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NON-TIMBER DIMENSIONS OF FOREST MANAGEMENT:
A QUALITATIVE EVALUATION OF ONTARIO'S FOREST POLICY

by

Allison Jennifer Grose, B.A.

A thesis submitted to
The Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Master of Arts

Department of Geography

Carleton University

Ottawa, Ontario

March 29, 1995

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**NON-TIMBER DIMENSIONS OF FOREST MANAGEMENT:
A QUALITATIVE EVALUATION OF ONTARIO'S FOREST POLICY**

submitted by Allison Grose, B.A.
in partial fulfilment of the requirements for
the degree of Master of Arts.

THESIS SUPERVISOR

CHAIR, DEPARTMENT OF GEOGRAPHY

Carleton University

May, 1995.

ABSTRACT

Ontario's forests, once seen primarily as a source of timber, are now expected to satisfy a wide variety of demands. As a large majority of forests in Ontario, Canada, are publicly owned, expectations are that management of the forests will reflect public values. However, there has recently been considerable criticism that current forest management policies and practices are threatening many forest values. The purpose of this thesis is to determine the extent to which Ontario's forest policy addresses non-timber values.

This research had four main components. First, an evaluation framework designed to compare policy goals to externally determined forest values was established. Next, the range and dimensions of non-timber values (NTVs) that Ontario's forests are expected to satisfy were identified. The NTVs identified for this research are tourism and recreation, cultural and spiritual values, old growth forests, wildlife, biodiversity and life-support systems. The third component was a summary of current forest policy for the province of Ontario. Finally, using the evaluation framework, the forest policy was analyzed to determine the extent to which it addresses the identified non-timber values.

The analysis indicates that there is an awareness of the importance of NTVs, but coverage of these values in Ontario's forest policy is not comprehensive. Newer policies reflect the importance placed on more recently identified values such as biodiversity whereas older policies indicate that priority is given to economically important values such as tourism. Problems with links between policies, both philosophical and technical, further contribute to the lack of coverage of NTVs in Ontario's forest policy.

ACKNOWLEDGEMENTS

I would like to express my gratitude to my thesis supervisor, Professor Mike Brklacich, for all his help and support, and in particular for his ability to provide criticism which is always positive and constructive. I would also like to thank my advisor Professor Doug King for all his insightful comments and suggestions.

I want to thank all of the people who make up the Department of Geography at Carleton for providing such an enjoyable environment in which to complete my studies. The encouragement from staff and professors alike has been greatly appreciated.

The unflagging belief in my abilities and the encouragement from my husband Doug was invaluable, as was the support and enthusiasm of my parents. A special thanks goes to the three of them.

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CHAPTER I

INTRODUCTION

1.1 Non-Timber Values and Forest Management

1.1.1 The Importance of Ontario's Forests

Ontario's forests are significant elements of many aspects of life in the province. They are a dominant part of the landscape, covering approximately three-quarters of the province's 80 million hectares. Some 2900 species of plants, 160 species of fish, 70 species of reptiles and amphibians, 400 species of birds and 85 species of mammals are found in Ontario's forests (Ontario Round Table on Environment and Economy (ORTEE)¹, 1992a, p.3). Forests provide clean air and water, prevent erosion, regulate water flows and act as carbon sinks.

Forests also play an important economic role in Ontario. More than \$10 billion worth of forest products are produced annually in the province, and in 1989, \$2.4 billion in wages and salaries were provided by the forest products industry (ORTEE, 1992a, p.3). Forty-one communities in Ontario are totally dependent on the forest industry for employment (Priddle, 1991, p.189); in northern Ontario, 126 communities out of 278 rely on forestry as a major economic activity (Ontario Environmental Assessment Board (OEAB), 1994, p.25).

¹See Appendix 1 for a list of acronyms.

Other activities that generate revenue also take place in the forests. Forests are essential settings for parts of the tourist industry, and for activities such as hunting, fishing and camping. OEAB (1994) estimated that anglers spent \$981 million in 1985, hunters spent approximately \$139 million in 1987, and tourism on provincial Crown lands generated \$1.4 billion in expenditures in 1989, and directly and indirectly created employment for approximately 46,700 people.

These activities, and others such as bird-watching, canoeing and hiking, can also provide less tangible but equally important social and spiritual benefits. It has been said that forests are part of the Canadian heritage, and a significant part of national identity (Canadian Council of Forest Ministers (CCFM), 1992a). The maple leaf is Canada's national symbol. A poll conducted in 1991 identified 'the natural environment including forests' as the third most important national characteristic of Canada (Forestry Canada, 1992). Overall, forests are of fundamental importance to Canadians, and they provide a broad array of goods and services, including environmental, economic, social and spiritual.

1.1.2 Criticism of Forest Management

Management of this crucial resource has come under increasing criticism. Some of this criticism has been directed at the forest industry, but much has also been directed towards government agencies. In Ontario, almost eighty-five percent of forests are on provincial Crown land (Forestry Canada, 1990). Forests, as natural resources, come under provincial jurisdiction. Ontario's interests in forests fall mainly under the mandate

of the Ontario Ministry of Natural Resources (OMNR). The public and the media have accused the OMNR of mismanagement of the Province's forests, and have called for sweeping changes (Priddle, 1991).

Logging practices have been criticized on environmental grounds. People have become more educated about the environment and more committed to environmental causes, and they see current forest management as harmful to environmental health (Dunster, 1987; Reed, 1990). There are concerns wildlife habitat is not being adequately protected (Atkinson, 1992; Canadian Wildlife Federation (CWF), 1993), and that broader ecological processes and geochemical cycles are being negatively altered (Behan, 1990; Bourdages, 1993).

There have been a growing number of conflicts between users of the forest (Dunster and Gibson, 1989). An increase in leisure time and money has resulted in a larger number of recreational users, and forests are now expected to satisfy an even broader range of needs and requirements (Bird, 1990; Dunster, 1987; Reed, 1990). With increasing non-timber use of forests, a larger number of people are exposed directly to logging operations, and this in turn has increased the probability of conflict between timber and non-timber users. In addition, there is a perception that the forest resource is shrinking as the trees that are harvested are not adequately restocked, which in turn heightens the prospect for additional conflicts amongst a growing number of forest users.

At the same time, changes in public attitudes, both towards the government and towards the environment, have contributed to criticisms of forest management. The public has become increasingly disenchanted with government, and suspicious of the

decision-making process (Knopp and Caldbeck, 1990; Maki, 1989; Sewell and O’Riordan, 1976). This alienation has intensified as evidence about failures of past decisions has grown (Sewell and O’Riordan, 1976). This disenchantment has been matched by a growing belief that people have a right to be involved in making decisions which will affect their lives, and this right is seen as particularly unambiguous with respect to a resource such as the forest, which is, after all, publicly owned (Reed, 1990).

1.1.3 A Changing Forest Perspective

Recent criticisms and concerns reflect a changing perspective on the forest as a resource. It is a change that is so profound that it is frequently referred to as a paradigm shift (Behan, 1990; Cortner and Moote, 1994; M’Gonigle, 1989). Zimmerman’s (1964) classic work describes resources as being culturally defined: ‘resources are not, they become’. That is, something is not a resource unless it is perceived as having a use or purpose. In this context, resources are not defined in static terms. As the desire or need for a resource changes, so does its value and nature as a resource.

In the past, natural resource management has had the focus of maximizing production of a single resource or use (Cortner and Moote, 1994). Historically, the forests of Ontario have been seen primarily as sources of timber. The original mandate of the provincial government regarding forest management was to regulate the use of Crown forests by industry (Dunster and Gibson, 1989). With what was perceived as an unlimited supply of timber, this focus continued until recent decades. The forests, through the timber industry, supplied and continue to supply significant numbers of jobs

and revenues.

However, people now see the forests as much more than a supply of timber. Although the economic significance of the forest industries is still recognized, people see these same industries as being a threat to other elements of the forest that they value (Bourdages and Amyot, 1992). Forest operations, particularly harvesting methods, are perceived as threats to wildlife habitat, recreation and tourism opportunities, and water, soil and air quality (Dunster, 1987). Unique areas such as old growth stands are threatened by these operations, as are traditional grounds for hunting, fishing, and trapping (Hodgins and Benedickson, 1989).

Government initiatives to protect identified elements, such as endangered species, from logging operations are not seen as sufficient. Minor alterations and fine-tuning to the current system of management are viewed as inadequate, and there are now calls for fundamental changes to the forest management system itself (M'Gonigle, 1989). This new style of management is given different names: ecologically-based management (Behan, 1990), ecosystem management (Cortner and Moote, 1994), or, most frequently, management by the precepts of sustainable development (Gale and Cordray, 1991; M'Gonigle, 1989). Although details associated with each of these terms differ, all are founded upon maintaining the integrity of the forest ecosystem and including social considerations in forest management decision-making. Forest industries should no longer have primacy in management decisions.

Increasing environmental awareness by the public at large, increased exposure to the forest environment, a perception that the forests are being degraded, and mistrust of

government decision-making have all led to criticisms of past management of the forest resource in Ontario. The OMNR has responded by introducing new policies that are intended to cover timber and non-timber interests for managing Ontario's forest resources. The forest industries are a powerful lobby for ensuring that timber interests are represented and protected. Non-timber interests, however, are less clearly defined and are more fragmented. The inclusion of non-timber issues in forest policies is a relatively new process.

1.2 Purpose and Objectives

Criticisms of forest management have led to a question as to whether forest policies in Ontario address the interests of non-timber stakeholders in the forest. Therefore, the purpose of this thesis is to evaluate OMNR's forest policies regarding forest management to determine whether they address the range of non-timber dimensions identified as being important elements of the forest landscape. There are four specific research objectives that are necessary to address this broad purpose.

Objective 1: The first objective is to identify a policy evaluation framework that

- a) defines policy goals independently of existing policy
- b) facilitates an explicit comparison of existing policies to the independently defined set of policy goals, and
- c) specifies criteria for evaluating the content of existing policies.

Objective 2: The second objective is to review and synthesize extant literature relating to non-timber values in order to determine the range and dimensions of non-

timber values which should be considered in contemporary forest policy.

Objective 3: The third objective is to summarize current Ontario forest policy, with an emphasis on existing NTV coverage.

Objective 4: The fourth research objective is to conduct a qualitative evaluation of Ontario's current forest policy to determine the extent to which it addresses non-timber dimensions of forest management.

1.3 Scope of Thesis

This thesis assesses forest policies for provincial Crown lands in Ontario in effect as of April, 1994. Although there is no doubt that forests on private, municipal or federal lands are important, by far the greatest amount of forested lands are provincial Crown lands. Eighty-five per cent of Ontario's forests are under the sole jurisdiction of the OMNR. This thesis is therefore not concerned with jurisdictional disputes or issues of ownership of the forest resource, but covers policies from a single government ministry which affect the large majority of the forests in Ontario. Also, only Crown lands that are being actively managed are covered (Figure 1.1). The most northerly part of the province, although forested, is only subject to intervention related to forest protection because it is not economically feasible for industry to harvest in the north. The more southerly part is subject to other interventions which have the potential to affect non-timber values.

Perceptions of resources tend to be regionally differentiated; this results in different issues being important in different areas. For example, the disappearance of

FIGURE 1.1 FOREST REGIONS OF ONTARIO

tropical rainforests, deforestation and desertification, and the overuse of forests for fuelwood are important forest-related issues but they are not important in all regions. By focusing on a single region, in this case Ontario, it is possible to concentrate on the issues that are germane to the selected region. Forest management within parks and other protected areas of the province are not covered in this thesis for similar reasons. Issues of resource use in protected areas have a different focus than those of resource use in unprotected areas.

