

**Values and Management Options for Sustainable
Forest Management in New Zealand**

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and
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Studies in land use change and socio-economic consequences

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Preface

In many sectors of primary production there is growing interest, or concern with, certification. In recent years, forestry is one sector where significant progress has been made and at the present time there is much interest in sustainable forest management. Typically, this interest is pursued by researchers and stakeholders and the assumption sometimes made is that that ideal of sustainable forestry is relatively easily defined. In this report steps are taken to clarify the meanings of sustainable forest management as they are seen by those in the industry. Readers interested in sustainable forest management policy will find this report useful in extending the discussion of this important topic.

Professor Caroline Saunders

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Summary

Progress toward sustainable forest management in New Zealand depends, in part, on understanding different views of sustainable forest management. The literature on sustainable forest management shows that the meanings of sustainable forest management are inseparable from the interests of the people who define it. Perley (2000) identified five positions on forestry management and these were used to frame a study of stakeholders' views of sustainable forest management in New Zealand.

Exploratory interviews with 18 stakeholders were used to construct decision trees which show why people hold different positions on sustainable indigenous and exotic forestry. The decision trees were then used to construct a short questionnaire, which was responded to by a random selection of 74 New Zealand forestry stakeholders.

The results of the interview questions focusing upon attitudes towards indigenous forestry show that stakeholders have either ecological values or a mix of ecological and utilitarian values. Most (60 per cent) emphasised sustainable yield and multiple use while some (21 per cent) emphasised ecosystem management. A few emphasized near natural forestry and ecological preservation. The results show that a combination of ecological and utilitarian values predominated and these values typically led to sustainable yield and multiple use. Only some of those who had ecological values were led to ecological preservation. Thus most stakeholders saw indigenous sustainable forestry as including ecological, social and economic goals. It must be noted, however, that there were few purely 'conservation' stakeholders in the sample since most respondents were from within the forest sector.

The results for exotic forestry showed that stakeholders emphasised either utilitarian values or a mix of ecological and utilitarian values. Most (58 per cent) emphasised sustainable yield and multiple use while some (41 per cent) emphasised ecosystem management. The results show that either utilitarian, or utilitarian and ecological values predominated, and these values typically lead to either sustainable yield and multiple use, or to ecosystems management. No one chose ecological values. Again, with the importance of sustainable yield and multiple use, most stakeholders saw exotic forestry as including ecological, social and economic goals.

Overall, stakeholders had different value orientations to each type of forestry but most emphasised the sustainable yield and multiple use position ahead of ecosystem management. Very few stakeholders thought that sustainable forest management was not possible.

Chapter 1

Introduction: Background, Research Objectives and Review of Literature on Sustainable Forest Management

1.1 Background

The concept of Sustainable Forest Management has become a major focus of policy, management, and reporting at a range of scales within the Forest Sector.

At the international level, the 'Brundtland' report of the World Commission on Environment and Development in 1987 (WCED 1987) stimulated a series of intergovernmental conferences, conventions and agreements upon the need for global and national economies to move towards more sustainable development and management of natural resources. There were significant agreements relating to forestry at both the 1992 and the 2002 UN World Summits on Environment and Development, and at the latter meeting, Sustainable Forest Management was recognised as a global priority for action. More specifically, New Zealand is a signatory to the Montreal Process. This requires countries to report upon progress towards sustainable forest management, as measured by eight indicators: (1) biodiversity, (2) production, (3) ecosystem health, (4) soil and water conservation, (5) contribution to global carbon cycles, (6) maintain or improve soil and (7) legal, institutional and economic framework for forest conservation and management.

At a sector level, consumers are also demanding more explicit reporting on the sustainable management of the forests from which wood products are taken. Product certification through organisations such as the Forest Stewardship Council has become a major focus of sustainable management policy and procedures. In 2002, Hay, using web information, estimated that a total of 610,000 hectares were covered under the Forest Stewardship Council certification scheme, and this is increasing annually (Hock et al., 2003). It is mainly forest owners and companies selling on international markets that have taken up certification.

Within New Zealand, the Resource Management Act 1992 has sustainable management as its primary goal, expressed at national, regional, district and site scale, expressed through policy statements, plans, rules and resource consent procedures. Sustainable development is also a central part of government strategic policy (Department of Prime Minister and Cabinet 2003).

Sustainable management is a notoriously multivalent term - it means many different things to different people, and the definition and understanding of the meaning of sustainable forest management has therefore become critical to legal, commercial, land management and silviculture activities within the sector. Further progress rests, in part, in understanding precisely the different views upon sustainable forest management.

This research reports upon an investigation into the way a variety of stakeholders in the New Zealand Forest Sector define and understand the concept of Sustainable Forest Management, by giving a detailed account of stakeholders' perceptions of sustainable forest management for both indigenous forestry and plantation forestry. It was undertaken as part of the Sustainable Forest Management programme at Forest Research, funded by the Public Good Science Fund.

1.2 Research Objective

The main objective of this research was to identify the types of positions on sustainable forest management held by a range of forestry stakeholders, and to explore possible reasons why these positions were held.

1.3 Sustainable Forest Management as Defined in the Literature

The following literature review puts the development of sustainable forest management in context by describing the multiple factors that have influenced the evolution of ideas about the nature and desirability of sustainable forest management. It then gives attention to definitions of sustainable forest management, drawing mainly upon monographs published in the mid to late 1990s. Following this discussion of definitions, the focus turns to research on attitudes towards certification.

1.3.1 Origins of Sustainable Forest Management

As noted in the introduction, the concepts of sustainable development and management became increasingly influential within a range of intergovernmental agencies and agreements during the 1980s and early 1990s. Burger (2000) suggests that in the forest sector, a primary turning point was a boycott of tropical timber promoted by environmental groups at the end of the 1980s, motivated by the destruction of tropical rainforest. The ideal of sustainable management of tropical hardwoods, and some kind of certification of this management, emerged as an alternative to the boycott. The tropical forest situation also raised the question that perhaps northern hemisphere forestry was unsustainable, and this was reinforced by nature conservation controversies in forest management in North America, such as the protection of Spotted Owl habitat in the Pacific North West. Thus, the drama of tropical deforestation coincided with more general concerns about the environment, which led in turn to interest among both producers and consumers in sustainable forest management.

The formal certification of forest management has subsequently assumed major importance, as a way of providing guarantees to consumers about the integrity of claims about sustainable management practices. This development has not been confined just to forestry, since the idea of certifying the primary production process has been growing in recent years, as illustrated by the steady increase in the availability of certified organic products. As in other sectors, specialised forestry certification providers have become established, and there has been a decade of debate and development devoted to defining sustainable forest management for the purposes of certification and other reporting requirements (Toffanin, 2000).

Jenkins and Smith (1999:3) present a more detailed account of the origins of sustainable forest management. They consider the critical turning point was the 1990s when:

...commercial extinction of native forests, lack of adequate reforestation, conversion of forestlands to other uses, conflicting demand for forest resources, public opposition to logging, more stringent environment regulations and diminishing supplies of wood became everyday business realities and forced the forestry industry to reconsider its norms and business strategies.

Thus, environment pressures were creating new market niches while at the same time there was rising public opposition to clear cutting and logging in old growth forests. The rise of the idea of sustainable forestry, and its accompanying certification, marked the end of an era of apparently abundant wood supplies, or wood supplies without significant costs. Overall, there has been a transition from exploitation of forests to sustainable forest management. An important part of this transition has been the expanded mix of values that the public in developed countries now recognise in forests (Sample et al., 1993). A growing list of threatened species, endangered salmon runs, degraded water quality, and the virtual disappearance of old-growth forests has contributed to the movement towards ecosystems management.

It is important to note that concerns about sustainable management and certification apply to both publicly owned and private forests, although the procedures vary between countries. A common theme among North American writers discussing sustainable forest management, for example, is that it is seen as a means to address environment issues on public (Federal) land in reaction to past forestry practices. In New Zealand, the break up of the Forest Service and the privatisation of exotic forests in the 1980s means that most certification activity is focused upon commercial private plantations. However sustainable management is also a major focus of debate in relation to indigenous forestry on both public and private land. Although the current government has ruled out the prospects of commercial use of indigenous forests within the conservation estate, there remain considerable areas under private and Maori ownership, and there continue to be advocates for some degree of commercial management on public lands.

1.3.2 Definitions of Sustainable Forest Management

There is wide debate about the definition of sustainable forest management, although often there is agreement on some of the characteristics that it might have. Typically, there is reference to environmental, social and economic factors, and public participation. Many authors acknowledge the disjuncture between a general definition and an on-the-ground working definition. Many note the dynamic nature of forests, that is, the forest is not a static entity and its character is changing over time, and the impossibility of absolute definitions. In the following review we start with some of the earliest analyses and show how there has been gradual progression in the depth of thinking about sustainable forest management. Precise definitions to which there is widespread agreement have proven to be elusive.

In one of the earliest monographs, Sample et al. (1993) note the importance of ecological, economic and social criteria but emphasised that in 1993 forestry as a discipline was at an early stage of the process of evolution towards sustainable forest management. They recognized that at that time science did not provide the understanding of the functioning and response of forest ecosystems, nor could scientists articulate how an ecosystem approach would look when compared to a conventional approach. A similarly broad-based approach to sustainable forest management is expressed by Elliot and Donovan (1996:9). In their introduction to a book on certification of forest products, they note that the broad shift in debate was from the traditional focus on sustained yield timber production to an integrated approach that seeks to reconcile wood production with watershed protection, biodiversity, and social considerations such as equitable social benefits and respect for local rights.

