

## KAWAU ISLAND HISTORIC RESERVE: A PUBLIC PERCEPTION OF LOGGING AND LANDSCAPE CHANGE

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Figure 1 - Mansion House, Kawau Island Historic Reserve

### ABSTRACT

*In early 1994, the Department of Conservation (DOC) announced proposals to log an exotic forest on Kawau Island Historic Reserve. As this forest was perceived by DOC as having significant recreational, aesthetic and historic value, and was located on public conservation land, public opinion of forest management was an important consideration.*

*To determine public perception of forest operations (particularly the visual impacts of logging) in a highly sensitive site, 426 Kawau Island landowners were sent a written questionnaire. Respondents' (n=153)*

*management preferences, impressions of forest landscapes, and concerns about logging were assessed.*

*The survey found that the majority of the landowners favoured gradual removal of the exotic forest and replanting much (if not all) of the area with indigenous vegetation. There was virtually no support for the perpetuation of the existing forest. Discriminant data analysis revealed that attitudes about landscape disruption, particularly the untidiness and duration of visual impacts, were a significant factor in differentiating a priori levels of concern about logging.*

## INTRODUCTION

In early 1994, DOC publicly announced a proposal to log an exotic forest on Kawau Island Historic Reserve. The Historic Reserve is a popular tourist destination in the Hauraki Gulf Maritime Park, located north of Auckland - New Zealand's largest metropolitan area. Logging was considered necessary as the trees would eventually deteriorate, posing a hazard to trampers.

The exotic forest on Kawau Island Historic Reserve was perceived by DOC as having significant recreational, aesthetic and historic value. Predominantly untended *Pinus radiata* and *Pinus pinaster* between 50 and 80 years old, the forest is a prominent scenic feature of the reserve's coastline and ridges. It was originally planted by Sir George Grey (Governor of New Zealand 1845-53 and 1861-68, Prime Minister 1877-79) as a backdrop for his island home, now known as Mansion House (Figure 1) (Barton, 1994).

DOC proposed to selectively log the pines along the coastline and ridges over a period of 10 years. As the forest presented a potential source of revenue for the maintenance of the reserve, DOC suggested clearfelling the less visible parts of the forest over a period of two years and replanting the area with *Pinus radiata*. This option was considered feasible, given that the maintenance of a pine forest on this reserve would perpetuate the landscape historically associated with Sir George Grey's island home.

A major issue confronting the viability of the forest management proposals was public landscape preference. An investigative report on revegetation options for the reserve (Barton, 1994)

noted that, while some people may detest the inclusion of even one exotic tree (especially *Pinus radiata*) on conservation land, the historical value of the existing exotic forest outweighed the argument that re-establishing native forest is the "right thing to do on a New Zealand reserve" (Barton, 1994 p.7). Furthermore, establishment of native vegetation was considered an unviable option due to low soil fertility.

Despite this, when DOC held a meeting on the island in March, 1994 to discuss revegetation options with the interested public, the vast majority of the people present (approximately 50) were critical of proposals to clearfell and replant with pines. The majority voted in favour of replanting with indigenous vegetation.

As part of a research programme on public perception of forest operations, the Logging Industry Research Organisation (LIRO) conducted a survey during September, 1994 of public opinion about logging on Kawau Island's Historic Reserve. This survey considered the opinions of a critical public group, the Kawau Island landowners. The primary objective of the survey was the measurement of the landowners' support for maintaining the exotic forest on Kawau Island Historic Reserve. This involved ascertaining:

- landowners' impressions of exotic and indigenous forests
- the value of the existing forest on Kawau Island Historic Reserve
- levels of concern about proposed logging activity
- reasons for different levels of concern
- reasons for different forest management preferences.

The survey was site-specific, in that it considered vegetation management on public conservation estate. However, findings on a public's *a priori* impressions of logged landscapes (that is, impressions derived deductively prior to logging) is of general interest for the forest industry.