The policies being assessed in the thesis are current policies related to forest management. Forest management is defined here as planned activities which are explicitly directed to affect the forest landscape. As previously stated, perceptions of a resource change over time. This evaluation pertains to the forest as it is currently perceived. Therefore, past policies are not included except to place current policies in context. It is necessary to examine a broad range of policies. Many of the OMNR's policies that affect forests are not, strictly speaking, forest policies. Some of OMNR policies, such as Direction 90's (OMNR, 1991c), deal with an approach to resource management generally. Other documents, such as the Strategic Land Use Plans, are planning rather than management documents, but directly affect management of the forest resource. Most documents being examined are directly related to forest management.

The assessment in the thesis focuses on policy formulation rather than policy implementation. Many of OMNR's policies are very recent. Some are so new that there are as yet no strategies for their implementation. Therefore, a determination of whether the current policies are successful in protecting non-timber values is beyond the scope

of this thesis. Instead, the thesis focuses on whether the non-timber values have been identified and addressed in the policies in a manner which will facilitate their protection. Such identification will not ensure the protection of these values; its absence would, however, probably result in a lack of protection.

Policy content is the subject of evaluation in this thesis rather than issues of policy process. Policy is examined as it exists. Questions as to how the policy was formed, or, more precisely, who was instrumental in the policy formulation, are beyond the scope of this thesis. Issues concerning public participation, institutional structures of control and consideration of alternative policies are important, but this thesis examines whether existing policies address non-timber issues, rather than the mechanisms underpinning the formulation of these policies.

Finally, this thesis is concerned with non-timber dimensions of forest policy. Ontario's forests have historically been managed for producing timber, first for whole logs, later for lumber, and most recently, primarily for pulp and paper. The many dimensions of this usage, from international timber demands to production forecasts, have been well-documented. However, forests provide much more than timber, and these other values are less well-documented. Some of these other elements, such as tourism and recreation opportunities, are related to direct human use of the forests, and provide direct, quantifiable, economic benefits. Sites of cultural and spiritual significance may also exist, and these elements tend to be less quantifiable. Forests, as habitat for wildlife and purifiers of air and water, have a broader ecological significance. This significance is again difficult to quantify.

This thesis covers a full range of non-timber elements, or benefits, or values. It does not attempt to rate the importance or priority of these non-timber values. Similarly, there is no assumption made that all non-timber values are of equal importance. Instead it defines different values which should all be considered when decisions are made about the management of Ontario's forests.

A discussion of non-timber values would be impossible without some consideration of timber management. It is precisely the manipulation of the forest environment for timber production that affects non-timber elements. Management for non-timber values is inseparable from management for timber. Therefore, even though the focus of this thesis is on non-timber values, timber management activities are discussed, but only as they directly affect identified non-timber elements. Broader issues of timber management, particularly those related to timber demand, economic policy and international trade policy are beyond the scope of this thesis.

In summary, this thesis is concerned with non-timber dimensions of forest policies covering provincial Crown lands in Ontario. Ontario's forest policies are examined to determine whether they have been formulated to address a broad range of non-timber elements. Timber management is discussed only as it affects the non-timber elements.

1.4 Research Overview and Thesis Structure

The overall goal of determining whether Ontario's forest policies address the range of non-timber values is addressed by four main research components which support the four research objectives described in Section 1.2 (Fig. 1.2). The first component,

FIGURE 1.2 THESIS RESEARCH OVERVIEW

developed in Chapter 2 of this thesis, establishes the framework for evaluating forest policies as formulated by the OMNR. The chapter contains a definition of policy as it is used in the thesis, and a description of the different policy elements. This is followed by a discussion of different approaches to policy evaluation. An approach appropriate for evaluating non-timber elements of forest policies in Ontario is defined, and then assessment criteria are chosen.

Chapter 3 addresses the second component by reviewing a broad range of literature to determine the range of non-timber values that modern forests are expected to supply. Some of the literature is from traditional sources such as academic journals and government reports. However, as the importance of resources is culturally determined, some of the material also comes from a variety of interest groups, and from public opinion polls. Regional differences in resource perception means that much material originates in Ontario, although issues of importance in Ontario are also identified in Canadian and North American literature. Few international sources are reviewed because forestry issues and management practices in developing countries and in Europe, for example, differ significantly from those in Ontario. The non-timber values identified in the literature are discussed first within the context of societal goals, and then within the context of forest policies. The reasons for these values being identified as important are ascertained. Forest management practices that affect each value are discussed, and their place in forest policy determined.

The third research component is covered in Chapter 4, which presents a synopsis of current OMNR forest policy documentation. Only those elements of forest policy

which relate to the non-timber values identified in Chapter 3 are included. This chapter provides an overview of the range of non-timber values that are included in the policies, and to what extent they are considered.

Chapter 5 contains the fourth research component and presents the analysis of Ontario's forest policy. Using the framework set out in Chapter 2, the policies summarized in Chapter 4 are compared to the non-timber values defined in Chapter 3. The evaluation attempts to determine if the identified non-timber values are addressed in the policies and the extent of such coverage, based on criteria developed in Chapter 2.

Chapter 6 presents a summary of the thesis and the chapter concludes with a discussion of possible directions for future research.

CHAPTER 2

FRAMEWORK FOR EVALUATION

It is important to recognize that there is no single accepted approach or method for policy evaluation. It is therefore necessary to review policy evaluation approaches and to develop the evaluation framework to be used in subsequent chapters. To this end, this chapter defines the term policy and identifies the various policy elements. Next, selected conceptual constructs for policy evaluation are discussed. The conceptual framework used in this thesis is then defined, and guidelines that facilitate its application in the evaluation of Ontario's forest policies and non-timber values are described.

2.1 Forest Management and Public Policy

Forests, being natural resources, fall under provincial jurisdiction in Canada. Approximately 85 percent of Ontario's forests exist on provincial Crown land. Given the size and importance of this forest resource, it is not surprising that public policies for forest management have a long history in Ontario, with the first Crown Timber Act having been passed in 1849. These policies have evolved considerably in the ensuing 145 years, reflecting a change in the perception of the roles and values of forests.

The changes in policy have been both evolutionary and revolutionary, although in either case they have tended to be reactive. Pepler (1970) describes the evolution of forest policies in relation to three stages of development. In the first stage, 'exploitation', policies are created to prevent damage to forests to safeguard a source of revenue. The second or 'supervisory' stage is prompted by concern about over-

exploitation, and deals with the renewal and the tending of forests. The third or 'developmental' stage, occurs as qualitative and quantitative demands on the timber resource increase and production must be increased.

This process that Pepler describes relates mainly to the timber resources. Demands on the forest have changed and diversified, however, and forest resources are now expected to satisfy many more demands, such as recreational, ecological and spiritual. The number of people placing demands on the resource has also increased. Overall, this increase in the range and number of stakeholders has led to conflicts about how the forest should be managed, and these conflicts will undoubtedly increase in number as the demands continue to grow. Further, conflicts tend to focus public attention on the issues, which then gain political legitimacy and may influence policy.

This type of process has been termed the 'issue-attention cycle' by Downs (1972). Mitchell (1989, p.297) describes the effect of this process on policy as follows: "Issues move from attracting initial concern from research specialists to achieving recognition from the media, general public and politicians. Each issue must struggle to reach the public agenda and maintain its position". After recognizing a problem, people become enthusiastic about correcting it. Their imaginations are caught and their energies are directed towards finding solutions. Political pressure may be exerted to change policies or enact legislation to solve perceived problems. However, many problems are complex and solutions can be expensive and take time to implement. Political bureaucracies may slow the process further. The time and expense involved then causes people to lose interest in seeking solutions, and pressures for change are eased. Forest management in

Ontario appears to be at the stage wherein it has the attention of the media, the public, and politicians. Political pressure is probably at least in part the reason that forest policies are in transition again.

These reactive changes have been necessary. As the perception of the forest resource changes, so must policies which drive management. However, it must not be forgotten that policy creation is a political process. Politicians, administrators and others involved in the process may have concerns other than those of good forest management. Forest management, due to the nature of the resource, must have an outlook measured in decades or centuries and this is in stark contrast with political time horizons which typically reach as far as the next election.

There is also a concern about the reactive nature of policy making. Good management should involve anticipating possible problems and preventing them, rather than simply fixing damage that has already occurred. Forests are expected to become increasingly important in Ontario, and it will be crucial for resource policies to address any impediments to forest utility.

A policy evaluation of forest management in Ontario is appropriate because most of the forests are on Crown land and are managed by the state on behalf of the public. This is not the place for a debate about the nature of representation and democracy, but it can at least be said that the resource should be managed in the best interests of the public. To do this, it is necessary to consider proposals for resource development (or non-development) in terms of broad social, environmental and institutional consequences (Sewell, 1973). A policy evaluation can help determine whether these broad

consequences are being considered.

2.2 Public Policy

2.2.1 Defining 'Policy'

Defining the term policy is a necessary prerequisite to any investigation into the formulation and evaluation of public policies. In its strictest sense, a government policy is a formalized, official statement by the said government, describing its goals in a particular area, usually by way of a White Paper, or Policy Statement such as the OMNR's (1985) A Policy for the Integration of Other Resource Values in Timber Management. In its widest sense, a government policy could be said to be a governing party's expression of its ideology or platform, including expressions of purpose and broad statements of intent. Statements such as 'It is this government's policy to reduce unemployment' would fall into this category.

Policy analysis literature includes other elements in the definition. Pal (1987), in his text Public Policy Analysis: An Introduction, states that policies must be consciously and deliberately created, and must contain a body of statements and/or decisions. Public policy is defined by Pal (1987, p.4) as "a course of action or inaction chosen by public authorities to address a given problem or interrelated set of problems". Nagel (1990) includes the elements of goals, programmes to achieve the goals, and the relationships between the goals and programmes, as policy. Both Pal (1987) and Pepler (1970) would include the ideology behind the actions- not just what a government does, but why it does it. Palfrey et al. (1992) use a definition that is most inclusive, describing

policy as a process having several different levels: policy as aspiration, policy as formal proposition, and policy as programme.

All of these definitions have merit, and most have elements that overlap. For this thesis, a comprehensive definition containing elements from all of the above statements is used. The ethical underpinnings of any government program should be open to scrutiny, so policy as aspiration or ideological commitment is included. Formally issued statements of aims or goals must obviously be included, as should descriptions of problems these policies are designed to correct. As is traditional in policy analysis, strategies and activities for implementation are also covered by the definition.

Policy is defined, therefore, as **'an interrelated set of ideological statements, defined goals, and programmes, set out by a government to address a defined problem'**. The breadth of this definition allows for the inclusion of formal and informal government statements such as accords, strategies, commitments, policy papers, planning documents, and legislation. In the context of Ontario, forest management is explicitly within the mandate of the OMNR, and therefore most of the province's forest-related policies originate from this Ministry.

2.2.2 Policy Elements

Public policy content is frequently described as having three key elements: problem definition, goals, and instruments or strategies (Pal, 1987). However, goals can usefully be divided into goals and objectives for purposes of clarity, to ensure that both ideological and practical or technical elements are included. As a consequence, policy

is considered here to have four elements. Each of these elements will now be described.

Problem definition: Problem definition is perhaps the key element of policy. It is from problem definition that all subsequent components flow. Without an identified problem, governments would not begin the process of developing new policies or revising old policies. Problems constitute the reason for the existence of policies, so there would be no policy if there was no need to prevent or solve a problem. Therefore, problems must be described and defined so that appropriate actions can be taken.

Problems have many dimensions. They do not exist as an external reality; rather, they exist through the perceptions of people. Therefore, defining a problem is a creative act, calling into play the judgment of people (Pal, 1987). Which problems are addressed, how they are interpreted, and what priority they are given is a part of a political process affected by the knowledge and values of the policy makers. It follows that definitions of the problems will narrow the choice of solutions.

In addition to the question of values and interpretation is the issue of how well the problems are defined in a more technical sense. Sewell (1973, p. 37), writing within the context of resource development, put it this way:

Faced with a growing number of claims on the public purse and with an increasing number of conflicts in the use of particular resources, decision-makers must know how serious the problems are, not only in terms of their physical magnitude, but also in terms of their impact upon human activity.