Ferguson (1996) examined sustainable forest management mainly for publicly-owned forests and concluded that it lacked clear definition. His approach was to argue that sustainability was about intergenerational equity and he drew on a wide range of economic theory to

develop concepts to deal with it, both in principle and in practice. Importantly, he notes that over and above any definition of sustainability, sustainable forest management requires effective institutions, rational allocation of property rights through land use planning, the management of supply via regional management plans, enforceability through a code of forest practice, and the management of demand to ease population and other pressures. It also requires public participation (Ferguson, 1996: 130).

Beyond these requirements, Ferguson argues that sustainable forest management involves sustainable wood production plus planning at the regional level to incorporate other forest uses such as conservation, recreation or water production. He argues that such planning is hard to implement in practice because data for these dimensions are often not available, and modelling may not be able to handle dynamics of change. Further, it is difficult to judge when change reaches unacceptable levels. Public participation is needed in order to maximize net social benefits, but there are limits from inadequate data about what the public think. Only general goals can be set, and the three main ones are economic viability, environmental sensitivity and sustainability. Ferguson (1996) argues that sustainability does not imply constant supply, seeing this goal as misleading in the context of ever changing economy and population.

Maser (1994) identified the key elements of sustainable forest management as involving a shift from products to processes, building biological capital, accepting that management is open-ended, and that nature is the teacher. In his vision, sustainable forest management includes variable rotation ages, a changing mix of plantations and native cover, operates on a pay-as-you-go basis not on a costs-deferred basis, and is a way of correcting past management errors. Sustainable management combines ecological principles with societal values, and takes a broad, not only a local, perspective. Where traditional forest management is top down, sustainable forest management needs people working with the resource itself. Overall, Maser sees that the ideal is 'adaptive ecosystems management' rather than best practice. Uncertainties and lack of data means that sustainable forest management entails a conservative approach to the level of cut, and the use of a silvicultural system with an appropriate rotation length because wood values may be quite high, especially in the eyes of the public.

Upton and Bass (1995) proposed the term 'quality forestry' in the absence of an agreed definition of sustainable forest management. They note that the principles of sustainability include maintaining a healthy environment (including its productivity, adaptability and that forest management respects and builds on natural processes), conforming to social norms, and ensuring that economic benefits exceed costs (and that some form of equivalent capital is handed from one generation to the next). This conventional definition is supplemented with an number of considerations that echo others' work, for example, they refer to making trade-offs between objectives, allowing for complexities, continuous improvement, participation of all stakeholders, and stakeholder accountability.

By the end of the 1990s it was possible to study the actual uptake of sustainable forest management by some forest companies and Rom (1999) provides an example of such analysis in his book entitled: *The Business of Sustainable Forestry*. He defines the sustainable forest as an aggregation of trees that people preserve in a dynamic social and natural environment for the ecological qualities, services and yields that they want (1999: 11-23). The sustainable forest strikes a dynamic balance among economic, environmental and social forces that people control to prevent the loss of whatever forest state they prefer. Rom then explains the

ubiquitous conflicts that exist among people who fully agree on the need to sustain forests. Conflicts arise because people have multiple and different interests in forests, and the meaning of sustainable forest management is inseparable from the interests of the people who define it. Rom (1999:14) therefore defines sustainable forest management as a social process through which people organize the effort to perpetuate a forest's desired attributes. It consists of regimes of actions that shapes the forest's attributes for specific purposes. Scale is clearly important.

For Rom, the essential difference between forestry and sustainable forestry lies in the complexity and scales of relations between people and trees that are now recognized to define forests and to motivate the actions that affect them. Forests are increasingly becoming diverse overlays of different systems of social interest that interact uniquely in any one place. Production under forestry has historically focused on cultivation for timber products. In sustainable forestry it includes a much wider range of goods and services including human foods, species, medicines, ornamental plants, stock foods, fuels and waste trees. This is a move from silviculture to eco-culture, volume to quality, stands to landscapes, ownership to councils and communities, forest as product to forest as capital, current income to natural capital and green finance, and finally from blind consumption towards consumer awareness.

Recent journal literature also devotes attention to principles, criteria and indicators of sustainable forest management, with attempts to provide international standards. The concepts and practices of certification are developing so that there are a variety of schemes in place in many regions of the world. It is not the purpose of this review to describe these in detail but to note that there is question and debate about the following issues, not necessarily mutually exclusive ones, relating to certification:

- The nature of certifying organizations, their programmes, comparability between systems, needs and plans for simpler or more universal systems.
- How to agree on standards, how to achieve compliance, within and between countries.
- Costs and benefits.
- Consumer attitudes, willingness to pay, public belief that certification leads to sustainable forest management.
- Who provides certification – NGOs, third parties etc.
- Is plantation forestry sustainable?

An important dimension underlying these issues is the question of the scale of management decisions. Scale can range from the individual forest to the global biosphere. The scale that people emphasise will reflect their roles and awareness, and affect their beliefs about sustainable forest management.

The literature on definitions of sustainable forest management also illustrates some general points. There is agreement that forestry management is moving from the single goal of production to multiple goals. Sustainable forest management is defined broadly and most approaches emphasise the ecosystem of forestry, that is, the whole system, including people. Consequently, a broad range of human needs and usages are considered and included. Some authors have noted that there is lack of forestry science data and theories to inform sustainable forest management. In our view, Rom (1999) offers most insight when he argues that sustainable forest management is inseparable from the interests of the people who define it (1999:4). In essence, this approach is a political-economic one, acknowledging that there is

not an 'objective' or ideal definition of sustainable forest management. The next section provides research results that support this view.

1.3.2 Attitudes Towards Certification

There are relatively few studies of attitudes towards certification reported to date and, among those studies, quite different groups have been examined. This literature is very relevant to the topic of sustainable forest management.

In Europe, Klins (2000) explains that controversy about forest certification stems from the different ways forests are perceived and valued. Environmentalists believe that forests are in danger; they therefore want action to help the forest, give priority to nature and want to be involved in decision making that affects forests. People in the forest sector believe that timber production is the main use so that the responsibility for sustainable forest management rests with foresters. They value tradition and emphasise private property rights. The distinctly different perceptions of these two groups means that there will be debate over sustainable forest management. Not only is there divergence between groups but there can be divergence within groups such as forestry professionals.

In Austria, Pregernig (2001) found that the values of forest managers have a major influence on perception of, and reaction to, different types of public policy instruments aimed at sustainable forest management. The values of forest managers were not uniform. Factor analysis was used to identify five value factors and these formed the basis for cluster analysis which identified six groups of forestry professionals. Pregernig argues that sustainable forest management policies need to be designed to target particular groups. He notes that while forestry professionals may share common values, when it comes to implementation of abstract principles in real world situations their responses show a high degree of variability.

Lindstrom et al., (1999) noted some differences in attitudes of private forest owners in Finland and the UK, based upon the size of their holdings, finding that large-scale owners saw certification as a threat while small-scale owners saw certification as a means to improve their forests. Overall however owners were unsure of the potential benefits of certification.

In the US, Vlosky (2000) studied the beliefs about certification among three groups: forest managers in the USDA, officials in the US Bureau of Land Management and state foresters. Survey results showed that most believed certification was needed in tropical forests rather than in the US. Within the US, they believed that state and federal timberlands have least need for certification compared with private landowners. Generally, these forest managers were skeptical of certification, not trusting the environmental claims of wood manufactures nor believing that customers would pay a premium for certified wood products.

In Australia, Wallis et al., (1997) report on the attitudes of timber industry stakeholders to certification and labelling. Knowledge levels varied: those with greatest knowledge saw certification as inevitable, while those less familiar displayed only tentative support. All stakeholders agreed in principle that, when used appropriately, certification will lead to improved forest management practices. However, the authors found that there was a variety of viewpoints about how best to apply certification and they noted that its use will depend on the effectiveness of labelling and consumers' willingness to pay.

In New Zealand, Ozanne et al. (1999) reported on consumers', architects' and retailers' attitudes towards certification of forest management practices. They found a high level of

interest and the belief that certification can have a positive influence on forest management. Architects and retailers believed clients would pay nine to 17 per cent more for certified wood products while consumers themselves indicated they would be willing to pay 16 to 20 per cent more.

There is considerable work in the tourism certification area that has relevance to forestry certification. Some researchers have examined tourism certification in detail. For example, Font (2001) develops a model of the agencies involved in ecolabelling which identifies the following components among those who work towards regulating the industry: the funding bodies, the awarding bodies, the verifying agencies and the operators who obtain an ecolabel to distinguish themselves in the market. Operators have a variety of motivations however, and Font identifies the conservationists, the leaders, the distracters, the compliers, the opportunists, the skivers and the cowboys. In essence, he is acknowledging that there is wide variety of reactions to certification among tourist operators. Importantly, Font (2001:14) suggests that most ecolabels are run as public relations exercises for funding bodies to show that they are acting responsibly and for applicants to seek industry recognition rather than responding to market signals. It appears that ecolabels play a small role in consumers' decision making and that the growing popularity of ecolabels does not signify an increase in environmental interest among tourists. Support for Font's interpretation is found in Dann's (1997) claim that green tourism is merely a promotion by operators as part of their ever-changing characterisation of tourism as presented by the marketing images.

This tourism research makes the point that movement towards certification has a momentum deriving from businesses within the industry aiming to differentiate their products, aided by certifying organisations, but somewhat separate from any direct consumer driven demand. It seems that a similar dynamic may be occurring in forestry. There is some research of consumer responses to green wood products and this is equivocal, with evidence for and against willingness to pay a premium. If nothing else, the tourism case helps to reinforce the argument that 'greening' is common in many industries and not just an isolated occurrence that can be expected go away.

1.4 Identifying Stakeholders

An important point identified in the literature is the observation that conflicts about sustainable forest management arise because people have multiple and different interests in forests, and that the meaning of sustainable forest management is inseparable from the interests of the people who define it. Consequently, one's role in forestry influences perception and definition of sustainable forest management. Some of the literature on attitudes towards certification supports this general conclusion.