**ACKNOWLEDGEMENTS**

*LIRO acknowledges the assistance of the Kawau Island landowners who participated in this survey.*

**PUBLIC PERCEPTION SURVEY**

**Objectives**

A survey of forest landscape management preferences for the Historic Reserve was undertaken in September, 1994. This study had four objectives:

1. Evaluate public perception of exotic and indigenous forest landscapes
2. Evaluate *a priori* perception of landscape change resulting from logging activity
3. Quantitatively assess the preferences of Kawau Island landowners regarding forest management on Kawau Island Historic Reserve
4. Identify key reasons for different forest management preferences.

**Methodology**

A written questionnaire was designed, and mailed to 426 Kawau Island landowners. These people were identified as an important community of interest, as they owned land in close

proximity to the Historic Reserve, were very familiar with the island landscape, and were likely to feel strongly about any landscape change. Those who resided permanently on the island (approximately 60 people) would be directly affected by the logging activity on a day-to-day basis. Those who owned land *in absentia*, using the island as a holiday retreat, would possibly be alarmed by any sudden or unexpected alteration of the landscape.

Questionnaires were returned by 153 people, providing an overall response rate of 36%. As illustrated in Table 1, there was a high response rate from landowners residing south of Auckland (47%) or overseas (67%), and a relatively low response rate from ratepayers living north of Auckland (27%). Note that the total number of permanent residents on Kawau Island could not be exactly determined as most had mainland Northland postal addresses.

*Table 1 - Location of respondents*

Location of Landowners	Surveyed	Responded
Kawau Island and Northland	116	31 (27%)
Greater Auckland	260	96 (37%)
South of Auckland	38	18 (47%)
Resident Overseas	12	8 (67%)
TOTAL	426	153 (36%)

A variety of statistical techniques were used to analyse the data obtained in the survey. Responses to closed questions (answered according to set responses) were numerically coded and aggregated; relevant percentages,

modes and mean scores were then calculated. Responses to open questions (answered using the respondent's own words) were coded on the basis of similar expressions or concepts before being coded and aggregated. Chi-square analysis was employed to determine the statistical significance ( $\alpha=0.10$ ) of differences between respondents' personal characteristics and impressions of forests. Stepwise discriminant analysis ( $\alpha=0.05$ ) was used to identify the key responses differentiating landscape preferences and levels of concern about logging.

## RESULTS AND DISCUSSION

### The Respondents

As an individual's social environment and personal background were assumed to have an important influence on environmental perception, the first task in evaluating the responses to the survey was an assessment of the demographic character of the sample population. This section provides an overview of the respondents' personal characteristics.

The majority of the sample resided in the Greater Auckland metropolitan area (Table 1), particularly in Auckland City and North Shore City. The list of ratepayers for Kawau Island recorded a slightly higher percentage of men than women and this bias was also reflected in the survey response, 61% of the respondents being male. Most respondents (67%) were aged between 41 and 60 years, with the median age falling in the 51 to 60 age range. The majority (90%) of respondents described themselves as New Zealand European, 74% having been born in New Zealand. The ratepayers who were not born in New Zealand were

predominantly of British, Australian, American, German or Danish origin.

Many of the survey respondents were tertiary educated professionals, technicians or managers. In relation to higher education, 40% stated that they had obtained a University degree or diploma, while 27% replied that they possessed a trade certificate. Regarding occupation, 20% of the respondents stated that they were retired from the workforce. Of those in full-time paid employment ( $n=101$ ), the majority held professional (37%), technical (21%) and managerial (18%) vocations, with a smaller percentage having jobs in the service, trade or agricultural sectors. Of the respondents who provided income data ( $n=130$ ), 23% stated that they earned less than \$25,000 before tax in the previous year, 36% earned between \$25,000 and \$50,000, and 41% earned more than \$50,000.

Table 2 - Forestry experience ( $n=153$ )

Forestry Experience	Response		
	Yes	No	Not Stated
Respondent had worked in forestry	21	129	3
Family member(s) had worked in forestry	28	122	3
Friends had worked in forestry	73	76	4
Respondent had money invested in forestry	32	116	5

In order to obtain an indication of the extent to which the respondents had direct personal knowledge or experience of forestry or logging, respondents were asked to state if they, other members of their family, and/or friends, had ever worked in the forest industry. They were also asked to state whether or not they had money invested in forestry. Table 2 illustrates that almost half of the respondents had

friends who have worked in the industry, while approximately 14% have had personal work experience, and 20% have a current financial interest.