The more clearly and completely the problems are defined, the easier it will be to find effective solutions.

Goals: Goals are statements of a philosophical position, or broad, general

statements of intent of governments. Examples of this type of statement are:

[the goal of the Strategic Land Use Plans is] to provide opportunities for outdoor recreation and resource development for the continuous social and economic benefit of the people of Ontario, and to administer, protect and conserve public land and water (OMNR, 1982, p.i),

and "Sustainable development is the cornerstone of MNR's new direction" (OMNR, 1991, p.1).

Goal statements are by their very nature somewhat vague, but they should be related as explicitly as possible to the defined problems. Even at this early stage in the policy process, cause and effect linkages should be made clear.

Objectives: Objectives or targets are the first stage in making the goals operational. Objectives are specific and measurable, and are often scheduled. For example, an OMNR forestry target is described as "To meet the wood requirements of the forest industry in the Planning Region by the year 2000. The target, at this point in time, is 10.4 million cubic meters of conifer and 1.2 million cubic meters of hardwood..." (OMNR, 1982, p.19).

Instruments or Strategies: Instruments or strategies form the means by which targets can be met and goals achieved. Instruments put the policy into operation. Instruments answer the question as to how a policy is to be implemented. They can take many forms, including research, regulation, taxation or subsidy, program creation, consultation and information provision.

These four elements comprise public policy. It should be noted that it is unlikely that each element will occur discretely in a single document, neatly labelled and ready for evaluation. A field such as forest management, even when more narrowly

constrained to include only policies related to non-timber values, and constrained further still to forests under the jurisdiction of the OMNR, is too complex to be contained in a single document. For example, some issues best managed on a broad scale may be dealt with in land-use planning documents; issues more appropriately dealt with on a local scale may be dealt with in individual resource plans.

This complexity is recognized in the definition of policy used in this thesis. The definition purposefully refers to interrelated sets of statements, and the task of evaluating Ontario forest policy will necessarily have to consider problem definitions, goals, objectives and instruments that occur in a number of documents that collectively form Ontario's forest policy.

2.3 Policy Evaluation

2.3.1 Policy Evaluation Defined

The terms 'policy analysis' and 'policy evaluation' are often used interchangeably and refer broadly to studies of individual facets of policy process, from policy determinants to programme impacts, and to the study of the policy process itself. Such analysis may be formative in nature, referring to evaluation during the policy process, in which elements are assessed and information is fed back to form or improve policies. Alternatively, summative analysis involves the evaluation of outcomes or consequences of policy (Palfrey et al., 1992; Smit and Johnston, 1983).

Pal (1987, p.43) makes an interesting distinction between analysis and evaluation. He defines policy analysis broadly as "the disciplined application of intellect to public

problems". Policy evaluation is defined as one element of policy analysis, lying within the applied tradition. Its purpose is to improve public policies, and is thus explicitly prescriptive in nature. Unlike other types of analysis, which may describe how or why a policy works, evaluation aims in varying degrees at judging what is good policy or what should be included in a policy (Pal, 1987). This is not to say it necessarily has a moral component as the notion of good policy may include multiple perspectives ranging from moral to economic to political, and so on.

In the past, evaluation of policies and programs, particularly in the resource field, often centred around a few simple criteria: technical feasibility, legality, and financial viability (Sewell, 1973). Now, economic, social, and ecological factors, as well as political viability, are commonly included in policy evaluation.

For the purposes of this thesis, Pal's view of evaluation is followed. The evaluation of, or the placement of value on, a public policy, connotes a judgment of that policy. Public policy evaluation therefore involves a study of public policy content to determine the extent to which it addresses the non-timber forest issues that are defined in Chapter 3. The criteria used to make this determination are elaborated upon in section 2.4.2.

2.3.2 Approaches to Policy Evaluation

Most policy evaluation is concerned with the effectiveness of programs as related to specified policy goals (Palfrey et al., 1992). Policy analysts ask the questions 'Are the policies and programs working? If not, why not?' (Pal, 1987, p.43). Because policy

evaluation is often part of the political process, it may be issue-driven, and hence 'effectiveness' may take on different meanings. Depending on who is asking the question, effectiveness may relate to cost-effectiveness, efficiency, legality, equity, or public acceptability (Lowry, 1980; Slaats and Kreutzwiser, 1997; Titus, 1990). Methods used to answer the questions can be equally diverse.

Pal (1987) details three main styles of policy evaluation: logical, empirical, and ethical. Logical evaluation, the most prevalent, entails examining the contents of current policies for internal rigour and consistency. It can include assessment of the internal consistency of policy goals (often with the political platform of the party involved), consistency between goals and related instruments, or the difference between intended and actual outcomes of policies.

The second most common type is empirical evaluation, which is used to determine whether the results of various programs will be able to achieve the stated goals. Policy effects are measured (or estimated if evaluation is performed pre-implementation) against the goals and objectives. Empirical evaluations can also focus on implicit goals, and can be used to assess the economic efficiency of alternative approaches for implementation, or consistency with political priorities of the governing body. It frequently involves evaluating alternative strategies to find the one that will best satisfy selected criteria.

Both the logical and empirical approaches are similar in that they focus on content in the latter stages of the policy process. The third approach, ethical evaluation, is quite different. A policy analyst using this approach examines policies on the basis of pre-existing value systems, of right and wrong (Pal, 1987). This approach involves looking

outside the policy process for an ideal with which to compare policies, then judges the various goals, objectives and strategies relative to this ideal. Instead of asking whether the right answers are being found, those performing an ethical evaluation ask if the right questions are being addressed. This type of analysis is rarely performed (Pal, 1987).

Johnston and Smit (1985) also describe an approach to analysis that involves looking outside the policy process. They recognize the limitations of internal evaluation, in which policy objectives are treated as if they were themselves ultimate goals. However, instead of referring to a pre-existing value system, they refer to defining the dimensions of the policy problem. They state that:

...application of conventional evaluations may indicate that a policy strategy would meet stated policy objectives effectively and/or efficiently. However, ...it also should be known whether or not those objectives are appropriate.... The link between the policy problem and policy objectives is the logical basis for the policy (Johnston and Smit, 1985, p.237).

Their approach involves evaluating the policy problems themselves, and examining the links between policy objectives and the problems the objectives are supposed to correct.

Smit and Johnston's process of defining the dimensions of the problem can clearly be related to the ethical approach described by Pal. Defining the problem requires that policy makers and analysts look outside the policy process, at a problem that exists 'in the real world'. Defining the problem may appear to be an objective process, particularly if the problem is economic in nature, but in fact the process is not value free. A problem only exists if it is perceived by someone to be a problem, and perceptions can change over time. Evaluation in terms of either of these approaches may therefore involve determination of values and perceptions external to the policy process.

The logical and empirical approaches differ significantly from the ethical approach and the approach described by Smit and Johnston. The first two concentrate on internal rigour, whether it be consistency between policies, or between goals and consequences. They look at policy as an axiomatic, self-contained process. These types of evaluation are particularly useful for internal use and enable policy makers to evaluate and select alternative strategies and to determine whether policy objectives have been achieved (Fig. 2.1, boxes 'A' and 'B').

There are questions these types of analysis do not answer, however, and these questions may best be addressed by the ethical approach or the approach of Smit and Johnston. It is essential to know whether the appropriate questions are being addressed and legitimate problems are being described, for only in this light can the appropriateness of the rest of the process be determined. The early stages of policy formulation are the focus here.

There are of course differences between Pal's ethical approach and that of Johnston and Smit. Both approaches are focused on the early stages of policy formulation, and both look outside the political process to determine the nature of the problems which should be addressed. However, Pal's ethical evaluation stresses the link between value systems and problem definition within policy, whereas Johnston and Smit emphasize the necessity for an empirical understanding of the policy problem, against which policy goals can be scrutinized. They model this approach as a modification of the traditional approach (Fig. 2.1, box 'C'). This approach also requires that outcomes of policy decisions be evaluated relative to externally defined problems (Fig. 2.1, box 'D').

FIGURE 2.1 A MODEL OF POLICY FORMULATION AND EVALUATION

Traditional policy formulation/evaluation in regular print
 Refinements to traditional model in bold print

(adapted from Smit and Johnston, 1983, pp.173, 176)

2.4 Development of a Framework for Evaluating Ontario's Forest Policy

2.4.1 Evaluation Approaches and the Ontario Context

The previously described approaches to policy evaluation all have merits, and are useful to help answer different questions. Logical evaluation can be used to assess the internal consistency of different stages of policy, such as whether goals and outcomes are consistent with one another. It can also be used to determine whether different policies are consistent with the overall platform of a political party. Questions concerning whether the results of policies, once implemented, will achieve or have achieved policy goals can be answered by performing an empirical evaluation. Ethical evaluations can be performed to determine whether problems and goals determined by a society are being addressed within a policy. Smit and Johnston's approach can help provide a framework for addressing whether all dimensions of a problem, whether ethical or technical, are being addressed.

In this thesis, the overall purpose is to assess whether the forest management policies of Ontario's Ministry of Natural Resources address non-timber values. A brief description of the context of this question will help to determine the evaluation approach best suited to address this set of issues.

Ontario is currently in the process of reformulating its policies relating to natural resources in general and forestry in particular. Many of the policy goal statements have been recast, but specific objectives have not been determined for all areas. In some cases new programs have been put into effect to achieve goals; elsewhere such programs have not yet been created. At this early stage in the current cycle of resource and forest

policy in Ontario, the impacts of the newly created policies and programs are not yet evident and evaluations of overall performance, or a summative evaluation, is not possible.

A logical evaluation is also clearly not appropriate. The determination of the internal rigour and consistency of Ontario's forest management policies will bring us no closer to addressing the central concern regarding whether the OMNR's forest policies address the protection of non-timber values. In fact, an analysis that remains within the bounds of stated policy will not adequately address the thesis objective. To determine whether non-timber values are addressed, it is first necessary to determine what these values are and identify the specific elements comprising these values. A study that is confined to stated policy indicates whether the various goals, objectives and strategies will solve the problems **as they are defined within that policy**. However, problem definition is part of a political process, as are most dimensions of policy formation. It is often the result of political pressure and crisis management (Smit and Johnston, 1983). This is specifically true of forest policies, which are reactive and frequently the result of hindsight (Pepler, 1970). Problems related to non-timber values may have dimensions beyond the purely political.

As the defining element in the policy process, problem definition itself must come under scrutiny: "Axiomatic acceptance of political issues as legitimate policy problems opens the door for unnecessary, insufficient and/or redundant policy initiatives and represents a serious logical flaw in the formulation and analysis of public policy" (Smit and Johnston, 1983, p.177). Therefore, problem definition should be examined outside

the political process to ensure that all dimensions of the problem are addressed.

Smit and Johnston (1983) propose a framework for policy evaluation in which the policy problem itself is analyzed. First, a complete empirical assessment is made to determine the nature, extent and magnitude of the problem (Smit and Johnston, 1983). Policy objectives are then assessed relative to this fully defined problem. This examination of the problem is referred to as an 'objective' process. However, it might be more appropriate to describe it as apolitical. Investigating the dimensions of the problem will, by Smit and Johnston's definition, involve technical assessments. However, this investigation should also capture prevailing human or social values. In other words, although the nature of the problem may be couched in quantitative terms, it is not value-free. The problem should be defined, and solutions proposed, in the context of the society in which the problem occurs. This goes beyond a simple assessment of the technical dimensions, and enters the realm of Pal's ethical evaluation.

Pal discusses this approach in terms of morality and right and wrong, as well as with reference to value systems, and it is this latter view which is of direct concern to this research. Johnston and Smit (1985, p.226) state that, "in the development and assessment of policy, reference must be given to ultimate goals. These are broadly accepted societal aspirations that are seldom, if ever, scrutinized". Societal aspirations or values help form the epistemological framework in which context decisions should be made. Such values cannot be determined by examining a policy, but they should be determined for an evaluation of policy.

