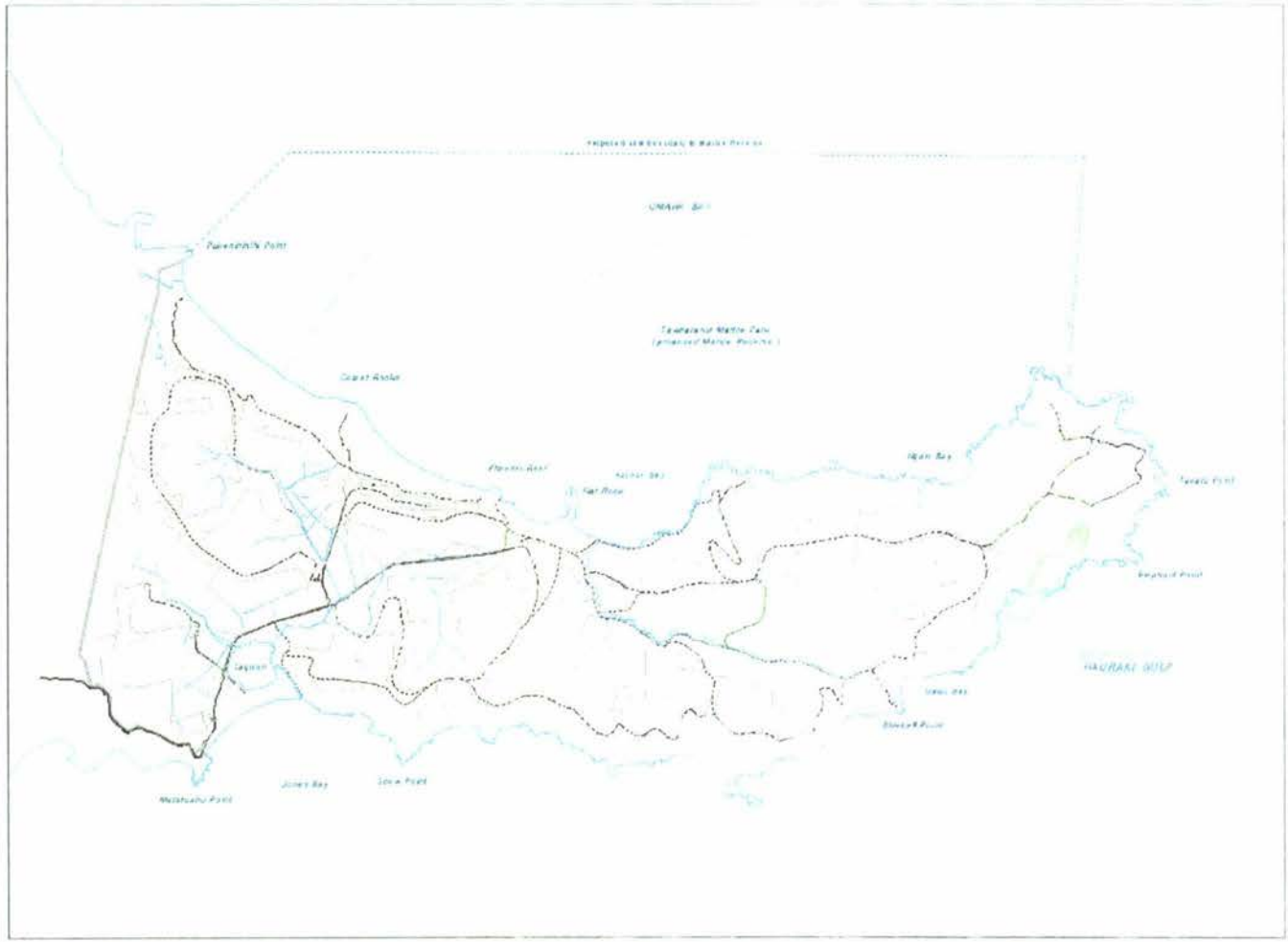
SOURCE: Tong, R. & Cox, G. (2000). *Clean and green? The New Zealand environment.* Auckland: David Bateman Ltd



Forest cover (shown in black) in New Zealand has fallen dramatically since the arrival of humans. The map at left shows the situation prior to the arrival of the Maori, with only alpine areas free from forest, which covered about 85% of the country. In centre is the situation after Maori forest clearance, with about 50% forest cover. At right, the situation today, with about 21% forest cover.

tawharanui3 (1631x1138x24b jpeg)

Tawharanui Regional Park



Source

Confidential

Legend

Fence shp
Road shp
Track shp
Streams shp
Mainmesost shp
Landbdy shp

N

Scale
1:25000

"Path: V:\projectparks\GIS\Project\Manage_apr\north.apr"

Date: 7 November 2002

Map Produced by: Neild

Auckland Regional Council

Regional Park Network
Figure 2

LEGEND

Regional Parkland
Regional Roads
ARC Regional Boundary
Motorway
Local Authority Boundary

ARC GIS Unit - August 2002

Tawharanui Open Sanctuary Society Inc.

Name: _____

Address: _____

Ph No: _____ Fax No: _____

Email: _____

I enclose my/our membership sub of $10/$20 (single $10, family $20).

If you can help us, please note your interests below by ticking the appropriate category or categories:

I would be interested in helping with:

Open days/ workdays ☐
Growing plants ☐
Planting ☐
Raising funds ☐
Administration ☐
Other (please specify) _____

Please return to: Rhys Thompson, 11 Clinton Road,
Baddeleys Beach, R D 6, Warkworth, Phone/fax 09 4229201
Email: gordini@wk.planet.gen.nz