To obtain an indication of the proportion of the sample who were 'active' proponents of environmental protection, ratepayers were also asked to state whether or not they were current members of any environmental groups. A total of 44 respondents (29%) stated that they belonged to environmental organisations. The most popular groups were Greenpeace, the Royal Forest and Bird Protection Society of New Zealand, and the Pohutukawa Trust.

### **Impressions of the Kawau Island Landscape**

The survey proceeded to assess the respondent's impressions of the Kawau Island landscape and the value of the existing pine forest.

Respondents were asked to state their main reasons for owning land on Kawau Island. The reasons given by the greatest number of landowners were recreation and holidays, peace and quiet, the quality of the environment and lifestyle, and the opportunity to escape from civilisation.

When asked to state, in their own words, what they considered to be the main scenic features of Kawau Island, the survey respondents most frequently identified the following: the island's harbours and coastline (52%), remaining native bush (50%), Mansion House (37%), the ruins at an old copper mine (19%), exotic trees (19%), forest tracks (15%) and the Mansion House grounds (14%). These results indicated that remnant native bush was

generally regarded as being a more significant scenic resource than the exotic forest.

The respondents were also asked to state whether any natural factors or human activities spoiled the Kawau Island landscape. A total of 117 (77%) stated that the landscape was being spoilt in one way or another. The main detrimental factors or activities were identified as: recent logging operations on private land (32%), damage to vegetation by introduced animals (20%) with a consequential lack of native forest regeneration (16%), rubbish and pollution mainly caused by tourists (12%), and pine trees (11%). Part of the emphasis on logging may have been due to the topic of the survey (halo effect).

### **Impressions of the Historic Reserve's Landscape**

The Kawau Island landowners, being a public group most familiar with the Historic Reserve, were then asked to rank seven values associated with the reserve: historic value, peace and solitude, recreational opportunity, trees and plants, wildlife, scenery, and pleasant memories. Table 3 shows the results from 147 responses, with the seven values ranked according to mean scores. Modal ranks (the rankings most frequently selected) are also listed.

*Table 3 - The reserve's attributes*

<b>Values</b>	<b>Rank</b>	<b>Mode</b>
Peace and solitude	1	1
Trees and plants	2	3
Scenery	3	3
Historic value	4	5
Wildlife	5	4,7
Recreation	6	7
Pleasant memories	7	7

Aesthetics (peace and solitude, and scenery) and vegetation (trees and plants) were found to be the most important attributes of the reserve for the island landowners. One respondent summed this up by stating that "the old trees give a feeling of calm and peace" and are "an integral part of the scenery". Historic values only ranked fourth.

There was, unfortunately, an ambiguity in this last question. Respondents identified two types of wildlife, with disparate value, in the reserve; native birds had a higher value than introduced animals. This ambiguity may be the reason why the wildlife attribute exhibits a bimodal ranking.

When respondents were asked to rate the attractiveness of the existing untended pine forest on a five-point scale (from very attractive to very unattractive), most (62%) stated that they considered the forest to be either attractive or very attractive, while 28% described it as average. Only 7% of the respondents described the forest as unattractive or very unattractive.

### Impressions of Forest Landscapes

While the existing exotic forest was regarded as both attractive and a valued feature of the Historic Reserve's landscape, mainly due to feelings of peace and solitude that mature forests evoke, the public's landscape preferences were strongly influenced by the perceived value of native forest. Native forest was found to be highly regarded due to its naturalness and beauty.

Two questions in the survey asked respondents to select words, from a supplied list of 24 adjectives, which best described their overall impressions

of exotic (plantation) and native (indigenous) forest landscapes in New Zealand. The same set of adjectives was used for both questions, though the words were presented in a different order.

Responses showed that the Kawau Island landowners have distinctly different impressions of these two types of forest. For planted exotic forests, the terms shown in Figure 2 were selected by over half of the respondents in the survey. Other key descriptors were peaceful (39%), tidy (38%), and interesting (32%). In contrast, the majority chose the words shown in Figure 3 to describe native forests.