Palfrey et al. (1992) subscribe to this approach, describing well-conducted

evaluation as relating findings not just to measurable, quantified targets, but to prior considerations about the values driving the policies. Such an approach, which refers back to guiding principles, they term 'referential', as opposed to exclusively 'instrumental'. This approach is particularly appropriate for the examination of forest policy.

Forests dominate much of the landscape and have become part of the identity of many Ontario residents. As Chapter 3 will show, people in Ontario value their forests for economic, ecological, social, and spiritual reasons. These forests, mostly on provincial Crown lands, are managed by the provincial government on behalf of, and for the benefit of, the people. The large number of forestry-related conflicts is evidence that there is dissatisfaction with the way the forest management process addresses the different needs of different users. Most current forestry practices are legal and fall within provincial guidelines, so the dissatisfaction lies as much with the government which created these guidelines and policies, as with the companies that follow them.

2.4.2 The Evaluation Framework for This Thesis

The Evaluation Process

The evaluation of forest management policies therefore requires two complementary approaches. The approach Pal terms ethical evaluation is necessary to determine a framework of values by which policies can be evaluated. Smit and Johnston's more technical approach, which might be termed a positivist or rational approach, helps define the way the evaluation is to be performed. Figure 2.2 outlines

the policy evaluation framework used in this thesis. It incorporates elements of both the ethical approach and Smit and Johnston's rational approach.

First, the nature, extent and magnitude of the problem of forest management as it relates to non-timber values is defined with reference to ultimate goals and societal aspirations (Boxes 'A' and 'B'). Ontario's forest policies are then described relative to these non-timber values and with reference to the four policy elements of problem: definition, goals, objectives and strategies (Boxes 'C' through 'F'). Finally, the policies are evaluated relative to the exogenously determined NTVs (Boxes 'G', 'H' and 'J').

The policy evaluation has three main perspectives. The first appraises individual policies, noting the extent to which each NTV is covered. In addition, the document-by-document examination also identifies and evaluates individual policy elements. Not all policy documents contain each of the four policy elements, and some documents may not explicitly express any of the elements. However, where policy elements are identifiable, they are evaluated within the examination of individual policy documents.

This reductionist approach is orderly and systematic, and allows for detailed analysis. However, it is also necessary to see how each NTV is addressed by Ontario's forest policy as a whole. Therefore, the second evaluation perspective is an NTV approach, wherein the policies in aggregate are evaluated as to the comprehensiveness of NTV coverage.

The third perspective is an evaluation of the level of policy integration. Ontario's forest policy is composed of a complex, interrelated set of documents which are not meant to function independently. These documents should form a cohesive whole, and

FIGURE 2.2 MODEL OF THE POLICY EVALUATION FRAMEWORK IN THIS THESIS

be explicitly and thematically linked to be effective.

These three evaluation perspectives are necessary if the overall purpose of the thesis is to be achieved. They enable the identification of the degree to which Ontario's policies match the exogenously defined NTVs, and the way in which the NTVs are addressed. Different criteria are needed for each evaluation perspective.

Evaluation Criteria

The first evaluation perspective is based upon two sets of evaluation criteria. The first set relates to NTV coverage specifically. The degree of NTV coverage by Ontario's forest policy is determined by comparing the content of policy documents to the NTV dimensions described in Chapter 3. Policies are rated on a scale of '0' to '3'. A rating of '3' indicates 'comprehensive coverage'. To achieve this rating, the policy must explicitly and directly address the majority of NTV dimensions outlined in Chapter 3. A rating of '2', or 'explicit but incomplete coverage', is given where the policy explicitly and specifically addresses the NTV, in a goal statement which describes the need for the protection of the NTV or by the designation of strategies for protecting the NTV, for example. However, this rating indicates that many of the NTV dimensions are not addressed. Policies which address the protection of some elements of an NTV indirectly, through the protection of other NTVs or other forest dimensions, are considered to have 'implicit incomplete coverage', or a rating of '1'. Policies which do not address NTVs directly or indirectly are assessed as having 'no coverage', or a rating of '0'. In cases where policies have strategies which relate strictly to research about NTVs rather than

on-the-ground management, a special assessment of 'coverage only in research directives', indicated by an 'R', is made.

The second set of criteria relates to characteristics of policy elements. A policy must have certain characteristics in order to be effective. The presence or absence of these characteristics is the criterion used to evaluate the four policy elements within the policy documents. The necessary characteristics vary from element to element.

Problem definitions should be clear and comprehensive. If problems are not defined clearly and comprehensively, it is unlikely that all problem dimensions will be addressed at later policy stages. Goals, which are frequently broad ideological statements, cannot really be judged except as they relate to the other elements, so they should address defined policy problems as explicitly as possible. In order to be an effective bridge between goals and instruments, to lead to specific steps towards attainment of a goal, objectives should be explicit, specific, measurable, scheduled, and assigned to an accountable person or team (Palfrey et al., 1992). As Haley and Luckert (1990, p.14) state,

A major problem facing policy makers is that, even if broad social objectives are clearly and explicitly articulated at a political level, which is frequently not the case, these objectives must be expressed in ways which permit the establishment of operational goals which are, above all, measurable.

The evaluation of policy instruments is more problematic because Ontario's forest management policy is currently in transition. In many cases, policy instruments have not yet been delineated. The instruments should be both necessary and sufficient to achieve the stated objectives. However, given the current transitional status of Ontario's forest policy, the evaluation will only identify the presence or absence of strategies related to

particular goals and objectives.

The second evaluation perspective is concerned primarily with the extent of NTV coverage in Ontario's policy in aggregate. The same criteria are used to determine the comprehensiveness of coverage as were used to evaluate the coverage in the individual documents. The same rating scheme is used.

The third evaluation perspective is concerned with policy integration. Policies can be integrated by making explicit links between policies, as when objectives in one policy are designed specifically to attain the goals set in another policy. The linkages can also be more thematic in nature, indicative of a unified approach to a problem. The criteria for evaluating policy integration relate to both of these types of linkages. The presence or absence of explicit, direct links between policies and between policy elements is identified, as is the presence or absence of thematic, philosophical links.

To summarize, the evaluation of Ontario's forest policies to determine if and how they address non-timber values requires a number of steps. Prior to the evaluation process, the dimensions of non-timber values, both ethical and rational, must be determined externally from the policy process. Next, the contents of the policies must be ascertained. Only then can the evaluation itself proceed.

The evaluation has three different perspectives. First, the policy documents are evaluated individually to determine the level of NTV coverage and the presence or absence of specified characteristics of individual policy elements. The second, or NTV, perspective evaluates the degree to which the policies in aggregate match the exogenously determined NTV dimensions. And finally, policy integration is evaluated based on

whether thematic and explicit, technical links exist between policies and between policy elements.

This evaluation enables us to see whether OMNR forest policy addresses non-timber values in forest management as defined outside the political process. It also enables us to determine in what area weaknesses lie, whether in the nature of the problems being addressed, in a more technical sense in the nature of the policy elements themselves, or in a lack of policy linkages.

CHAPTER 3

NON-TIMBER VALUES AND FOREST MANAGEMENT

This section commences with a definition of non-timber values (NTVs), an overview of current forest management practices in Ontario, and a discussion of the emergence of NTVs. Then, NTVs are grouped into six main categories, tourism and recreation, cultural and spiritual values, old growth forests, wildlife, biodiversity, and life-support systems, and reviewed individually in sections 3.2 through 3.7.

The choice of NTVs for this thesis is based on recent literature on the subject, which is consistent with the perspective of resources expressed in Chapter 1. Perceptions of resources change over time, as do expectations of what benefits resources are to provide. NTVs such as old growth forests and biodiversity, for example, have become the focus of attention only recently and would not likely have been the subject of literature on forest values even a decade ago. This thesis is explicitly concerned with current perceptions of the forest resource, and this is reflected by an NTV list which covers current forest values.

The categories of NTVs are based on divisions which are frequently employed in the literature. The categories are used to facilitate a thorough understanding of NTVs, but this analysis also recognizes that many of the NTVs are interrelated. Therefore the divisions do not follow normal taxonomic classification systems but instead reflect individual values identified in the literature.

The classification scheme is based on a loose ordering of NTVs from values that are more human-centred to those which are defined on the basis of ecological criteria.

The first two, tourism and recreation and cultural and spiritual values, represent a very human perspective of the forest. The values of old growth forests and wildlife represent NTVs which integrate human and biophysical dimensions of the forest. Biodiversity and life-support systems, while directly related to human conditions, are defined primarily as biophysical elements of NTVs.

For each NTV, four dimensions are described. Non-timber value dimensions are outlined, relationships between the value and the forest are discussed, the impacts of forest practices on the NTV are reviewed, and policy implications within the Ontario context are summarized. Table 3.1 presents the six NTVs and summarizes these four NTV dimensions.

3.1 An Introduction to Non-Timber Values

3.1.1 Defining the Term 'Non-Timber Value'

Historically, Ontario's forests have been managed for timber. This reflected the needs and resource perspectives of the day. Today, many benefits still flow from the timber industry, through logging, wood products, and pulp and paper. In 1989, industry provided direct employment for 80,744 people, and stimulated another 100,000 jobs indirectly (OEAB, 1994). Compared to other industries in Ontario, forest products sales are the seventh largest (ORTEEE, 1992). Clearly, timber is a significant contributor to Ontario's economy.

However, there are many other activities and benefits from the forest that do not come from forest industries, that do not rely on the removal of trees from the forest.

TABLE 3.1

SUMMARY OF NON-TIMBER VALUE DIMENSIONS

NON-TIMBER VALUE	DIMENSION	DESCRIPTION
Tourism and Recreation	Importance	-economic -social/spiritual -health
	Forest Requirements	-visual quality -ecologically intact (appearance) -sense of wilderness/remoteness
	Effects of Forest Management Activities	-clearcutting: visually degraded landscape, debris, less wildlife* -logging roads: increase access -regeneration: less attractive even-aged stands, more attractive reduced undergrowth; fewer attractive older, larger stands -noise
	Policy-Related Issues	-conflicts few and isolated but could increase -need reserves around use areas -time operations to avoid recreation periods -protect older stands -increase regeneration efforts -get input from tourism industry and Ministry
Cultural and Spiritual Values	Importance	-quality of life -national heritage -ties to cultural identities
	Forest Requirements	-forest landscape as a whole as general source of spiritual fulfilment -location of heritage sites -place for traditional activities
	Effects of Forest Management Activities	-overall reduction in unspoiled wilderness -clearcutting, inadequate regeneration and use of pesticides* reduce source of traditional activities (hunting, medicinal plants) -increased access increases difficulty in maintaining cultural practices (but increases economic opportunities)
	Policy-Related Issues	-difficult to gauge magnitude of problem -preserve specific sites -maintain ecosystem -get community input to plan roads

Table 3.1, cont.

NON-TIMBER VALUE	DIMENSION	DESCRIPTION
Old Growth Forests	Importance	<ul style="list-style-type: none"> -spiritual -scientific/education -contributes to biodiversity -economic (indirect)
	Forest Requirements	-old growth forests are an element of the forest landscape
	Effects of Forest Management Activities	<ul style="list-style-type: none"> -harvest: removal of old growth -regeneration: industrial forestry does not allow stands to reach the old growth stage
	Policy-Related Issues	<ul style="list-style-type: none"> -red and white pine old growth almost gone; other species well-represented -need workable definition for old growth -establish protection objectives for current old growth and successional stages to produce old growth -allow trees to reach late successional stages
Wildlife	Importance	<ul style="list-style-type: none"> -economic (indirect) -spiritual/cultural/esthetic -scientific/education
	Forest Requirements	<ul style="list-style-type: none"> -vary from species to species but virtually all elements of forest landscape required for food or shelter -size and diversity of forested area important
	Effects of Forest Management Activities	<ul style="list-style-type: none"> -harvest: reduction of forested area**, fragmentation, site impoverishment, removal of specialized habitats -regeneration: ecological conversion -tending: direct and indirect effects of chemicals** -roads: increased access
	Policy-Related Issues	<ul style="list-style-type: none"> -little evidence as to what effects habitat changes have had on wildlife -regulate size, shape, contiguity of cuts -protect sensitive areas -protect specialized habitat (stand and forest level) -regenerate to previous type/amount/age of species -control access -coordinate activities with wildlife branch

Table 3.1, cont.