The concept of a 'stakeholder' has attracted increasing attention in management and public policy analysis (Mitchell et al. 1997, Freidman and Miles 2002), and has been considered in the forest context by Shepherd (2003). The theory of 'stakeholders' attempts to define who really counts in an organisation or situation, and there are different ways of approaching the issue. Shepherd notes that an important feature of 'stakeholders' is that they are not an objective and unchanging feature, but are very much a result of evolving awareness and understanding. 'Who counts' depends in part on who is counting, and the scope of who are valid stakeholders evolves over time. The idea of a stakeholder is therefore socially and politically defined.

Stakeholder attitudes are also dynamic and may reveal quite complex overlays of belief, perception and attitude. A study of stakeholder attitudes towards forestry in the New Zealand High Country identified seven different 'frames of reference' towards management of trees and plantations, and the concepts, attitudes and language used varied according to a stakeholders particular role and interests (Swaffield 1994, 1998). A recent study investigating community attitudes towards forestry in the Gisborne East Coast region also found that there are contrasting attitudes towards the role of forestry in sustainable land management (Fairweather et al. 2002).

Perley (2000) has proposed a typology of five positions on forest management in New Zealand. These five positions, including both contemporary and historical viewpoints, are shown in Table 1 (below adapted from Perley's article). The important point is that the position or paradigm held by a person entails a distinctive view of sustainable forest management. Ecological preservation and ecosystem management positions are held by people who are expected to have ecocentric environmental values. Sustainable yield and multiple use, and sustainable yield cropping positions are held by people who are expected to have anthropocentric environmental values.

At present, Perley's typology remains untested in New Zealand, but its overall structure appears plausible in the light of previous studies and overseas comparisons. In this report we adopted Perley's typology as a basis for analysis and the research provides a preliminary assessment of it.

1.5 Conclusion

For a number of reasons, the concept of sustainable forest management has gained increasing attention in recent years. It has been considered at a range of scales, and in a range of contexts, from global reporting on sustainable development, biodiversity and climate change, to national level environmental reporting, regional and local statutory environmental management and site-specific development control. It has also become closely linked to certification procedures, and is a basic concept underlying the product certification schemes that now play a major role in shaping commercial forest management.

The attitudes of managers, foresters, regulators and others directly involved in the practice of sustainable forest management are central to the way it is implemented. The literature suggests that a number of positions are adopted, and that these positions are frequently in conflict with each other. Long-term implementation of formal requirements for sustainable forest management requires some measure of consistency, or at least an understanding of where differences in understanding occur, and why. Perley has suggested that attitudes are linked to both underlying presumptions about forestry and to beliefs about appropriate actions, and his typology provides a useful starting point and structure for an investigation into current attitudes in New Zealand.

Table 1
Perley's Classification of Forestry Management Positions

PARADIGM	DESCRIPTION	TIME	OBJECTIVE	SCOPE	HARVEST	HEALTH	ENERGY INPUT	SUSTAINABILITY CRITERIA
Ecological Preservation (E.g. NZ Dept. of Conservation) Wholly ecocentric	Single objective of protecting ecosystem health/integrity. Management for intrinsic forest values – ecological diversity and function – and non-wood utilitarian values – soil and water, aesthetics, recreation, etc. No forest wood product use. Requires external financing to maintain ecological health.	Long (ecological) perspective	Protecting Ecosystem Health/ Integrity	Intrinsic ecological values & non-extractive utilitarian values.	None	Ecosystem functions.	Low	Sustaining ecosystem functions, biodiversity and complexity across space and time
Ecosystem Management (Sustainable management) (E.g. Timberlands West Coast) Primarily ecocentric	Primary objective of protecting ecosystem health/integrity. Management for intrinsic forest values – ecological diversity and function – and wider range of utilitarian values, including timber. Timber management is within ecological disturbance patterns to protect intrinsic values. Large proportion of funds invested back into the forest system, including its ecological health.	Long (ecological) perspective	Protecting EH. Commercial use allowed within that constraint.	Broadest perspective – Intrinsic, utilitarian, community considerations.	Below 'sustainable yield' of timber alone	Ecosystem functions.	Low	Sustaining ecosystem functions, biodiversity and complexity across space and time
Sustainable yield & Multiple Use (E.g. Some NZ Industry and farm forestry) Primarily anthropocentric	Mixed environmental, social and economic objectives – respective priorities depending upon particular circumstances. Management for usually utilitarian values – timber as well as soil and water, aesthetics, recreation. Intrinsic environmental benefits are usually incidental, though not inconsiderable	Intergenerational	Commercial and non-commercial utilitarian – timber dominant use.	Utilitarian values to owner and wider community.	At or below 'sustainable yield' of timber	Utilitarian forest values – timber, aesthetics, water, recreation.	Low to moderate	Sustaining crop production (wood fibre, and other utilitarian "crops") to owner and community
Sustainable Yield "Cropping" (E.g. Much NZ Industrial forestry) Anthropocentric	Single objective on (usually) sustainable timber yield. Social and environmental constraints, other than sustainable yield, are imposed by regulation/legislation. Any intrinsic benefits to environment are incidental to management objective.	Shortest possible rotation	Sustaining timber yield	Utilitarian values to owners	At 'sustainable timber' yield	Timber quality and quantity	High	Sustaining crop production (wood fibre)
Mining/liquidation Anthropocentric	Single objective of either maximising profit or land use change. Timber harvest rates at above sustainable yield levels. Funds not invested back into the forest system – invested in next mining operation.	Short (future very highly discounted)	Single Objective – Maximise DCF Profit	Narrowest considerations – utilitarian monetary values	Above sustainable yield for all forest values.	Relates to cashflow and capital	Low	Sustaining capital and Profit

Chapter 2

Method

2.1 Introduction

Two methods were used in this study of sustainable forest management. The first was open-ended interviewing on the topic of sustainable forest management. The second was a telephone questionnaire survey of forestry stakeholders using a decision tree to identify respondents' attitudes towards implementation. This survey was also used to record stakeholders' priorities for sustainable forest management research and these results are reported in Fairweather and Hock (under review).

2.2 Open-ended Interviews

An initial pilot study was conducted between June and July, 2002 with 18 subjects from a variety of backgrounds. The list included:

- Forestry consultants
- Forestry and resource management lecturers
- Forestry students
- Ecologists
- Environmentalists
- MAF personnel.

The first interviews started with open-ended questions about sustainable forestry management focusing on the key drivers of sustainable forest management, the possibility of sustainable forest management and the key indicators of sustainable forest management. After three interviews additional questions were added to include some additional topics that were relevant. One additional topic was the management positions identified by Perley (2000) and Table 2, summarizing the positions, was shown to each respondent. Each was asked to choose the position that they endorsed. For most of the respondents it was possible for them to select one of Perley's categories of forestry management.

Other useful questions were developed after the first five interviews and these gave a good indication of basic views of sustainable forest management. These critical questions were:

- What is your position on the Timberlands West Coast plan for sustainable harvesting of indigenous forests?
- Most people agree that we need sanctuaries or reserves of 'pristine' forest but should we be increasing the size of these?
- Can conservation and production goals be achieved on the same land?

Generally, the approach was to use questions on drivers, possibility and indicators of sustainable forest management to guide the interview and allow the respondent to express their ideas about sustainable forest management. This approach worked well and respondents gave such fulsome answers that it was not necessary to ask all of the guiding questions.

Table 2
Management Positions for Sustainable Forest Management

1. Ecological Preservation (EP)	Single objective of protecting ecosystem health/integrity. Management for intrinsic forest values- ecological diversity and function- and non-wood utilitarian values- soil and water, aesthetics, recreation etc. No forest wood product use. Requires external financing to maintain ecological health.
2. Ecosystem Management (EM)	Single objective of protecting ecosystem health/integrity. Management for intrinsic forest values- ecological diversity and function- and wider range of utilitarian values, including timber. Timber management is within ecological disturbance patterns to protect intrinsic values. Large proportion of funds invested back into the forest ecosystem, including its ecological health.
3. Sustainable Yield and Multiple Use (SY&MU)	Mixed environmental, social and economic objectives- respective priorities depending upon particular circumstances. Management for usually utilitarian values- timber as well as soil and water, aesthetics, recreation. Intrinsic environmental benefits are usually incidental though not inconsiderable.
4. Sustainable Yield 'Cropping'	Single objective on (usually) sustainable yield timber. Social and environmental constraints, other than sustainable yield, are imposed by regulation/legislation. Any intrinsic benefits to environment are incidental to management objective.
5. Mining or Liquidation	Single objective of either maximizing profit or land use change. Timber harvests above sustainable yield levels. funds not invested back into the forest system- invested in next mining operation.

Since a wide variety of people were interviewed we were able to record a wide variety of positions on sustainable forestry management. Four of the five positions in Perley's table were selected by respondents with no one choosing mining or liquidation. In addition, some respondents identified 'near natural forestry' and some took the view that sustainable forest management was not possible. The interviews allowed for the detailed views and justifications of each position on sustainable forest management to be expressed. Records of the variety of views then needed to be analysed in such a way as to make the basic positions clear. An approach was needed that reduced some of the details but still allowed for the richness of viewpoints to be expressed. One way to achieve this is to develop a decision pathway, which shows how people arrived at their particular position on sustainable forest management.

Following Gladwin's (1989) decision tree approach, and Satterfield and Gregory's (1998) decision pathway approach, we used the interview notes to identify why particular positions were held. The pathway showed how respondent's values, ideas and beliefs were linked to a management position. The values, ideas and beliefs are assessed by asking key questions that form decision criteria in the decision tree. The sum of the pathways forms an overall decision tree. Decision criteria can include reasons for or against a particular decision. The principal feature of any decision tree is that it is predictive. That is, when we know how a respondent answers the questions specified in the decision criteria, the tree predicts the management position that logically flows from the answers to those questions. A separate decision pathway was developed for indigenous and for exotic forestry.