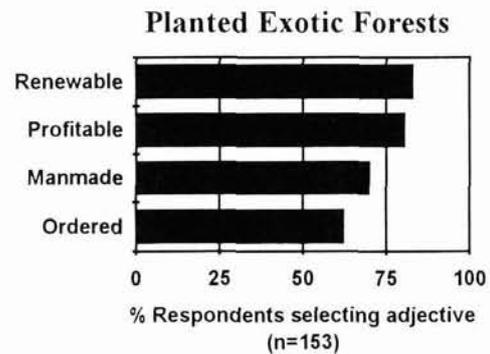


Figure 2 - Adjectives selected by more than half of the respondents to describe planted exotic forests

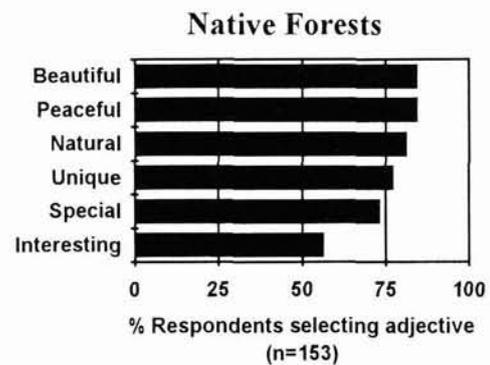


Figure 3 - Adjectives selected by more than half of the respondents to describe native forests

Chi-square analysis revealed that the landowners considered planted forests

to be significantly more profitable, renewable, human-made, ordered, tidy, boring, common, robust, ugly, disruptive and static than native forests. In contrast, native forests were perceived to be significantly more natural, unique, beautiful, fragile, peaceful, non-renewable, interesting and dynamic environments.

A comparison of planted and native forests was made on the basis of seven words representing a scale of landscape value: boring, common, interesting, beautiful, special, unique and sacred. Figure 4 shows that while planted exotic forests were regarded as interesting, native forests were deemed to be particularly beautiful, special and unique.

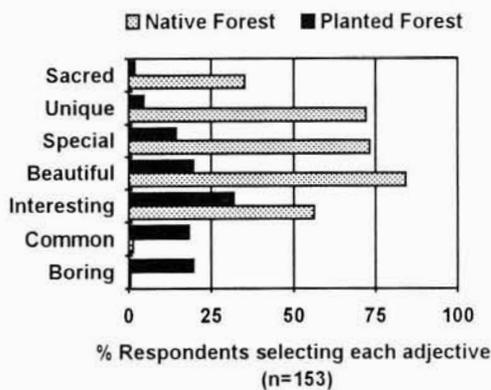


Figure 4 - Comparison of exotic and native forest landscapes

### Concern about Logging

The survey respondents were asked to rate their level of concern about proposed logging activity in the Historic Reserve, using a five-point attitude scale (Figure 5).

The majority stated that they were either *concerned* (33%) or *very concerned* (33%), while 20% were *neutral* or undecided. Only 14% were *unconcerned* to *very unconcerned* about logging proposals.

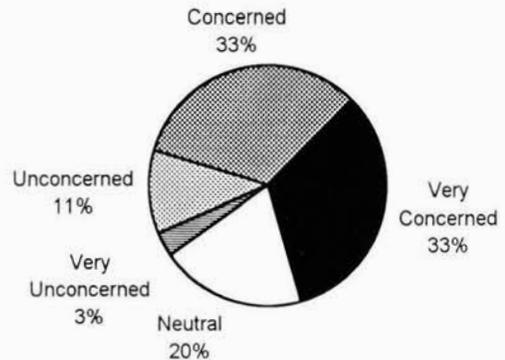


Figure 5 - Levels of concern about logging (n=153)

As an initial assessment of reasons for concern about proposed logging, all respondents were also asked to state their level of concern about the potential impact of timber harvesting on 14 environmental attributes. Again, a five-point attitude scale was used for measuring concern. The results are listed in Table 4, with the environmental impacts ranked in descending order according to mean scores. Modal scores are also noted.