NON-TIMBER VALUE	DIMENSION	DESCRIPTION
Biodiversity	Importance	<ul style="list-style-type: none"> -economic* -scientific -medical* -spiritual -stability/resiliency of ecosystem
	Forest Requirements	-mix of species and age class structure
	Effects of Forest Management Activities	<ul style="list-style-type: none"> -harvest: removal of specialized habitat -regeneration: alteration of age class structure and species mix -tending: removal of undergrowth
	Policy-Related Issues	<ul style="list-style-type: none"> -no current evidence as to overall reduction in biodiversity, but ecological conversion is occurring -need definition -set objectives at provincial level -maintain current diversity through management controls (harvest and regeneration)
Life-Support Systems	Importance	-survival of species (including human)
	Forest Requirements	-overall ecosystem health/processes
	Effects of Forest Management Activities	<ul style="list-style-type: none"> -harvest: soil quality (compaction, nutrient loss, erosion)*, water quality (chemical and nutrient changes from erosion)*, fewer mature trees -insufficient regeneration -tending: chemical use could affect water**
	Policy-Related Issues	<ul style="list-style-type: none"> -lack of evidence as to significance or long-term effects of changes -short term: management to minimize environmental effects -long-term: manage on ecosystem basis to maintain processes -determine baselines/targets for management and monitoring -change tenure to concur with ecosystem boundaries

*- no evidence of effect (in Ontario)

**- evidence to contrary exists

Some of these activities, such as tourist operations, hunting and fishing, and trapping, result in direct quantifiable, economic benefits. Other activities and human benefits, such as the aesthetic appreciation or spiritual significance of the forest, are not readily quantifiable. Other benefits of a more general but essential nature, for example, clean air, water purification, and watershed maintenance, are also dependent upon forests. Finally, some non-timber activities represent general public benefits that do not necessarily fulfil a direct purpose for individuals but are important in defining Canadian identity. For some individuals, old growth forests have been identified as an important value of the forests simply because people want to know they exist.

The breadth of these benefits is considerable. The one thing they do have in common is the defining element- none rely on the removal of trees from the forest. This is the key element of the definition of non-timber values. **Non-timber values are benefits from the forest which do not flow from the activities related to timber industries, whether of harvest or renewal, or the wood products industry.**

3.1.2 Emergence of Non-Timber Values as a Political Issue

Non-timber elements have been identified as important for reasons ranging from the economic to the spiritual. Use of the forests is expected to grow as more leisure time results in increased opportunity to experience the forest. At the same time, there is also a movement away from the anthropocentric view of the natural environment, which sees it as having value only as it can be used by humans (Hammond, 1991).

Whether people believe in the importance of forests for their utility or for other

reasons, there is a serious concern that current forest management practices, and in particular timber operations, are threatening other values of the forest (Amyot, 1989; Bourdages, 1993; Hammond, 1991; Tester, 1992). Citing evidence that forest cover is declining (Reed, 1990), that timber operations are reducing the ecological complexity of the managed forests (Hammond, 1991; Harris, 1984), and that timber operations are contributing to soil compaction and accelerating erosion rates (Bourdages, 1993; Hammond, 1991), the media, environmental groups, and the public at large have begun to question the impacts of timber management on NTVs. Protests and demonstrations have centred around logging methods, areas of harvest, and increased access to previously inaccessible areas. This attention has brought the issue of NTVs into the political sphere and made it a subject for policy.

3.1.3 Timber Management and Non-Timber Values

To understand the relationship between management of the forest for timber and its effects on NTVs, it is necessary to have some understanding of the timber management process and how it affects the forest. Managing the forest for timber has changed since the early days of the lumber barons, when widespread removal of particular species was the only intervention. Today, timber management consists of four main interventions: harvesting, renewal, tending, and protection (OEAB, 1994; OMNR, 1987a). All of these processes have the potential to alter the forest environment significantly, and by extension, non-timber values associated with the forest.

Harvesting: Harvesting is the cutting down and removal of trees, and can include

the delivery of the trees for processing. This has become an increasingly mechanized process. The use of chainsaws became widespread in the 1950's, and in Ontario chainsaws have largely been replaced by less labour-intensive 'full tree logging systems' such as feller-bunchers, which cut and stack whole trees that are later removed to a central processing plant (Swift, 1983). Less debris is left at the cutting site because trees are delimbed at a central location. These machines work quickly and fellers which can cut and stack from 90 to 180 trees per hour are in commercial use (Swift, 1983). Overall, this technology has allowed the timber industry to remove greater numbers of trees over increasingly large tracts of land.

Removal has also changed. At first trees were delimbed where they were cut, hauled by horses to the edge of a river, and then floated to the mill site. Now, mechanical skidders take logs to roadsides, where they are removed by truck (Gillis and Roach, 1986; Swift, 1983). This has enabled the expansion of the logging season, from a winter harvest operation after which logs were floated down rivers during spring thaw, to a year-round operation (Swift, 1983).

There are three main harvesting types: clearcut, shelterwood, and selection. Each type is defined by the manner in which trees are removed, and use of any type defines or limits regeneration options. Theoretically, the choice of harvest method is determined by the species being cut, the species to be planted, and geographical considerations such as slope, proximity to water bodies, and soil depth and type (MacKay, 1985).

Clearcut harvesting involves the removal of all trees, or all marketable trees, on a site in a single operation (MacKay, 1985; OEAB, 1994; OMNR, 1986a). Although

unmarketable trees are to be left standing, it is frequently the case that all trees are cut down, but only the marketable trees are removed (MacKay, 1985). This is the most widely used system in Ontario. In 1990, harvesting operations occurred on more than 219,000 ha of Crown land. About 95% of this harvest was clearcut (CCFM, 1992b, p.47).

Clearcutting is the most visible and most controversial harvest type (MacKay, 1986). Proponents claim that clearcutting closely mimics natural hazards such as fire, insect damage and blowdown (Hammond, 1991; OEAB, 1994). It may be the best method of managing forests dying of old age, disease or insect infestation (MacKay, 1986). It is appropriate for allowing regeneration of species such as black spruce which require full sunlight (OEAB, 1994). However, critics state that clearcuts do not mimic natural hazards. They leave little debris on site, they tend not to avoid wet areas as do fires, and they require the use of heavy machinery which compacts the soil (Dunster, 1987; Hammond, 1991; MacKay, 1985). In addition, clearcuts are criticized for exposing soil and water bodies to increased sun, wind, and rain. This causes temperature changes, changes in run-off, and increases in nutrients in the water (Dunster, 1987; Hammond, 1991; Hatfield, 1988; MacKay, 1985).

Sizes of clearcuts are also controversial. Large clearcuts have been criticized for exacerbating many environmental problems. There is some question as to what constitutes a large clearcut. At the hearings for the class environmental assessment for timber management, an OMNR biologist described a large clearcut as being anything over 130 ha, but an OMNR director of forest resources defined a large clearcut as 2000

to 4000 ha (Forests for Tomorrow (FFT), 1989).

Clearcutting is the least expensive harvesting method. Fewer roads are used than for any other system. Machinery reduces labour requirements. Harvesting is carried out in a single operation. However, if regeneration of a desired species is required after harvest, a large amount of intervention is necessary. The land must be prepared, seeding or planting must be carried out, and undesirable species must be controlled. If lands are left to regenerate naturally, initial costs will be lower, but production of a new merchantable crop will be slower. In Ontario, regeneration costs are borne by the OMNR rather than the timber industry so the timber industry does not have to take into account the costs of regeneration when planning overall harvesting/regeneration systems.

Shelterwood harvesting involves the removal of mature trees only, in a series of two or more sequential cuts (MacKay, 1985; OEAB, 1994; OMNR, 1986a). Harvesting is done in stages, leaving enough trees standing to protect and shade new growth, and to provide seeds for natural regeneration (MacKay, 1985). Like clearcutting, it is an even-aged system, wherein blocks (whose size is determined by the size of each cut) of trees of the same age are harvested (OMNR, 1986a). It is more costly than clearcut harvesting, as it requires more road-building and more visits to the site, but regeneration costs are lower (MacKay, 1985).

Under a selection system, single trees or small stands of trees are taken in relatively short, frequent intervals (MacKay, 1985; OMNR, 1986a). It results in uneven-aged stands and harvesting operations do not alter the species composition of the forest. It is a labour-intensive harvest system and regeneration costs are minimal, but it is

unsuitable for shallow-rooted trees or trees that require full sunlight to regenerate (Hatfield, 1988; MacKay, 1985; OMNR, 1986a).

Renewal: This part of the timber management process refers to both the natural and artificial replacement of trees (OMNR, 1986a). Natural regeneration allows the forest to re-seed itself, and until recently was considered to be the best method for forest regeneration. However, it has become apparent that natural regeneration frequently resulted in the growth of unmarketable species (Swift, 1983). There are still debates as to whether 'extensive' forest management, which involves low costs and low inputs into regeneration on large tracts of land, or 'intensive' management, involving higher costs, more inputs, and higher productivity on a more restricted land base, is appropriate under Ontario conditions (Bird, 1990; Benson, 1989).

Artificial regeneration can be costly as it requires both site preparation and seeding or planting stock. Site preparation modifies the planting area, disturbing the forest floor and topsoil to improve planting conditions by fire, chemical application, or mechanical treatment (CCFM, 1992b; OEAB, 1994). Site preparation can also be done to improve natural regeneration. In Ontario in 1990, site preparation occurred on 113,867 ha of Crown land. 27,002 ha were seeded and 71,192 ha were planted with stock (CCFM, 1992b). One of the criticisms of artificial regeneration is that it replaces the natural forest with an even-aged monoculture crop that is less diverse and more susceptible to diseases, fungi, insects, fires and blowdown (Hammond, 1991). However, in Ontario the boreal forest, which is the subject of most artificial regeneration activities, tends to be composed of even-aged stands of little diversity in its natural state.

Tending: After seeding or planting occurs, operations are carried out to encourage the growth of the desirable species, and to discourage or prevent the growth of undesirable 'weed' species (OEAB, 1994; OMNR, 1986a). Although removal of competing species, called 'cleaning', can be done by hand, it is most frequently accomplished with the use of herbicides (Hammond, 1991; OEAB, 1994). In 1990, approximately 85 percent of stand tending was in the form of chemical cleansing (CCFM, 1992b). Other tending operations include thinning stands and pruning trees (OEAB, 1994; OMNR, 1986a). These processes, although costly, are expected to increase forest productivity for timber.

Protection: Protection refers to the prevention and control of damage to timber by fire, insects, disease, or climatic agency (OEAB, 1994). Controlling fires was one of the earliest state interventions in the forest, starting in the early 1900's (Swift, 1983). There are little data for fire-fighting prior to 1970, but records subsequent to this indicate that the OMNR's fire suppression activities have reduced the size and frequency of fires (OEAB, 1994). Because this indicates that the size and number of natural disturbances have been reduced, particularly in the boreal forest, this information is used to justify clearcutting, as it is said to replace the effects of large, natural wildfires (Hammond, 1991).

Disease control is not generally a significant part of timber management in Ontario, but insect pest management is widespread (OEAB, 1994). Two types of insecticides are used on Crown lands in Ontario, chemical and biological. Since 1985, only the biological insecticide B.t. (bacillus thuringiensis) has been used in aerial spraying

programs, and non-aerial chemical applications have been extremely limited (OEAB, 1994).

All of these timber management practices have the potential to change the forest environment. The extent to which the changes are important or significant is something that must be determined, and an examination of the many dimensions of non-timber values will aid in making this determination.