2.3 The Stakeholder Survey

A total of 74 forestry stakeholders, broadly defined, were interviewed. They were randomly drawn from a number of lists, including the New Zealand Farm Forestry Association (NZFFA), non-governmental organizations (NGO's), Maori groups, territorial local authorities (TLAs), central government, forestry professional groups and corporate groups. A list of stakeholder groups was obtained from internet listings and a Forest Research list of forestry corporations and contacts. A sample from each list was interviewed by telephone in September 2002. Table 3 shows the main stakeholder groups included in the survey, the size of each group and the size of the sample interviewed. Simple random sampling was used to select the stakeholders from the lists for the local authorities, farm forestry and the forestry professionals. For the government ministries, environment groups and local authorities, the interviewer asked to speak to the person within the organisation who was knowledgeable about, or who had responsibilities for, forestry matters. The number of Maori stakeholders is low as a more detailed programme on Maori values of forestry was being planned to separately and more comprehensively address this area.

Table 3
Stakeholders Included in Survey

Stakeholder Type	Selection Policy or Groups Included	N	n
Forestry corporates		20	16
Farm Forestry Association	Branch association presidents	30	15
Local and regional governments	Selected mainly rural councils, spoke to economic development officer	86	11
Government ministries	Doc, MfE, MAF, MED	4	4
Environmental groups	Forest and Bird Greenpeace NZ Native Forest Action NZ Native Forest Restoration Trust.	4	4
Maori	Ngati Porou Ngai Tahu	4	2 2
Forestry professionals	List of registered consultants	87	20
Total		233	74

The decision tree provided a framework from which a questionnaire was developed to assess stakeholder views of sustainable forest management. Appendix 1 shows the list of questions asked and how these lead to management positions. The questionnaire was divided into two sections to assess both indigenous exotic forestry management priorities. Note that interviewers did not mention the sustainable forest management positions to the respondents.

Chapter 3

Results

3.1 Introduction

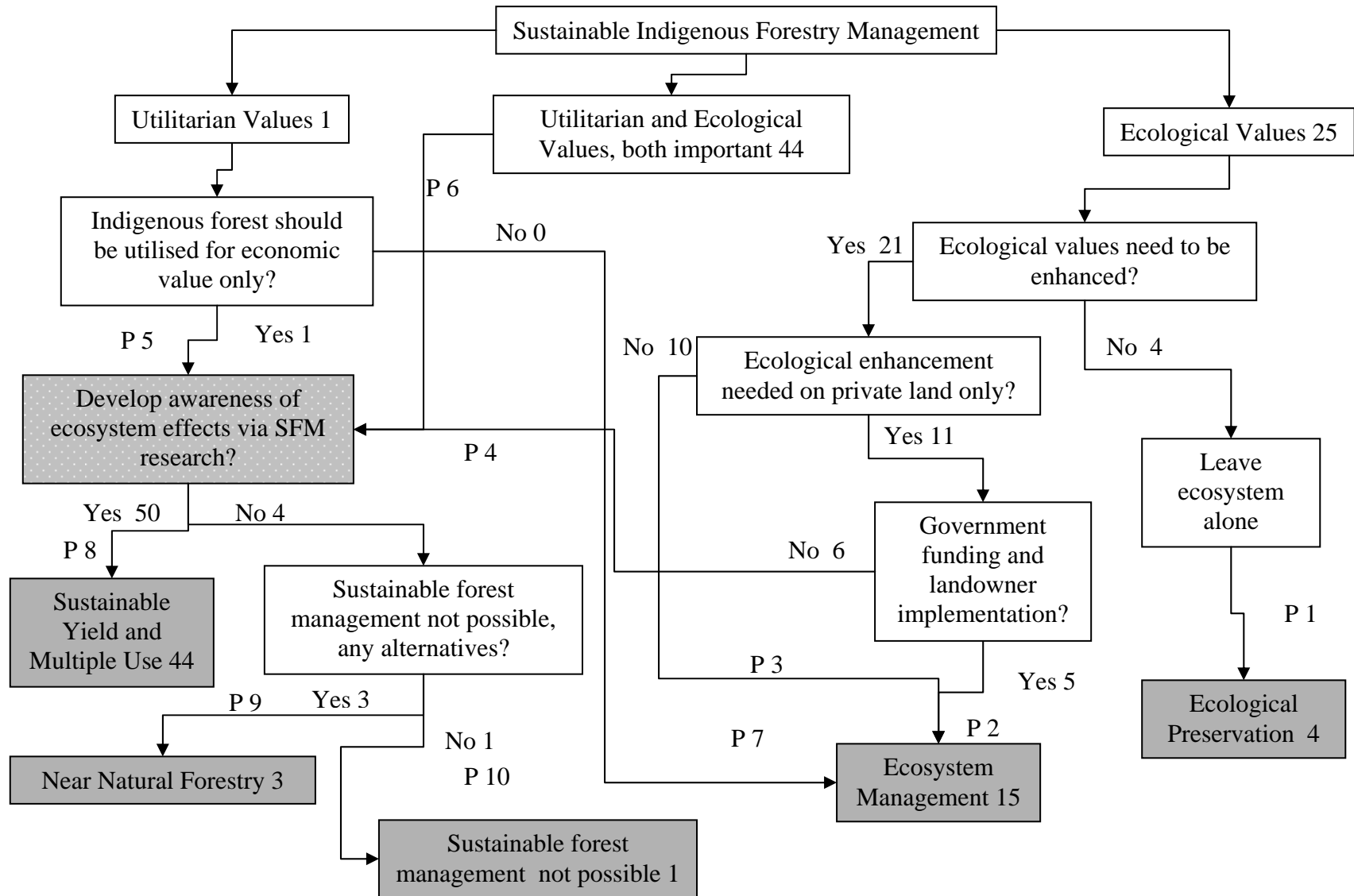
The interviews showed that for each sustainable forestry management position selected, there were a variety of beliefs associated with it. This was the case for both indigenous and exotic forests. In working with the open-ended interview data from 18 subjects it was possible to develop a complex decision tree for indigenous and exotic forestry separately that showed why particular respondents chose a particular management position. These original decision trees were simplified in order to prepare the questionnaire for the broader survey. These simplified trees are shown and discussed below and give a good indication of some of the key beliefs that lie behind the management position selected. The decision trees show ‘pathways’ which represent the flow or logic of thinking that one or more people went down. The decision trees were developed from the original 18 interviews but the figures presented below also include the results from the telephone survey of 74 forestry stakeholders. (The abbreviations used in the decision trees are the same as those included in Table 1 presented earlier.)

3.2 Indigenous Forestry

Figure 1 shows the decision tree for indigenous forestry. There are ten distinct numbered pathways to five management positions. The five positions include only three from Perley (excluding sustainable yield cropping and mining) and, in addition, include near natural forestry (NNF) and the view the sustainable forest management is not possible. It is unsurprising that cropping or mining are not identified as management positions for indigenous forestry in New Zealand. There was a total of 74 stakeholders included in the telephone survey but for the indigenous decision tree there were only 70 respondents with viable responses.

An important point of division in the decision tree relates to the values attributed to forests. From the original 18 interviews there were ten subjects who chose ecological values, three who chose utilitarian values and eight who said both were equally important. The pathways from ecological values leads to all five management positions while the pathways from utilitarian values lead to all except EP. This overall observation suggests that values are not decisive in leading to management position. However, EP is selected only by people with ecological values. People who stated that both values were important do not have much effect on the decision tree since they slot into each side of the decision tree. On reflection, it would have been useful to ask additional questions for these respondents in order to determine what lay behind some of them considering the issue of ecological values needing enhancing and the remainder who did not.

Figure 1
Decision Tree for Indigenous Forestry



A number of the pathways lead to the shaded criterion which asks: ‘Develop awareness of ecosystem effects via SFM (sustainable forest management) research?’ This question emphasises the role that research can play in guiding forestry management and was an important issue to people who provide sustainable forest management research. In essence, the tree shows that people choosing utilitarian values, and some who chose both utilitarian and ecological values as important for forestry, consider this criterion. People choosing ecological values for forestry will get to this criterion only if they believe in the need for ecological enhancement and do not believe in government funding.

The following account describes the different pathways in the decision tree and also presents the data from the stakeholder survey which shows the number of people who selected that pathway. There were 74 stakeholders included in the survey but for this decision tree there were only 73 respondents with viable responses. The number of respondents who chose each pathway is indicated, as are the number for each management position.

Pathway 1 to EP: four respondents who believe that ecological values do not need to be enhanced and who wanted to leave the ecosystem alone.

Pathway 2 to EM: five respondents who believe that ecological values need to be enhanced, that this is needed on private land only, and with government funding and landowner implementation.

Pathway 3 to EM: ten respondents who disagreed with the view that ecological values needed to be enhanced on private land only.

Pathway 4 to EM: there was one respondent who believed in utilitarian values and who believed that indigenous forest should be utilised for economic value only.

Pathways to SFM research:

Pathway 5: one respondent who believed in utilitarian values and that indigenous forest should be utilised for economic value only.

Pathway 6: 44 respondents who believe that utilitarian values and ecological values are of equal value.

Pathway 7: six respondents who believe that ecological values need to be enhanced, that this is needed on private land only, but not with government funding and landowner implementation.

Pathways from SFM research:

Pathway 8 to SY&MU: 50 respondents who believe that sustainable forest management research can lead to sustainable yield and multiple use management.

Pathway 9 to NNF: three respondents who do not believe in sustainable forest management research (because they do not believe that sustainable forestry management is possible) but who also believe that an alternative is available.