Table 4 - Levels of concern about specific environmental impacts

Attribute Affected	Level of Concern	
	Rank	Mode
Pleasantness	1	1
Scenery	2	1
Wildlife	3	1
Vegetation	4	1
Soil	5	1
Fire risk	6	1
Marine life	7	1
Water	8	3
Lifestyle	9	3
History	10	3
Safety	11	3
Noise levels	12	3
Dust levels	13	3
Tourism	14	3

The results indicate that impacts on forest aesthetics (pleasantness and scenery) were the main basis for concern about proposed logging activity. Potential impacts on flora, fauna, soil and fire risk were also very important. Most respondents tended to be neutral about the impact on historic values and tourism.

To elaborate upon these findings, respondents were also asked to state reasons for their level of concern about logging in their own words. Impacts on forest aesthetics were most frequently mentioned. Thirty-seven percent expressed concerns about visual impact, while 26% cited concern about disruption to the island's character.

### Impressions of the Visual Impacts of Logging

In order to assess landowners' *a priori* perceptions of landscape change, respondents were presented with a set of 20 adjectives and asked to select those which best described the visual impacts of logging. Figure 6 shows those words selected by more than half of the respondents. The primary perception of a logged site was of an untidy and discordant (in the words of one respondent) "blot on the landscape".

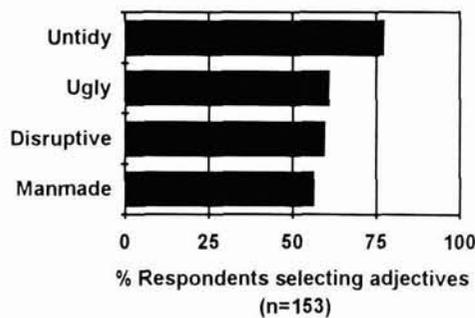


Figure 6 - Adjectives selected by more than half of the respondents to describe the visual impacts of logging

Respondents were given an opportunity to elaborate upon their reasons for concern about visual impacts using their own words. It was hoped that this would provide additional data on which specific aspects of an operation have a significant negative visual impact. Unfortunately, no clarification was provided by this question; respondents tended to simply reiterate that they found logged landscapes untidy and ugly.

Four words were included in the adjective list to examine the perceived duration of visual impacts: temporary, short-term, long-term, and permanent. The frequency with which these words were selected is illustrated in Figure 7. Of the 153 respondents, most identified visual impacts as either temporary or short-term. However, there were some who considered visual disruption to be long-term or even permanent.

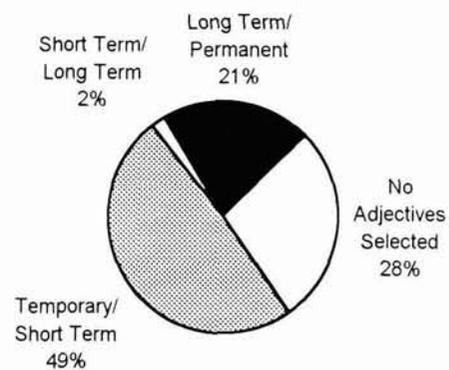


Figure 7 - Adjectives selected for describing the duration of visual impacts (n=153)

Stepwise discriminant analysis was used to determine which factors contributed to different levels of concern about visual impacts. This analysis found that those people *very concerned* about adverse impacts on

scenery (n=65) were particularly worried about potential disruption to both landscape and lifestyle. A very high percentage selected the words untidy (89%), disruptive (71%) or disordered (49%) to describe the visual impacts of logging.

In contrast, those people who were *unconcerned* to *very unconcerned* about visual impacts (n=17) did not consider logging to be too disruptive. Forty percent of these people regarded logging as potentially beneficial if it increased the area of native bush on the island. Twenty-nine percent regarded the existing exotic forest as unattractive.

Further stepwise discriminant data analysis found that impressions of, and reaction to, potential landscape change was of primary importance in explaining different levels of concern about the proposed logging. Mean levels of concern about the impact of logging on scenery decreased in proportion to decreasing concern about logging. Ninety-four percent of those respondents who were *very concerned* about logging (n=51) considered logged areas to be particularly ugly, as opposed to only 30% of those who were *unconcerned* to *very unconcerned* about logging (n=23).