3.2 Tourism and Recreation

Importance

Tourism and recreation on Crown lands in Ontario are focused on outdoor activities. There is a broad range of these activities, which include hunting, fishing, guiding, canoeing, hiking, snowshoeing, cross-country skiing, bird-watching, camping and cottaging. Economic benefits accrue from the provision of tourism and recreation services (Dearden, 1983; Ontario Forest Policy Panel (OFPP), 1993; Scace et al., 1992; Wall, 1989). However, the benefits go beyond economic rewards and include social benefits such as education (Scace et al., 1992; OFPP, 1993), psychological benefits such as relief from stress (Murphy, 1989; Taylor, 1983; Wall, 1989), and physical benefits such as exercise (Murphy, 1989; Wall, 1989).

Economic benefits from tourism and recreation are substantial. In 1985, anglers in Ontario spent \$981 million related to their sport, and licensed hunters spent an estimated \$139 million in 1987 (OEAB, 1994). In 1989, tourism on Crown lands generated approximately \$1.4 billion in revenues (OEAB, 1994). Recreational

expenditures by cottagers on Crown lands were estimated at \$784 million in 1979 (OEAB, 1994). Even an activity that is not normally associated with major equipment expenditures, bird-watching, has the potential to provide economic benefits: bird watchers in Point Pelee National Park spend approximately \$6 million annually (Scace et al., 1992).

Another important aspect of the economic benefits is their distribution. Benefits from tourism and recreation tend to be generated annually rather than as single episodic events (Hammond, 1991). In addition, they are distributed over the province. This is particularly important for northern or single-resource dependent communities which have limited economic opportunities (Dearden, 1983; Hammond, 1991; OFPP, 1993).

Social benefits from tourism and recreation are also important. Material benefits accrue to providers of the experience, whereas social benefits are gained by the participants (OFPP, 1993). There is some indication that this will become increasingly important as populations become more urbanized, as stress increases, and as spiritual well-being and self-fulfilment become goals in people's lives (Murphy, 1989; Taylor, 1983; OFPP, 1993). Many people stated that these outdoor recreational opportunities were a vital element of their quality of life (OFPP, 1993), or essential to their physical and mental well-being (CCFM, 1992a). These benefits are difficult to quantify, but they are considered essential by many people.

Forest Requirements

Tourism in Canada is to a large extent a resource-based industry, and it is at least partially dependent on the same resources as the forestry and fisheries industries (Dearden, 1983). The outdoor environment is named by tourists from many countries as an important feature of Canada as a holiday destination. Three of the top five features for British visitors were scenery, good outdoor activities, and open spaces. French visitors listed open spaces, landscape, nature, and flora and fauna while Japanese visitors listed scenery, outdoor activities, wildlife and the green landscape (Taylor, 1983). The quality of the forest resource, and the outdoor environment generally, are considered key elements to the enjoyment of the experience (Dearden, 1983; Jackson, 1989; Kreutzwiser, 1989; OFPP, 1993).

It is important to note that it is the perception of the environment that must be considered here as landscapes that appear to be extensively modified or degraded are often viewed as inferior for tourism and recreation purposes (Jackson, 1989). Tourism in remote and isolated regions is especially dependent on the unspoiled wilderness experience (OEAB, 1994). Ecotourism, a growing segment of tourism, requires an ecologically intact resource base with pristine areas that provide opportunities for wildlife viewing (Scace et al., 1992). Canada, which is seen as having a diversity of unmodified landscapes and a strong conservation ethic, could be an outstanding candidate for ecotourism, which is expected to be one of the growth areas for tourism (Scace et al., 1992).

Effects of Forest Management Activities

The main alterations to the forest that affect tourism and recreation arise out of timber activities, chiefly harvesting. Harvesting affects the aesthetics of the landscape, access to the activity, and the amount of area available for tourism and recreation activities. These effects are generally seen as negative, and the forest industry is generally perceived as being insensitive to the tourist industry (Dearden, 1983; Dunster, 1987).

Harvesting causes a loss of trees and an increase in dead wood left as debris, either at the cutting site or where trees are delimbed. Clearcuts, roads and the use of heavy equipment increase erosion (Hull, 1988). Clearcutting, the most widely used harvest method in Ontario, results in an extremely low level of scenic beauty according to studies, because of the degraded appearance of the landscape and the unnatural boundaries of the cuts (Hull, 1988). Tourism operators, anglers and hunters, and cottagers have opposed clearcutting, believing that large clearcuts have destroyed wildlife, wildlife habitat, spawning beds, portages and businesses, although these claims are frequently not substantiated. Tourism operators, cottagers and the general public have complained about the loss of visual quality, especially along roadways and around lakes and rivers (OEAB, 1994).

Other concerns related to the harvest operations centre around noise, either from logging or from industry and recreational vehicle use of logging roads (OEAB, 1994). Noise can affect the recreational experience directly, or indirectly by scaring away wildlife. Logging roads can have other effects on tourism and recreation, both positive

and negative. Logging roads increase access to remote sites (OFPP, 1993), and subsequent increases in outdoor recreationists can diminish the wilderness experience (Hull, 1988) and can increase competition for fish and game (OEAB, 1994). However, improved access can also make recreational opportunities available for people who would otherwise be unable to participate, and can therefore also benefit some tourist operations (OFPP, 1993; OEAB, 1994).

Because the appearance of a natural environment is important for the recreational experience, clearcutting temporarily reduces the land base available for recreational activities (Dearden, 1983; Scace et al., 1992). Regeneration of the forest can reduce this impact, improve Canada's reputation regarding forestry, and be used for educational purposes to promote ecotourism (Scace et al., 1992). However, in 1989/1990, only about 75 percent of the 220,000 ha of forest harvested were the subject of stand tending or regeneration activities. About 60,000 ha were not subject to any regeneration activities (OEAB, 1994).

Other aspects of regeneration also affect the scenic resource. Even-aged forests are seen as being less attractive and less diverse than uneven-aged stands (Hull, 1988). However, even-aged stands also tend to have less understory vegetation, which is seen as beneficial as it allows for visual penetration and ease of access in the forest (Hull, 1988; OFPP, 1993). Planted stands are perceived as being more attractive than naturally regenerated stands, at least in the early successional stages, because they grow faster and contain less 'scrub', as well as providing fewer, larger trees rather than more, smaller trees (Hull, 1983). However, forests managed for timber have a shorter rotation age

than natural forests, and people perceive older trees and mature ecosystems as having higher scenic values (Hull, 1983).

Policy-Related Issues

It is clear that the forested landscape of Ontario is important for successful tourism and positive recreational experiences. These activities have been identified as providing important economic and social benefits. It seems evident that alterations to the environment have the potential to affect these activities, most frequently, although not always, in a negative way. However, the effects have been difficult to quantify. At the hearings for the class environmental assessment for timber management, no evidence could be brought forward that even one business had been lost because of forestry operations (OEAB, 1994).

Given the significance of tourism and recreation, it is important that the environment which supports them is protected. It would appear that visual quality is the most important forest characteristic for both tourism and recreation. Maintaining visual quality entails ensuring that clearcuts are not visible to participants, and that stands are regenerated adequately. Enjoyment can be enhanced by ensuring that use of logging roads is regulated and that noise from operations cannot be heard by outdoor recreationists. Ecotourism and wilderness experiences require pristine areas that are not subject to timber operations at all.

Remote tourism operators and recreation groups such as Canoe Ontario believe that there must be reserves around lakes and rivers and along roads and portages to

protect scenic values (OEAB, 1994). Reserves around existing tourism and recreation areas might not remove too much timber land from the harvest base, but including reserves around potential tourist areas could prevent large amounts of economically beneficial timber from being harvested. In addition, determination of potential sites for tourism and recreation is a process that goes beyond forest management policy. However, part of the forest management process could involve collaboration with tourism and recreation agencies so that important resource areas could be identified for protection.

Similarly, the choice of wilderness reserves or other nature parks in which forestry operations are restricted could be made jointly by forest managers and other interested parties. However, for areas in which forestry operations occur, which are frequently the same areas in which tourism and recreation opportunities occur, it is possible to make policies which direct management of such operations to protect or enhance visual quality for participants. Policies could help ensure that reserves are kept around existing areas of use, that operations are timed to avoid recreational use periods, that older stands are protected, and that regeneration efforts are increased.

Some tourism and recreation activities rely indirectly on the health of the forest ecosystem. Only a healthy system will support a variety of wildlife, including game animals and fish, and these are crucial elements of the tourism industry. The relationship between forest health and wildlife is discussed more fully in Section 3.5. Tourism and recreation can also benefit from cultural and spiritual values of the forest, discussed in Section 3.3, and from old growth forests, discussed in Section 3.4.

3.3 Cultural and Spiritual Values

Importance

Although cultural and spiritual values are human values like tourism and recreation, their importance is more difficult to measure. They provide few economic benefits but are essential to the quality of life for many people. In a 1991 survey, Canadians identified 'the natural environment including forests' as the third most important national characteristic, after democracy and multiculturalism/bilingualism (Forestry Canada, 1992). After an extensive public consultation process, the Canadian Council of Forest Ministers concluded that forests are part of the national heritage and national identity, and stated that "the spiritual qualities and inherent beauty of our forests are essential to our physical and mental well-being" (CCFM, 1992a, p.5).

The importance of the forests for spiritual fulfilment was also identified by the Ontario Forest Policy Panel after public consultation (OFPP, 1993). A number of environmental groups, including Northwatch and the Forests For Tomorrow coalition, indicated that people value forested wilderness areas for spiritual renewal as well as for recreational and ecological purposes (OEAB, 1994). Aboriginal groups in particular have their spiritual and cultural identities linked directly to the forests (CCFM, 1992a; Hammond, 1991; Hodgins and Benedickson, 1989; OEAB, 1994; OFPP, 1993; ORTEE, 1992b).

Forest Requirements

Cultural and spiritual values and forest use are inextricably linked; the forest is the source of these values. For many people, the importance is of a general nature. They see forests as having intrinsic or existence value; pleasure is derived simply from knowing they exist (CCFM, 1992a; OFPP, 1993). For others, the spiritual and cultural importance of the forests is more direct and specific.

For aboriginal peoples, forests meet cultural, spiritual and material needs (CCFM, 1992a; OFPP, 1993; ORTEE, 1992b). Healthy forests have a religious and ethical significance as people are seen as stewards of the environment (CCFM, 1992a; OFPP, 1993). The country is the homeland, the centre of identity, and part of the existence of the community (Hodgins and Benedickson, 1989). Individual sites in the forest can have cultural or spiritual significance, as powwow sites, or locations of spirit rocks, burial grounds or pictographs (OEAB, 1994). Some activities such as fishing, that take place in the forest, can have a religious ceremonial importance (ORTEE, 1992b).

Forests are becoming increasingly important because many aboriginal groups are undergoing a cultural rebirth and renewal, emphasizing traditional language, knowledge and practices (Hodgins and Benedickson, 1989; ORTEE, 1992b). Traditional activities such as hunting, trapping, fishing, and gathering, while providing economic benefits, are also linked with native culture (OEAB, 1994; ORTEE, 1992b). A diverse and healthy forest ecosystem is necessary to provide food, fuel, shelter, clothing, tools and transportation (ORTEE, 1992a). Raw materials such as wild rice, maple sugar, fruit, nuts, berries, roots, medicinal plants, birch bark for canoes, fishing and hunting

implements, and items for trade were traditionally provided by the forest (OEAB, 1994). Again, these activities and materials are crucial in communities with limited employment opportunities that rely heavily on a non-cash economy, but they are also important for providing a cultural identity. It should also be noted that the land area that is required for these activities far exceeds that available on most reserves, so use of Crown lands over which natives have no formal tenure rights is necessary (OEAB, 1994).