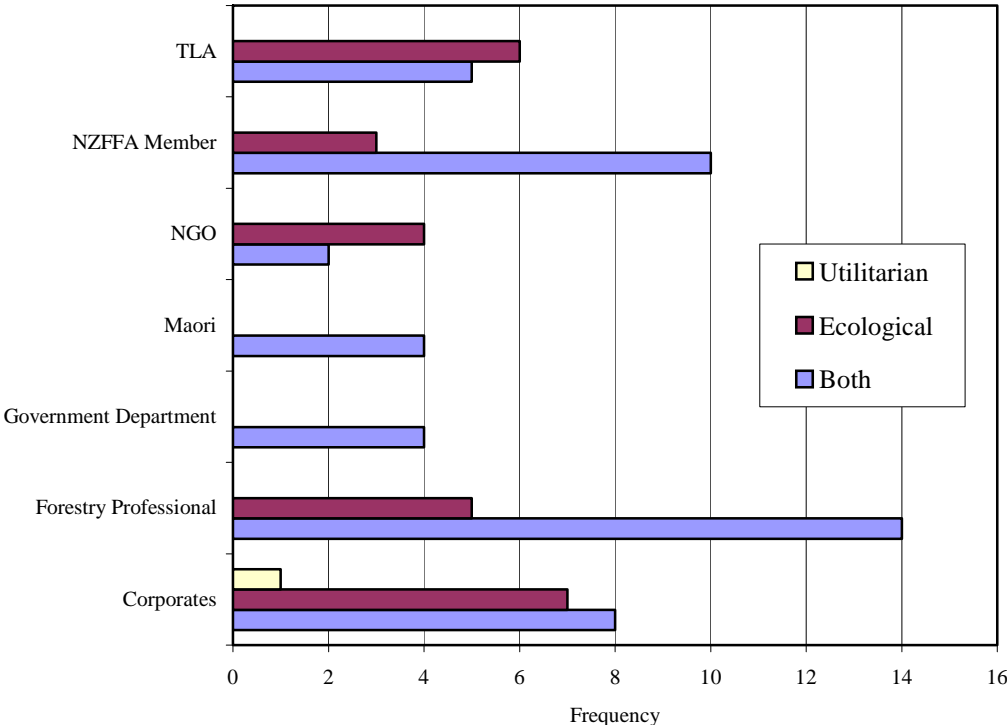
Pathway 10 to SFM not possible: one respondent who did not believe that sustainable forest management research can lead to awareness of the ecosystem effects of forestry and who saw no alternatives.

Figure 1 shows that for indigenous forestry the stakeholders chose either ecological values or a mix of utilitarian and ecological values. Further, there was considerable importance given to sustainable forest management research with a total of 51 respondents emphasising this criterion. Stakeholders with both values, or just ecological values, can get to this criterion, the latter by way of believing that ecological values need to be enhanced on private land but not by government funding. Most of the stakeholders who do emphasise sustainable forest management research come out in favour of sustainable yield and multiple use (60 per cent of all respondents). A few reject this and end up at near natural forestry. The other popular management position was ecosystems management (21 per cent of all respondents). Only some of those with ecological values end up at ecological preservation.

The results show that ecological and utilitarian values predominated and they typically led to sustainable yield and multiple use. Because of the importance given to sustainable yield and multiple use we can observe that most stakeholders support indigenous forestry seeking a mix of ecological, social and economic objectives. This entails management for timber production as well as meeting soil, water, aesthetic and recreational goals.

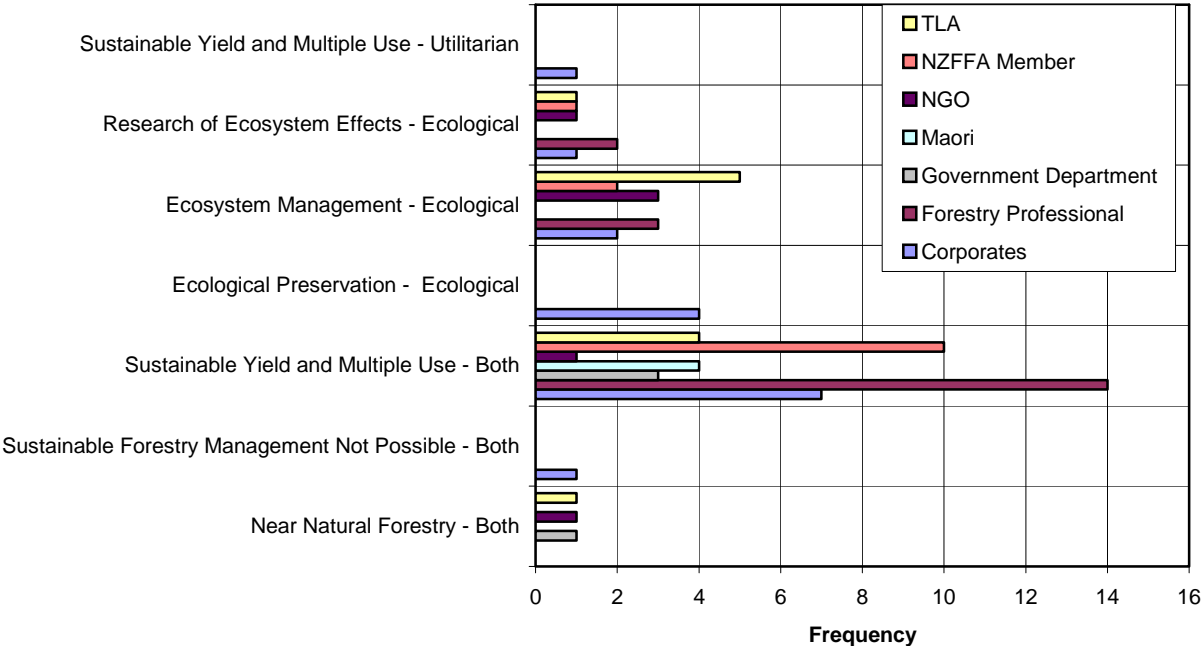
Figure 2 shows the values attributed to indigenous forests by stakeholder groups. Corporates were the only group with a representative attributing utilitarian value to indigenous forests. The largest proportion of corporate representatives placed equal importance on utilitarian and ecological values, while a slightly smaller number felt that ecological values were more important. Maori and Government Department representatives agreed unanimously that both sets of values should be given equal consideration. Responses from Territorial Local Authorities and Non Governmental Groups surveyed were similar in pattern with most representatives indicating a preference for ecological values of indigenous forests. Conversely, NZFFA members and Forestry Professionals chose both values as being more important.

Figure 2
Values Attributed to Indigenous Forests by Stakeholder Groups



Management positions for indigenous forests by stakeholder group are presented in Figure 3. The positions listed include the values chosen and identify the pathways in the decision tree. Overall ‘Sustainable Yield and Multiple Use’ (SY&MU) was the preferred management position with equal value being placed on associated utilitarian and ecological values of the forest. There was support for this option from at least one representative of each surveyed group.

Figure 3
Indigenous Management Priorities by Stakeholder Group



The Corporate group supported the widest variety of management positions with at least one representative indicating support for each management option except Near Natural Forestry (NNF). The majority of forestry professionals supported a SY&MU management objective for indigenous forests, however one felt it was not possible and several others favoured ‘Ecological Preservation’ (EP) of indigenous forest as opposed to a more diverse management objective. Conversely, one representative of the Corporate group indicated that SY&MU should be the management objective and that the utilitarian value of indigenous forest is higher than an ecological value. The Maori group had unanimous support for SY&MU as a management objective with importance attributed to both utilitarian and ecological values of indigenous forests. Government departments supported only two management options, SY&MU and NNF. Utilitarian and ecological values were indicated as being equally important in both cases.

Territorial Local Authorities indicated preference for a more diverse set of management options. One representative supported NNF as the ideal management priority, with equal values attributed. One representative was more conservative, recognising a need for research into ecosystem effects of forestry prior to implementing more SFM. The highest proportion of TLA representatives supported SY&MU with both sets of values considered equally important. A slightly smaller number of representatives indicated preference for ‘Ecosystem Management’ (EM) as a management objective with emphasis placed on ecological values as

important. NGO groups also chose a diverse range of management options. One felt that NNF should be the management objective with equal value placed on utilitarian and ecological aspects of indigenous forest as was the case with the one representative in support of SY&MU. The highest number of NGO representatives supported EM as the most beneficial management objective – with a higher value placed on indigenous forest ecology than utilitarian potential.

Forestry Professionals and NZFFA member responses were very similar. Each group had representatives in support of research into ecosystem effects of forestry prior to active SFM and EM. Both groups placed great value on forest ecology. The highest numbers of representatives from these two groups supported SY&MU however, with equal importance being attributed to both utilitarian and ecological values of forestry prior to implementing more SFM.

3.3 Exotic Forestry

Figure 4 shows the decision tree for exotic forestry. There are nine distinct pathways to six positions including the view that sustainable forest management is not possible. The decision tree includes all of Perley's management positions. From the initial 18 interviews there were ten subjects who chose utilitarian values, five who chose ecological values and three who chose both. The pathways from ecological values lead to only two management positions (EP and EM) while the pathways from utilitarian values lead to all except EP. The pathways from both values equally important lead to SY&MU or EM. People who stated that both values were important go straight to the option of SY&MU or EM. The structure of the decision tree suggests that values play a modest role in influencing direction or outcome. The tree needs further development in order to determine how people move from selecting both values as important to either SY&MU or EM. There was a total of 74 stakeholders included in the telephone survey but for the decision tree there were only 73 respondents with viable responses.

The following account describes the different pathways in the decision tree.

Pathway 1 to EP: there were no respondents who believe that ecological values do need to be enhanced.