Perceived duration of visual disruption was also closely associated with levels of concern about logging. Seventy-seven percent of those respondents who were *unconcerned* about logging described the duration of visual impacts as short-term. In contrast, most of those people who selected the words long-term or permanent to describe visual impacts were in the *very concerned* category. Only 12% of those who were *very concerned* about

logging described visual impacts as short-term.

### Logging Preferences

Having considered general impressions of Kawau Island, forest landscapes, and levels of concern about logging, the survey then focussed on the landowners' forest management preferences. Logging preferences and revegetation preferences were considered separately, and then in combination.

Respondents were presented with three logging options in the Historic Reserve: do nothing, selectively log over an extended period of time, or clearfell over a short period of time. Spatial combination of these practices was not presented as a main option, nor was the extent of selective felling (whether by individual trees or patches of forest) specified. There were several reasons for this rather simplified approach: specific details had not yet been officially finalised; the questionnaire aimed to use terms presented to the public by DOC and the media; and only relatively straightforward concepts were used in order to minimise complexity, and thereby increase survey response.

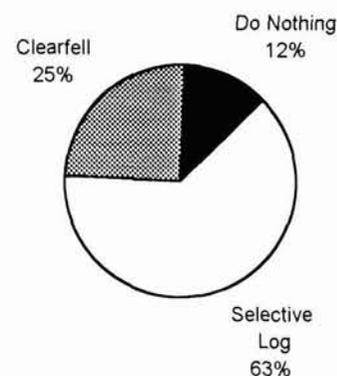


Figure 8 - Logging preferences

Figure 8 shows that the vast majority of island landowners (63%) favoured selectively logging the pine forest over an extended period of time. Only 25% were in favour of clearfelling, while 12% suggested leaving the forest to natural processes of deterioration and regeneration (at most removing only those trees which pose an immediate hazard to the safety of recreationalists).

The majority (71%) of those respondents who favoured *selectively logging* the forest over an extended time period (n=97) were either concerned or very concerned about the proposed logging. Discriminant analysis revealed that these respondents generally described visual impacts as:

- temporary or short-term (49%) but
- particularly disruptive (68%).

In contrast, most (63%) of those people in favour of quickly *clearfelling* the forest (n=38) were neutral to very unconcerned about proposed logging. Analysis showed that:

- most described the existing forest as being of only average scenic quality
- 16% went so far as to describe planted forests as ugly
- 34% stated that they were neutral or unconcerned about logging if it resulted in fewer pine trees in the landscape
- 79% of this group perceived the duration of landscape change to be temporary or short-term
- only 32% described logging as visually disruptive.

Data analysis revealed that half of the respondents favouring the *do nothing* approach (n=18) perceived the existing exotic forest to be attractive and one of

the main scenic features of the island. The majority (67%) of the *do nothing* proponents stated that they were very concerned about logging, particularly because of potential disruption to landscape and lifestyle values. The main distinguishing traits of the *do nothing* group were:

- a moderately high percentage (44%) expressing distrust in DOC's motives for logging
- most (56%) describing the duration of visual disruption as either long-term or permanent.

### Revegetation Preferences

Respondents were then asked to state their revegetation preferences if logging proceeded. They were presented with four options: replanting pines, replanting a mixture of exotics and natives, replanting with natives only, or natural regeneration to native forest.

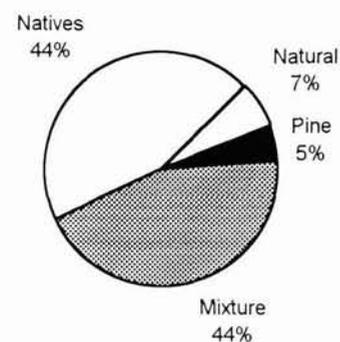


Figure 9 - Revegetation preferences

The responses to this question (Figure 9) show an even division between those people favouring the re-establishment of a mixed forest and those favouring a return to an exclusively native forest.

Discriminant analysis revealed that those respondents favouring the

replanting or natural regeneration of native forest throughout the Historic Reserve (n=78) had a very high appreciation of natives and a low appreciation of exotics. Nearly half (47%) used the word sacred to describe native forests, while also describing such forests as natural (79%) and unique (78%).