Effects of Forest Management Activities

A number of interventions in the forest have the potential to affect cultural and spiritual values. Logging operations could destroy cultural sites or artifacts, and contribute to a loss of forested land area, a decline in habitat quality and area, and a reduction in the number of plant and animal species (OEAB, 1994). Inadequate regeneration or replacement of natural stands with monoculture, industrial forest crops would exacerbate the impact of harvesting operations. These changes could negatively impact the lifestyle of aboriginal groups especially, particularly if key activities such as hunting, fishing and trapping are affected (OFPP, 1993). There is also concern that herbicides will kill off medicinal plants, and effects from insecticides will eventually work their way up the food chain to affect game species of birds and mammals (OEAB, 1994). Records of the locations and numbers of medicinal plants in Ontario's forests and data on the long-term effects of insecticides in current use are incomplete and therefore it is not possible to accurately project the impacts of current forest management practices on these dimensions.

Logging roads represent another potentially important intervention as they enhance access to remote sites. People want to preserve roadless wilderness areas (Dunster, 1987; OEAB, 1994; OFPP, 1993). Wilderness preservation was identified as the fourth most important forest value, even before economic wealth, jobs, and recreation (Forestry Canada, 1992), and the building of access roads destroys the very nature of the wilderness. Access roads have both positive and negative effects on native communities (OEAB, 1994). Increased contacts for remote native communities provide for a broader range of economic opportunities, but easier access could also increase competition for game species and make it more difficult to maintain cultural practices.

Policy-Related Issues

It is difficult to gauge the magnitude of the effects of forest management activities on cultural and spiritual values because of the intangible nature of the values. However, it is clear that there is concern about the effects, and that the activities have the potential to affect these values. The key forest policies for preserving cultural and spiritual values would relate to protection from harvest. Important cultural and spiritual sites could be identified and preserved. Identification of cultural sites is beyond the mandate of forest managers and forest policy makers but forest policies could create mechanisms by which consultation with interested parties would occur.

Logging roads clearly fall within the jurisdiction of forest managers, but the planning of these roads to protect cultural and spiritual values, including wilderness areas, again requires the input of other parties such as aboriginal communities. The

identification of wilderness reserves is a process that would be completed prior to the forest management process. It is beyond the jurisdiction of those generating forest policy specifically to determine how much land should remain wilderness and what areas should be represented, but as parks and forests are under the jurisdiction of the OMNR, coordination of these activities can be considered within forest policies.

Some cultural and spiritual values could be preserved by ensuring that the forests that are managed for timber maintain healthy ecosystems which would protect bird, fish and animal habitats. Harvesting methods, area, location and boundaries, and the amount and nature of forest renewal, could be planned to ensure the survival of non-timber flora and fauna. Part of this could be addressed in forest policies that incorporate decisions about the scale on which this type of management should take place. Some plants and animals are important on a province-wide basis, and so decisions concerning their habitat would be generated at the highest level and then interpreted on a local, forest-management sized unit. Decisions about the protection of local cultural sites could be addressed locally, although the process for identifying these sites could be determined provincially and incorporated into forest policies.

There is some question as to whether cultural and spiritual values can be protected under current forest tenure arrangements in which forest lands are owned by the Crown, policies and regulations are generated by the Crown, and timber rights are leased to forest industries which also, in most cases, generate forest management plans (Baskerville, 1986a; Duinker et al., 1991; Hammond, 1991; OFPP, 1993)). Community-based forestry has been suggested as an alternative, in which management decisions are

based on community values and control of the forest is held locally (Duinker et al., 1991). This would place more power in the hands of both single-resource based communities and aboriginal communities. First Nation and aboriginal peoples have been described as far more than just another stakeholder in the forest management process (OEAB, 1994), and this would be one way to address their needs. However, community-based forestry would also likely be biased towards local needs and could ignore broader issues relating to national or provincial cultural and spiritual values.

3.4 Old Growth Forests

Importance

Old growth forests are part of the forest environment. They are the later successional stages, and are composed of both trees and associated flora and fauna (OEAB, 1994). There is evidence that Canadians have a special attachment to old forests (CCFM, 1992a). Eighty-six percent of Canadians surveyed in 1991 felt that most old growth forests should be protected, although the survey did not indicate whether Canadians could define 'old growth' (Forestry Canada, 1992).

Four types of values have been identified as being associated with old growth forests: ecological, emotional or spiritual, wilderness and natural heritage, and economic (Old Growth Policy Advisory Committee (OGPAC), 1993a). Although these values could be encompassed within other NTV categories, the strong views evident from both surveys and public consultations about old growth forests specifically indicated that they should be included in a category of their own.

Old growth forests are unique ecosystems which provide specialized habitats for plants and animals (OEAB, 1994; OGPAC, 1993a) and play an important role in preserving biodiversity in the forests (OGPAC, 1993a; ORTEE, 1992a). They exist as a historical database that can provide scientists with information about previous climatic conditions and disturbance events such as fires (OGPAC, 1993a; ORTEE, 1992a), and represent a necessary element for study of complete ecological processes (OEAB, 1994; OGPAC, 1993a; ORTEE, 1992a). Old growth forests effectively fulfill the role of living laboratories (FFT, 1993).

Old growth forests have been identified as part of Ontario's natural heritage which should be preserved (OFPP, 1993; ORTEE, 1992a). There are inherent arguments for protection, which state that these forests are important for their own unique qualities of age, rarity and beauty (OGPAC, 1993a). However, this may indicate a bias by the public towards old growth species which display certain characteristics, including great size and beauty. Many of Ontario's tree species, such as black spruce, do not resemble old growth as it exists in the temperate rainforest and which has garnered so much media attention.

Timber has been traditionally recognized as the main economic value of old growth forests, but economic benefits which are also derived from old growth forest ecosystems include trapping, hunting and gathering, and tourism (OGPAC, 1993a).

Forest Requirements

Old growth forests are an integral part of the forest system, in which trees grow and age, and provide habitat, food and shelter for a changing variety of species. There is no single accepted definition for old growth forests (Amyot, 1989; CCFM, 1992a; OEAB, 1994). They are difficult to define because important characteristics relate both to ecological processes and human values (OEAB, 1994; OGPAC, 1993a). Age and size are defining characteristics to some people (OGPAC, 1993a), but whether a tree is considered to be 'old' or 'large' depends on the species involved.

Effects of Forest Management Activities

The main intervention in the forest that affects old growth is harvest. Some areas, such as the Carolinian hardwood forests in southern Ontario, have been logged virtually to extinction (Dufour, 1991). Old growth red and white pine is almost gone in Ontario; less than one percent of the original white pine forest remains (Dufour, 1991; OEAB, 1994). Over the long term harvesting would not have as large an impact on the amount of old growth, if regenerated areas were allowed to reach this successional stage. However, trees in a managed, industrial forest are expected to reach maturity in approximately 80 years (depending on the species), after which they will be harvested again (OEAB, 1994). This would prevent the development of old growth systems.

Policy-Related Issues

Most of Ontario's old growth red and white pine is already gone, but old growth for most boreal species, such as jack pine, is not currently in danger. Unless protection measures are introduced, this may change in the future. The only way to protect old growth forests is to set aside a representative range by creating reserves where forestry operations are not carried out (Dufour, 1991; OEAB, 1994; OFPP, 1993; OGPAC, 1993a; ORTEE, 1992a). However, it is unclear as to whether this should be addressed in forest policy or in other ways, such as within a provincial park system. If permanent reserves are deemed to be more appropriate, then the issue would not have to be addressed within forest policy. If a park system is not utilized, forest policy could dictate that some stands reach the old growth stage.

The consensus is that protection of old growth forests needs to extend beyond representative stands and include protection of areas large enough to represent all age classes and successional stages in order to maintain a continuous supply of old growth (OFPP, 1993; OGPAC, 1993a). In addition, the protected areas must be large enough to support ecosystem functions (OGPAC, 1993a). The question of forest fragmentation could be addressed within forest policy. Isolated systems tend to be more fragile, so it may be necessary to protect relatively large, contiguous areas to maintain old growth systems (Harris, 1984; Hammond, 1991; OGPAC, 1993a).

The issue of protecting old growth forests has provincial as well as local implications. The desirable amount to be protected and maintained could be determined provincially and then target amounts and locations can be identified and transferred to

the local, forest management level. In some cases, previous actions may have to be redressed, as in the case of red and white pine for which systems may have to be restored and then protected (OGPAC, 1993a). The range of successional stages is more abundant for other species, so protection should be easier to address. Of course before any of this can be done, an acceptable definition for old growth must be determined, which will likely vary from species to species.

3.5 Wildlife

Importance

Wildlife, which for the purposes of this thesis has been broadly defined to include all species of animals, including fish, birds and mammals, provides many important benefits. Wild species have important economic, recreational, aesthetic, cultural, educational and scientific value (Baskerville, 1986a; Filion et al., 1992; ORTEE, 1992a).

Economic benefits from wildlife are substantial. In 1991, 91.9 percent of the population of Ontario took part in one or more wildlife-related activities, spending approximately \$5.6 billion (Filion et al., 1992). 18.5 percent of the population took trips or outings specifically for wildlife contact, generating \$700 million in revenue, and 5 percent of the population hunted, generating \$300 million (Filion et al., 1992). In 1984/1985, 3,314 registered Indian trappers harvested furs worth \$2.4 million (ORTEE, 1992b). In 1991, 26.4 percent of Canadians took part in recreational fishing, spending \$2.8 billion (Filion et al., 1992). The flow of visitors into Canada for fish and wildlife based tourism was approximately three times the outflow in 1991, and the amount spent

by visitors was approximately five times that spent by Canadians for similar activities outside Canada (Filion et al., 1992).

These economic benefits are spread across the province, and occur continuously rather than periodically (Hammond, 1991). Activities such as guiding and trapping provide benefits in areas such as northern Ontario, in communities where economic opportunities may be limited. In addition, hunting and fishing may be a necessary source of food for people in remote communities (ORTEE, 1992b).

Specific animals or activities have cultural significance for some aboriginal groups. Activities such as hunting and trapping provide a cultural link, and the catching and eating of fish has cultural as well as ceremonial importance (ORTEE, 1992b). Of course, animal life in general is seen as an integral part of the environment, of which aboriginal peoples see themselves as the stewards.

Many benefits from wildlife are more general and difficult to quantify. People simply enjoy watching wildlife and knowing it exists (OEAB, 1994). 87 percent of people in Ontario feel it is important to maintain abundant wildlife, and 60 percent would be willing to pay to conserve habitat (although only 10 percent have joined or contributed to a wildlife organization) (Filion et al., 1992). Habitat was seen as the third most important value of the forest, after only ecological and global balance values (Forestry Canada, 1992).

Forest Requirements

Forests are essential for the survival of many species. Many species live in the forest, or spend a key part of their life there (OFPP, 1993). Forests provide shelter and protection, nesting sites, and food. Trees provide shade over water bodies which helps maintain water temperatures that are suitable for particular species. They regulate water flow and are important elements of the water filtration process by which pollution and organic matter is removed from precipitation before it enters the water bodies (CWF, 1993).

Different elements of the forest are important to different species. Deer require forest canopy and a moderate amount of undergrowth for protection, and openings in the forest that create edge conditions which favor the growth of browse for food (CWF, 1993; Hammond, 1991). Songbirds generally need a mixed hardwood forest for nesting sites and food (CWF, 1993). Some boreal dwellers, such as caribou, lynx, wolverine, fisher, spruce grouse, and martens, are dependent on mature forests for dens and nesting sites, and for food (CWF, 1993). Many of the larger carnivores are wide ranging and have a low tolerance for human intervention, so they require large tracts of undisturbed forest (CWF, 1993; Harris, 1984; OEAB, 1994). Caribou also need areas of undisturbed conifers on the order of several thousand hectares (OEAB, 1994).

Other species require specialized habitats, particularly those associated with mature or old growth forests (CWF, 1993; OEAB, 1994). Snags, which are dead standing trees, are homes to woodpeckers and pine martens, and fallen woody debris and riparian zones are homes and food sources for other species (CWF, 1993). Both the size

and the nature of the forest are important elements when considering wildlife habitat. A larger area will generally support greater numbers, and a diverse forest environment will support a diverse wildlife population.