Pathway 2 to EP: there were no respondents who do not believe that ecological values need to be enhanced and want to leave the ecosystem alone.

Pathway 3 to EM: there were no respondents who believe that ecological values do not need to be enhanced, and want to leave the ecosystem alone.

Pathway 4 to SYC: one respondent who believed in utilitarian values, that exotic forest should be utilised for economic value only and that environmental health is unimportant. The logically possible pathway to mining and liquidation is shown in the figure although no-one identified this position.

Pathways to SY&MU:

Pathway 5: 15 respondents who believe in utilitarian values, that exotic forest should be utilised for economic value only and that environmental health is important.

Pathway 6: 27 respondents who believe that both utilitarian and ecological values are important.

Pathways to EM:

Pathway 7 to EM via both values: eight respondents who believe that both utilitarian and ecological values are important and prefer EM.

Pathway 8 to EM via utilitarian values: 22 respondents who believe in utilitarian values, that exotic forest should not be utilised for economic value only, and that it is possible to harvest and maintain the ecosystem.

Pathway 9 to SFM not possible: there were no respondents who believe in utilitarian values, that exotic forest should not be utilised for economic value only, and that it is not possible to harvest and maintain the ecosystem.

Figure 2 shows that for exotic forestry the stakeholders chose either utilitarian values or a mix of utilitarian and ecological values. Most (58 per cent) emphasised sustainable yield and multiple use while some (41 per cent) emphasised ecosystem management. Stakeholders with utilitarian values went to either of these management positions, and similarly, most the stakeholders with both values went to sustainable yield and multiple use. Because of the importance given to sustainable yield and multiple use and ecosystem management we can observe that most stakeholders support exotic forestry seeking a mix of ecological, social and economic goals, and seeing that productive use is entirely compatible with maintaining the ecosystem.

It is worthy to note that although a total of 30 respondents identified EM as their management preference for exotic forests there was a division of values in this group. There were 22 respondents who came to this position by placing an emphasis on maximising the utilitarian value of exotic forests. Alternatively, eight of the respondents did not believe that utilitarian values should be given greater emphasis, rather, that both ecological and utilitarian values should be treated as equally important when working to reach the EM objective. Similarly, there was a division in the group of 42 respondents who identified SY&MU as their preferred management choice for exotic forests. The majority of this group (27 respondents) placed equal value on the ecological and utilitarian aspects of exotic forests. Meanwhile, the remaining 15 respondents attached a greater utilitarian value to exotic forests that they felt should be given precedence when managing the forest with an SY&MU objective.

Figure 4
Decision Tree for Exotic Forestry

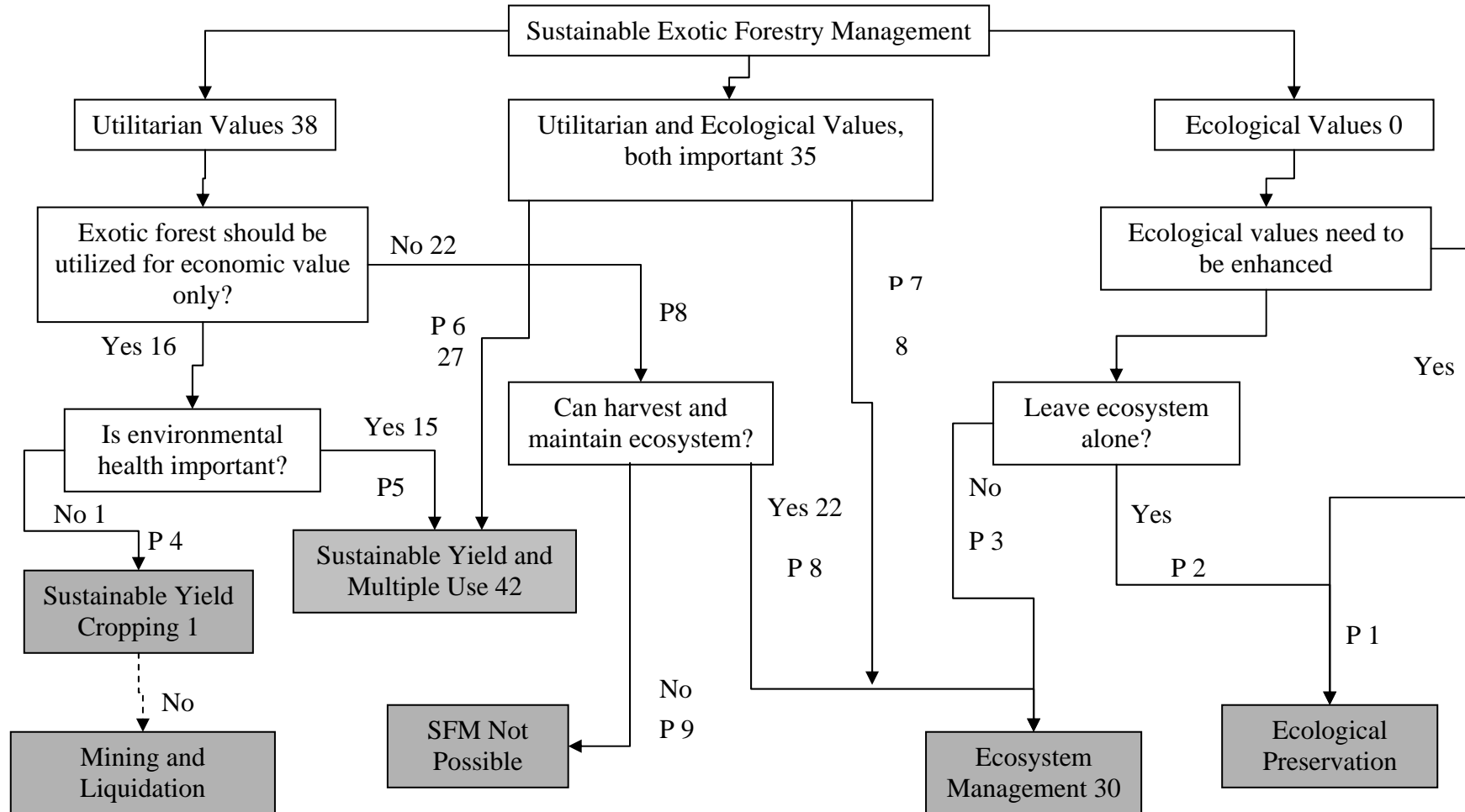
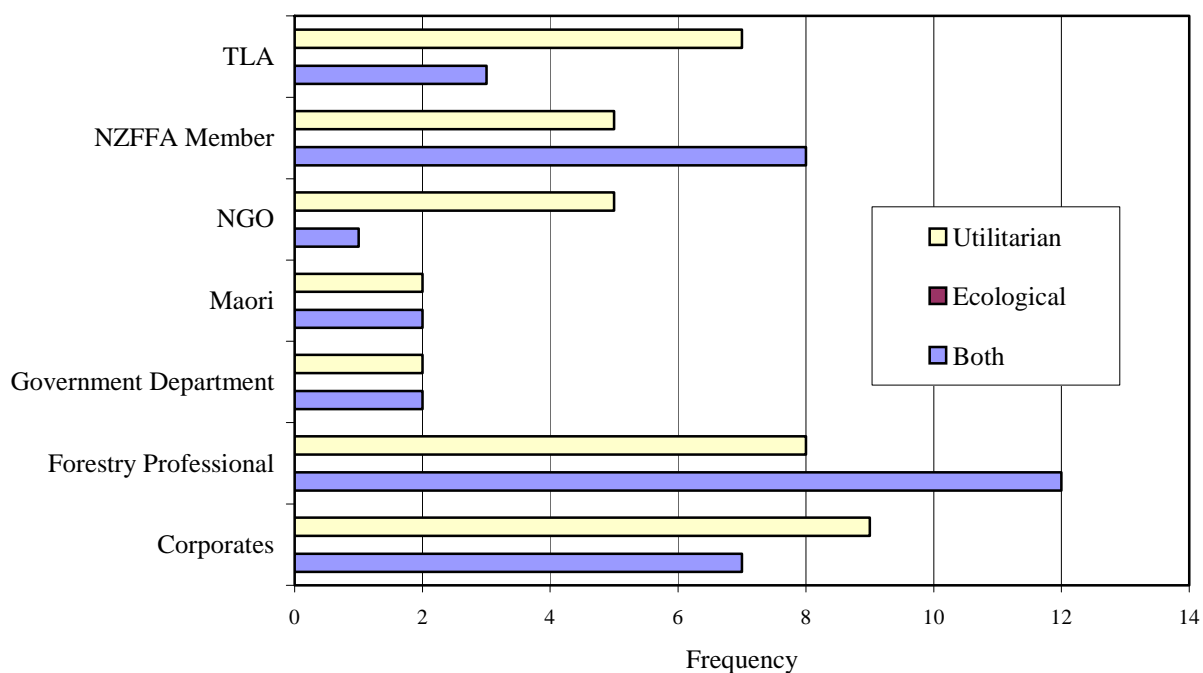