Planted forests were described as interesting by only 20% of native forest advocates. In contrast, 43% of the people favouring the establishment of a mixed forest (n=68), and 57% of those favouring replanting pines (n=8), described planted exotic forests as interesting landscapes. Many of the advocates of pines (43%) queried the viability of reforestation with indigenous vegetation.

### Forest Management Preferences

A synthesis of logging and revegetation preferences (Table 5) revealed that the majority of landowners favoured gradual transformation of the Historic Reserve's landscape, with at least part of the exotic forest being completely replaced by native bush. There was virtually no public support for the maintenance of an exclusively exotic

forest on this conservation estate. Results of discriminant data analysis showed that those respondents supporting clearfelling (25%) favoured rapid transformation of the forest landscape to one with fewer pine trees. Rapid transformation "would be more economical and would get the pain over as soon as possible". Few members of this group considered the visual impacts of logging to be disruptive; most described any disruption as temporary, a "short-term necessary evil". One respondent wrote "the long-term benefits of pines going mitigates shorter term landscape scars and activity noise and dust". There was, however, some concern about the need for guaranteed immediate replanting after logging.

The majority of the respondents favoured gradual transformation of the landscape, either by selective logging or patch-cutting. Visual impacts were a primary reason for this attitude; selective logging proponents did not want to see the area (in the words of one respondent) "completely denuded of greenery". They were also very concerned about the impact of clearfelling on the existing native vegetation.

*Table 5 - Forest management preferences*

Forest Management Preference	Response	
	Frequency	%
Selectively log the forest, replant with natives and exotics	45	29
Selectively log the forest, replant with native vegetation only	40	26
Clearfell the forest, replant with native vegetation only	22	14
Do Nothing	18	12
Clearfell the forest, replant with natives and exotics	13	9
Selectively log the forest, replant with pine trees	6	4
Selectively log the forest, natural regeneration to native forest	5	3
Clearfell the forest, natural regeneration to native forest	3	2
Selectively log the forest, revegetation uncertain	1	1
Clearfell the forest, replant with pine trees	0	0
<b>TOTAL</b>	<b>153</b>	<b>100</b>

There was a small group of respondents opposed to logging. These people were extremely concerned about potential disruption to the island landscape and lifestyle. Very few regarded the logging to be a necessary activity and queried DOC's interest in commercial forestry on conservation land. The existing forest was perceived as attractive and an integral component of the Kawau Island landscape. A respondent in this group, emphasising a desire not to intervene with natural processes, wrote "I may have missed the point but why is it necessary to log the trees? There were no chainsaws in the Garden of Eden!"

## CONCLUSIONS

In early 1994, DOC released plans to log an untended exotic forest on Kawau Island Historic Reserve. Logging would remove any hazard posed to the public by deteriorating trees and would provide revenue for maintaining the reserve. The plans also suggested replanting the area in pines, in order to perpetuate the landscape established by Sir George Grey last century and provide a source of ongoing revenue. A report on the revegetation options suggested that, given the historic value of the exotic forest, little weight should be given to the argument that native forest is the appropriate vegetation for this conservation land. The viability of these forest management plans depended (in part) on public endorsement.

Responses to a public opinion survey about forest management on Kawau Island Historic Reserve revealed:

- that the majority of respondents do not support the perpetuation of the exotic forest

- the perceived importance of the historic value of the exotic forest was not borne out by the survey findings; adjacent landowners ranked aesthetic considerations over historic value
- indigenous vegetation was regarded as being more appropriate for the site given its naturalness and superior aesthetic qualities
- there was no public endorsement of replanting exclusively with pines
- half of the survey respondents would support replanting part of the area with mixed exotics if a significant area was also planted in indigenous vegetation
- most respondents favoured gradual transformation of the landscape over an extended period.

Any forest management activities on Kawau Island Historic Reserve will have intense public scrutiny from adjacent landowners, tourists and the media. The survey results indicate that particular care is required regarding the tidiness of the operation and rehabilitation of the site.

## REFERENCE

Barton, I. (1994): "Proposals for the Revegetation of Logged Areas on Kawau Island's Historic and Recreational Reserves". Report prepared for DOC, Auckland.

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