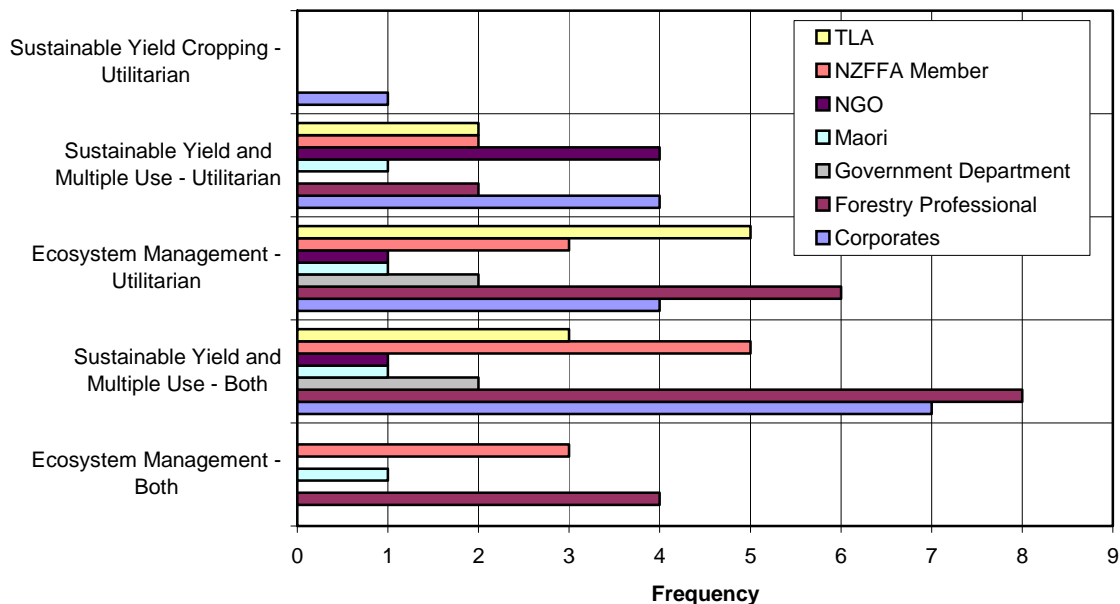
Figure 5 shows the values attributed to exotic forest by each stakeholder group. NZFFA and Forestry Professional values for exotic forests were similar to those for indigenous with the majority placing a high value on both sets of values. The remaining representatives valued the utilitarian aspect of exotic forests. Maori and Government Department positions were also similar with equal numbers from each group supported solely utilitarian or both utilitarian and ecological values of exotic forests. The TLA, NGO and Corporate groups were the only groups of respondents to have a significantly higher number of representatives placing most importance on the utilitarian value, rather than both sets of values.

Figure 5
Values Attributed to Exotic Forests by Stakeholder Groups



Management priorities for exotic forests by stakeholder group are presented in Figure 6. While there were fewer management options for exotic forests than for indigenous forests the majority of respondents favoured SY&MU as the preferred management position with equal value being placed on associated utilitarian and ecological values of the forest. There was support for this option from at least one representative of each surveyed group.

Figure 6
Exotic Management Priorities by Stakeholder Group



Government Departments supported only two of the possible five management options for exotic forests preferring either EM with utilitarian as the highest value of the forest, or SY&MU with an equal emphasis placed on utilitarian and ecological values of the forest. Territorial Local Authorities position were closely related to those of government, although in some cases a predominantly utilitarian value was attributed to the SY&MU option. NGO representative results reflected those of the TLAs although they attributed a significantly higher utilitarian value than either the TLA or Central Government to exotic forests with a corresponding preference for SY&MU as a management option. Each of the four Maori representatives supported a different management option suggesting that Maori hold a diverse position on management priorities and values of exotic forestry, preferring a proactive but precautionary approach to sustainable management practices by supporting both SY&MU and EM equally, but rejecting ‘Sustainable Yield Cropping’.

The only group to have a representative in support of SYC was the corporate group. They predominantly selected SY&MU with an equal preference for the utilitarian and ecological value when making management decisions for exotic forests. EM was preferred by the remaining respondents, although these indicated that the utilitarian value of exotic forests is higher than the ecological value and should be given priority.

Forestry professionals gave their highest support for SY&MU with equal emphasis placed on utilitarian and ecological values in forest management. This was also the case with the next set of representatives from the forestry professionals group who placed a higher utilitarian value on exotic forests but preferred EM as the ideal management objective. A lesser number of representatives in favour of EM attributed both sets of values equally to exotic forests. An

even smaller number of representatives preferred SY&MU with a solely utilitarian value attached. NZFFA representative management options echo those of the forestry professionals as would be expected, with lesser numbers in support of each number a product of fewer members surveyed than the group of professionals.

Chapter 4

Discussion and Conclusion

4.1 Summary

Progress toward sustainable forest management in New Zealand depends, in part, on understanding different views of sustainable forest management. The literature on sustainable forest management shows that the meanings of sustainable forest management are inseparable from the interests of the people who define it. Perley (2000) identified five positions on forestry management and these were used to frame a study of stakeholders' views of sustainable forest management in New Zealand. The main objectives of this research were to identify the types of positions on sustainable forest management held by forestry stakeholders in New Zealand and to show why these positions were held. Perley's ideas on forestry management have been used but not formally tested, although the results do have some implications for the interpretation of the model he presents.

Exploratory interviews with 18 stakeholders were used to construct decision trees which show why people hold different positions on sustainable indigenous and exotic forestry. The decision trees were then used to construct a short questionnaire which was responded to by a random selection of 74 forestry stakeholders.

Results for *Indigenous Forestry* show that stakeholders have either ecological values or a mix of ecological and utilitarian values. Most (60 per cent) emphasised sustainable yield and multiple use while some (21 per cent) emphasised ecosystem management. A few emphasized near natural forestry and ecological preservation. The results show that a combination of ecological and utilitarian values predominated and these values typically led to sustainable yield and multiple use. Only some of those who had ecological values were led to ecological preservation. Thus most stakeholders saw indigenous sustainable forestry as including ecological, social and economic goals.

The results for *Exotic Forestry* showed that stakeholders emphasised either utilitarian values or a mix of ecological and utilitarian values. Most (58 per cent) emphasised sustainable yield and multiple use while some (41 per cent) emphasised ecosystem management. The results show that either utilitarian or utilitarian and ecological values predominated and these values typically lead to either sustainable yield and multiple use, or to ecosystems management. No-one chose ecological values only. Again, the emphasis upon sustainable yield and multiple use was reflected in the way most stakeholders saw exotic forestry as including ecological, social and economic goals. Overall, stakeholders had different value orientations to each type of forestry but most emphasised the sustainable yield and multiple use position ahead of ecosystem management. No stakeholders thought that sustainable forest management was not possible.

There are some interesting observations when the separate results are compared. The results for exotic forestry show 30 stakeholders (41 per cent) emphasised ecosystem management and this is more than the proportion choosing this option in indigenous forestry (21 per cent) or the combined subtotal of 19 (26 per cent) who chose ecosystem management or ecological protection. The majority of this non-random sample of stakeholders within the industry clearly favour Sustainable Yield and Multiple Use over Ecosystem Management for indigenous forests, whilst a significant proportion see a need for emphasis upon Ecosystem Management in exotic forests. The rationale for management is not the same in both settings- a combination of ecological and utilitarian values dominates as the preferred basis for

decision making in indigenous forests (44) as opposed to ecological values only (25). In the exotic forest, there is an almost even split between Utilitarian values only (38) and combined Utilitarian and Ecological values (35). Hence there is not a one-to-one relationship between expressed values and definition of sustainable forest management. The way in which the expressed values are translated into SFM actions depends upon whether we are talking about exotic or indigenous forests. Or to put it another way, the definition of SFM by stakeholders depends both upon their expressed values, and upon the setting in which they are applied.

Table 4 shows the value frequencies for each type of forestry. It reminds us that ecological values were not associated with exotic forests and utilitarian value was only associated with indigenous forest in one case.

Table 4
Frequency of Values for Indigenous and Exotic Forests

	Indigenous Forest	Exotic Forest
Ecological Values	25	0
Utilitarian and Ecological Values	44	35
Utilitarian Values	1	38
Total	70	73

Note, however, that 30 respondents selected ecosystem management as their preferred approach to sustainable management in exotic forests. This shows that the rationale for ecosystem management as the basis for sustainable forest management in exotic forests is not based upon ecological values per se. So that just as expressed values do not necessarily lead to particular management outcomes, neither do definitions of sustainable management necessarily imply a particular set of values. As the decision trees show, there can be several pathways to reach an outwardly similar end point.

4.2 Discussion

Perley's typology of management positions proved to be helpful in understanding stakeholders' perceptions of sustainable forest management in New Zealand. The extreme positions of sustainable yield cropping and mining and liquidation did not feature in the results but the other three positions did. Ecological preservation was a definite minority viewpoint. This viewpoint is likely to be more popular among environmentalists for which we had only four representatives in the sample. This left sustainable yield and multiple use, and ecosystem management, as the two dominant management positions among the forestry stakeholders surveyed.

It is evident from the management options implied by participants and the clear decision pathways to these management options that although forests do have utilitarian value, and in some cases a greater utilitarian value than any other associated value, a regard for the environment is held by the respondents, albeit to differing degrees. Responses indicated that most respondents place at least some value on all three economic, social and economic goals, although a less balanced set of values are attached by those that indicated Ecological Preservation as their preferred management position. Overall this indicates a prevailing vision that the environment should not be managed separately from economic or social goals. This finding reflects the premise that economy, society and environment are integrated entities with associated values that should be managed holistically to achieve sustainable forest

management. This fits well with the definitions of sustainable forest management reported in the literature review.

It is also significant that it is possible to reach the most widely favoured management approaches via different decision pathways, expressing different values. Hence 'ecosystem management' may be the preferred approach for people with different values, drawing upon a different rationale. While it may therefore be possible to agree on an overall approach called 'ecosystem management', there may be differences in detailed interpretation, which reflect the contrasting values, and these will need to be reconciled at the detailed, applied level. Nonetheless, the dominance of 'sustainable yield and multiple use' and 'ecosystem management' approaches suggests some grounds for believing that there is scope for agreement on the broad parameters of SFM, and this is confirmed in the development of draft national guidelines for the FSC certification process, for example.

In these results, Sustained Yield and Multiple Use was the predominant preferred option for stakeholders in respect to both indigenous and exotic forests. This is consistent with a sentiment expressed by a number of speakers at the recent joint conference of the Australian and New Zealand Institutes of Forestry (Mason and Perley, 2003) who emphasised the need for a return in New Zealand to a more integrated approach to forestry, redressing the balance of the effects of the reform process over the past decade and a half. Set against this is the apparent contrast between the values and management preferences expressed by the respondents and those of the conference, and the prevailing statutory and organisational approach to natural resource management in New Zealand. At the national level, the organisational and political approach to forest management remains largely focused upon single objective land management. The overall split between 'conservation' land and 'production' land, which was strongly enforced during the forest sector reforms, continues to drive political decision making. In the High Country tenure review, for example, the primary approach continues to be separation of publicly owned conservation land from freeholded production land. In forest management within the Crown estate, there is strong political opposition to any suggestion of sustained yield from indigenous forests. In policy for private forests, the East Coast stands as an exception to the overall approach which regards forests as essentially productive resources.

The argument presented by advocates of the separation of conservation and production lands is that environmental and social concerns will be addressed through statutory environmental management. It is notable that the primary statute, The Resource Management Act, emphasises ecosystem management rather than Multiple Use, and so again, the views of the Sustainable Yield and Multiple Use stakeholders are somewhat 'out of step' with the primary thrust of statute. With respect to the Resource Management Act however, the results identify a significant number of people emphasising ecosystem management, and this raises the issue of the extent to which particular views are specific to particular interests.

The analysis of views by stakeholder group shows that while some types of stakeholder are represented across all or most possible outcomes (e.g., corporates), others tend to express particular outcomes. The Sustainable Yield and Multiple Use position is most strongly associated with forestry professionals, farm foresters and Maori, whereas TLA, Government and NGO stakeholders predominate in those preferring Ecosystem Management.

Hence the survey suggests that, in broad terms, those who are responsible for regulating forestry, or who have specific interests in non-production values in forests (the NGOs), express a view on sustainable forest management that is broadly consistent with the statutory and political emphasis upon a separation of productive land management from conservation,

mediated by a requirement for ecosystem management of basic ecological values. In contrast, those who manage or own forests, tend to express a view of sustainable forest management which embraces a more multivalent approach, including some production from indigenous forests, and non production uses in exotic forests. This latter view comes closer to the international approaches to sustainable forest management expressed through certification.

These observations need to be qualified in three ways. First, the sample of stakeholders is neither random nor comprehensive. As noted before, Maori and conservation NGOs are under represented. On the basis of these results, it is likely that Maori might reinforce the emphasis upon Sustainable Yield and Multiple Use, whereas NGO conservation views would probably strengthen the emphasis upon ecosystem preservation and possibly ecosystem management.

Second, the analysis is based upon the decision pathways developed from categories derived from Perley's classification. Although intuitively appealing, with some broad support from New Zealand and international literature, Perley's model is essentially untested. Had a fundamentally different conceptual structure been adopted, it is likely that the results would have been different.

Third, the analysis is based upon peoples' responses taken at face value. Perhaps the results reflect what stakeholders would want others to believe about current forestry practice. All we have done is report what stakeholders say, not what they do. Further, it may be that the stakeholders included may have been in positions that strongly support sustainable forest management and the results may reflect what they genuinely believe is the best way to proceed for forestry, but beneath this level may be actual practice which may not necessarily match the expectation of those included in the study.

Finally, although the survey was not designed to test Perley's model in any formal sense, the results do provide some support for, and insight into, his proposal. They give support to the salience of the broad positions he identified, in that all respondents were able to relate to the questions we asked, derived from the model. They were able to follow a logical decision path to an outcome that can be expressed in terms of the model, in a way that makes sense to the respondents. However, the decision paths and the analysis of responses by stakeholder group suggest a less tightly structured and more contingent decision making framework than Perley implies. There was not a one-to-one relationship between values and management outcomes, and some individual outcomes could be reached from more than one value position and via different decision pathways. Hence Perley's classification must be qualified when applied to actual management settings. In the real world, the categories and the processes by which we make decisions are less well defined than a simple classification might suggest.

4.3 Conclusion

The results suggest that the idea of sustainable forest management (SFM) is well established and recognized in the minds of key stakeholders in the sector. There are several interpretations of what SFM means and implies. The majority of stakeholders see sustainable yield and multiple use forestry as the best expression of SFM for both indigenous and exotic forestry. This means that they see SFM as fulfilling a wide range of goals, and this is consistent with international definitions of SFM, and the way that SFM is expressed in forest certification. A significant minority prefer Ecosystem Management as the route to SFM. This is broadly consistent with the dominant regulatory and public policy approach in New Zealand. Notably, the Sustainable Yield and Multiple Use approach is most clearly associated with forestry professionals, farm foresters, and Maori, whereas the Ecosystem Management

approach is more closely associated with TLA and Government regulators and conservation NGOs.

There are a number of implications for future research. First, the focus on stakeholders used in this study may mean that the results reported here are not a good reflection of what the general population thinks about sustainable forest management. Future research could usefully survey the public on their attitudes in order to see whether they are compatible with those closer to forestry issues. Second, some kind of assessment of on-the-ground forestry practice would be useful in order to assess how the values of our stakeholders relate to current forestry practices, and to assess whether the practices believed to ensure sustainable forest management by different groups are actually taking place. Third, the decision trees are not fully developed and could be refined and extended to take into account more detailed thinking about sustainable forest management. Finally, the similarities and differences between Sustainable Yield and Multiple Use, and Ecosystem Management, require further investigation, with a view to identifying areas of overlap and complementarity that can provide a base for working agreements. On the face of it, this study suggests that there are some differences in belief and preference about SFM between those most closely associated with forest management within the sector, and those most involved in public policy and regulation, and conservation advocacy. The challenge is to find procedures that enable the differences between these positions on SFM to be minimised and the points of agreement to be strengthened.

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Appendix 1: The Questionnaire

Lincoln University

Telephone survey of Forestry Management Positions Adopted by Stakeholders

September, 2002

SUSTAINABLE INDIGENOUS FORESTRY MANAGEMENT

Do you attribute mainly Utilitarian Values, Ecological Values or both Utilitarian and Ecological Values to Indigenous Forests?.

Highest Value: Utilitarian

- Indigenous forests should be utilised mainly for gaining economic profit?
 - 1.) No: ECOSYSTEM MANAGEMENT
 - 2) Yes: Do we need to develop awareness of ecosystem effects ie-via application of Sustainable Forestry Management research
 - 2.1) Yes: SUSTAINABLE YIELD AND MULTIPLE USE
 - 2.2) No: Manage with Near Natural Forest objective.
 - 2.2.1) No: SUSTAINABLE FORESTRY MANAGEMENT NOT POSSIBLE/DOUBTS ABOUT SFM
No alternatives available/is not possible
Near Natural Forestry (manage to mimic natural processes in forest).

Highest Value: Ecological

- Ecological value enhancement should be the focus of sustainable indigenous forestry management.
 - 1) No: Leave the forest alone
 - 1.1) Yes: ECOLOGICAL PRESERVATION
 - 2) Yes: Ecological values will be adequately enhanced by increasing conservation efforts on private land.
 - 2.1) Yes: For indigenous ecological values to be enhanced landowners must implement conservation initiatives with the support of government funding.
 - 2.1.1) Yes: Near Natural Forestry as a possible initiative.
 - Yes: ECOSYSTEM MANAGEMENT.
 - 2.1.2) No: Ecological value enhancement is subject to research of ecosystem effects resulting from SFM. With this research SFM can be a way of reaching management goals for Ecological values.
 - 2.2) No: ECOSYSTEM MANAGEMENT
 - 2.2.1) Yes: Reach ecosystem management goals through Near Natural Forestry.

Ecological and Utilitarian Values are equal in Indigenous Forests.

- Subject to research of ecosystem effects, SFM can be a way to reach management goals.

- 1.) Yes: SUSTAINABLE YIELD AND MULTIPLE USE.
- 2.) No: Manage Indigenous Forest with Near Natural Forestry objective to meet both ecological and utilitarian values.
 - 2.1) Yes: NEAR NATURAL FORESTRY
 - 2.2) No: SUSTAINABLE FORESTRY MANAGEMENT NOT POSSIBLE.

SUSTAINABLE EXOTIC FORESTRY MANAGEMENT

Do you attribute mainly Utilitarian Values, Ecological Values or both Utilitarian and Ecological Values to Exotic Forests?.

- A. Highest Value: Utilitarian Values
 - Exotic Forests should be utilised for economic value only through harvest.
 - 1.) Yes: Is environmental health important in exotic forest management?
 - 1.1) Yes: SUSTAINABLE YIELD AND MULTIPLE USE.
 - 1.2) No: SUSTAINABLE YIELD CROPPING
No: MINING AND LIQUIDATION.
 - 2.) No: Exotic Forest should be utilised for other profit/non-profit benefits.
 - 2.1) Yes: It is possible to harvest and maintain exotic ecosystems.
 - 2.1.1) Yes: ECOSYSTEM MANAGEMENT.
 - 2.2) No: SUSTAINABLE EXOTIC FORESTRY MANAGEMENT NOT POSSIBLE.
- B. Highest Value: Ecological Values
 - Ecological Values of Exotic Forests need to be enhanced.
 - 1.) Yes: ECOLOGICAL PRESERVATION
 - 2.) No: Leave ecosystem alone
 - 2.1.) Yes: ECOLOGICAL PRESERVATION
 - 2.2.) No: ECOSYSTEM MANAGEMENT
- C. Ecological and Utilitarian Values are equal in Exotic Forests.
 - 1.) Yes: SUSTAINABLE YIELD AND MULTIPLE USE.
 - 2.) No: ECOSYSTEM MANAGEMENT

Do you have any doubts or concerns about Sustainable Exotic Forestry Management?