Effects of Forest Management Activities

Interventions for timber management have caused a number of changes in the forests which affect wildlife habitat, although there are in most cases insufficient data to determine the magnitude and significance of these effects on wildlife populations. The main effects that timber management is said to have had on the forest are a reduction in total forested areas, ecological conversion of forests, forest fragmentation, a loss of specialized areas, and site impoverishment (CWF, 1993; Hammond, 1991; Harris, 1984; Ontario Federation of Anglers and Hunters (OFAH), undated). These changes are caused by harvest, renewal and stand-tending activities.

The nature, size and location of cutting operations are factors affecting wildlife (ORTEE, 1992a). Clearcutting can benefit species which prefer clearings and edge conditions, such as deer (CWF, 1993; Clawson, 1975; Hammond, 1991; OEAB, 1994). However, the benefits may be limited by the size and shape of the cut. Small clearcuts, up to 4 ha, improve browse and protective cover, whereas larger cuts result in a declining habitat with less cover and food with less nutritional value (Hammond, 1991). Straight-edged clearcuts offer less shelter than cuts which follow the landscape (FFT, 1989).

Clearcutting also results in the loss of specialized habitats such as old growth

forests and snags (CWF, 1993; OEAB, 1994). Caribou, the only indigenous cervid species north of Lake Superior, rely on uncut portions of the boreal forest for wintering, and clearcutting renders the area unsuitable for a period of at least twelve years. Even modified harvesting techniques do not affect reductions in use; only use of uncut areas remains unchanged (Cummings and Beange, 1993). This underlines the danger in extrapolating conditions from one species to another. Ungulates such as deer, moose and caribou have very different habitat requirements.

Clearcutting is believed to result in site impoverishment because the protective canopy is lost and soil is exposed (CWF, 1993). This can cause nutrient losses, and a resulting decrease in vegetation growth. In particular, clearcutting can have a detrimental effect on water quality and fish habitat (CWF, 1993; Dunster, 1987; FFT, 1989; Hammond, 1991). It can affect the hydrological cycle, changing the timing and intensity of stream flow, as well as affecting the nutritional and particulate content of the water, and the temperature of water bodies (CWF, 1993; FFT, 1989; Hammond, 1991).

Another concern about harvesting is that the resulting landscape is composed of fragmented, isolated forested habitats which are separated by areas of incompatible use, in which the trees have been removed (CWF, 1993; Harris, 1984). A parallel has been drawn to principles of island biogeography, which indicate that these isolated habitats sustain fewer species and are more fragile and less resilient than other habitats (CWF, 1993). For example, "...although islands represent less than 7 percent of global land area and less than 10 percent of all bird species occur there, more than 90 percent of all bird extinctions have occurred on islands" (Harris, 1984, p.4). Reserves on which

logging is prohibited are often selected for criteria such as single species protection, watershed protection, or recreational values, and this contributes to fragmentation (Harris, 1984).

Access roads built for harvesting purposes contribute to the problems. These roads are responsible for a significant amount of erosion and sedimentation which can negatively affect water quality (Clawson, 1975; Dunster, 1987; OFAH, undated). They also allow access to animal populations which would otherwise remain undisturbed, particularly with the growth of use in recreational vehicles such as snowmobiles and all-terrain vehicles. This could cause reductions in numbers from hunting and roadkill, and could reduce the amount of habitat available for animals which are sensitive to the presence of people (OFAH, undated).

The nature and amount of regeneration can also affect wildlife habitat. Less effort towards regeneration will result in less forested land because it will take longer to return to the forested state. Conversion of the natural forest to managed industrial forest will result in a reduction of mature and old growth forest, which is essential habitat for some species (Baskerville, 1986b; CWF, 1993). However, in Ontario's forests there is currently an abundance of trees in the older age classes, so that this is unlikely to be a concern at the present time. The fact that conversion to industrial forests may result in an alteration of the composition of the forest is of more concern, as this results in changes in habitat and food supply.

Stand tending, whether mechanical or with the use of chemicals, reduces the amount and type of understory vegetation, which affects the elements of protection and

food supply in the forest (CWF, 1993; OEAB, 1994). The public has also expressed concern about pesticides used for forest protection, fearing that non-destructive insects, birds and small mammals could be harmed, which could then affect the entire food chain (OEAB, 1994). However, the use of chemical pesticides in Ontario is minimal, and the effects of the biological pesticide B.t. have been found to be limited to target species.

Generally, the amount of wildlife habitat in the forest that is currently available and becoming available as the forest evolves, is adequate (Baskerville, 1986b). The number of rare, vulnerable, threatened, and endangered species on forested Crown lands in Ontario in 1992 included: 1 insect species, 4 reptiles, 16 birds, 4 mammals, and 10 fish (OEAB, 1994). Currently, there is little evidence linking the loss or endangerment of animal species to forest management practices. However, as the amount and nature of the forest changes, as the industrial forest replaces the natural, the quality, range and availability of wildlife habitat will be adversely impacted (Baskerville, 1986b).

Policy-Related Issues

Little research has been done to determine the actual effects forest management activities have had on wildlife populations, with the possible exception of deer and moose populations. However, there is evidence that population numbers are tied to habitat supply and ecological conversion is taking place in the forest. Studies indicate that there are no insurmountable problems in integrating wood supply with wildlife habitat supply, as long as the temporal and spatial parameters of both are quantitatively specified (Baskerville, 1986b; OFAH, undated). However, to quantify habitat requirements, data

must be collected on numbers and species of wildlife, and habitat requirements. This information is rarely available (Amyot, 1989; FFT, 1989; GFAH, undated). The exceptions are game species such as deer, moose, ducks and geese, and endangered species, for which population data are kept (Amyot, 1989). Collection of inventories and habitat requirements would aid greatly in the management of forests for wildlife protection. This is clearly outside the responsibilities of forest managers, who must rely on the data available to them. The alternative, which would be possible for forest managers, would be to catalogue current forest conditions, and to then maintain the range of species numbers and age and class structures.

Another aspect of the forest policy/wildlife interface relates to scale. Wildlife species are currently managed on a provincial basis, so Provincial targets could be translated to the scale at which forests are managed if forest management activities were to be manipulated to affect (or not affect) wildlife habitat. Again, information from outside the forest management process is required, including information on target numbers and habitat locations. Once available, this data can be combined with data about existing forest structures and proposed timber harvest areas to identify where conflicts are likely to occur. Forest policy could include mechanisms by which conflicts could be resolved.

Some of the required information is available now. There is no question that mature and old growth forests, and special conditions such as snags and debris, are necessary elements of wildlife habitat. Regulations for harvesting could dictate when the old growth, snags and debris should remain, as well as allowing for some uncut forests

to reach maturity and over-maturity (CWF, 1993). Rotation times could be varied to result in a variety of age and class structures (CWF, 1993).

Policies could regulate the size and shapes of clearcuts, so that they follow the local topography and approximate natural disturbances (CWF, 1993). Riparian buffer-strips and travel corridors could be protected from harvest. Policies could ensure that areas which are protected for purposes of habitat supply are large enough to maintain the system that supports the wildlife, and that such areas are not isolated from one another (CWF, 1993; Harris, 1984). Further, policies could dictate that areas in which soils are vulnerable or erosion is likely to occur be protected from clearcutting, although other harvest methods could be allowed (CWF, 1993; Clawson, 1975).

Over the long term, a diverse forest environment will have to be maintained. For this to occur, a significant amount of forest will have to either be left in its natural state, or be regenerated with the same variety of species it originally maintained (CWF, 1993). Industrial monoculture forests will not support a diverse wildlife population. Forest policies can address the issue of conversion to managed forests.

3.6 Biodiversity

Importance

Biodiversity refers to the variety of species, both plant and animal, on the earth. Its components include genetic variations within species, different species, and the various habitats and ecosystems that support them (ORTEE, 1992a). It implies an interrelated system in which components are dependent on each other for survival.

Biodiversity is often seen as a means to an end, its value being primarily product-oriented (Noss, 1993). However, demonstrating the practical values of biodiversity has been difficult because benefits relating to future potential, undiscovered medicines from plant sources, and so on, are virtually impossible to quantify (Cairns and Meganck, 1994). Diverse systems are likely to provide a wider range of goods, including medicinal plants, wood, and animal products (OFPP, 1993).

Another element that is difficult to quantify is the intrinsic value of a diverse ecosystem and the life it supports (CCFM, 1992a). People value the variety of life simply for its existence (OFPP, 1993), and this can lead to aesthetic appreciation and recreational, educational, and scientific values (ORTEE, 1992a).

By far the most important value of biodiversity that was identified is that it leads to stability and resiliency in an ecosystem (CCFM, 1992a; Hammond, 1991; Harris, 1984; Noss, 1993; OEAB, 1994; OFPP, 1993). As Harris (1984) interprets island biogeography, small, isolated ecosystems support fewer species, which are more sensitive to disruptions, and are therefore more likely to become extinct. A variety of life is important if a system is going to be able to survive and adapt (CCFM, 1992a). Biodiversity is also a key to maintaining future options in an ecosystem as it does not restrict benefits to a single use (OEAB, 1994). As such, the concepts of biodiversity and sustainability are linked (OFPP, 1993).

Biodiversity tends to be a concern of scientists and other experts rather than the general public. In fact, a 1991 survey indicated that only one in ten Canadians were familiar with the term biodiversity, and even fewer could give a definition of the term

(Forestry Canada, 1992). However, biodiversity has become a major focus of international concern and was the subject of the first UNEP conference, in November 1994, to follow the 'Earth Summit', the United Nations Conference on Environment and Development in 1992.

Forest Requirements

In an unmanaged state forests are often diverse ecosystems, supporting a wide variety of plant and animal life. Of course, some forests are more diverse than others. For example, the boreal forest in Ontario contains only six principal tree species, with five other species represented to a lesser extent, whereas the Great Lakes/St. Lawrence forest region is made up of nine principal species with thirteen others represented, or twice the number of species as the boreal forest (OEAB, 1994, p.23). In addition, boreal forests are disturbance forests whose composition and structure is determined largely by disruptions such as fire, disease and insect damage (CCFM, 1992a). This results in large even-aged stands which are by their nature not very diverse.

This being said, Ontario's forests do provide a variety of habitats for many species, including those which have very specialized requirements (OGPAC, 1993a). They also support a range of products and activities. The diversity of the forests provides a number of benefits, while at the same time providing stability to the forest systems themselves. This stability and resilience could be of particular importance as the results of global warming become more evident (CCFM, 1992a).

Effects of Forest Management Activities

Forests which are managed for industrial purposes are manipulated so that their structure and composition are changed (ORTEEE, 1992a). This occurs less dramatically when selective cutting is performed, but changes can be significant when forests are clearcut. Clearcutting and stand tending result in even-aged stands with little undergrowth. This can change or reduce the numbers and species of animal populations. Although overall numbers may not be reduced, the composition of species will almost certainly be changed. This and other changes to wildlife populations was discussed more fully in Section 3.4.

Harvesting methods which use heavy machinery can compact soil, reducing its productive capacity (CCFM, 1992a). This could result in the growth of less nutritional fodder, and plants which are weaker and more susceptible to disease or insects. What is harvested also has implications for biodiversity. Unique ecosystems are required by some wildlife species. The complete removal of a particular tree species, which has almost been the case for red and white pine, reduces diversity of plant life and could affect animals that rely on these trees for food or shelter. As was discussed previously, the pattern of harvest can result in a fragmented landscape in which species are more fragile and more likely to become extinct.

The type of regeneration also affects biodiversity. Clearcut areas that are not left to regenerate naturally, are generally replaced by monoculture plantations (OFAH, undated), which Hammond (1991), refers to as 'the unstable non-forest'. Trees selected for timber have different characteristics, such as being straight, fast-growing, and with

few branches, that are not beneficial for other species (Hammond, 1991). Such monoculture crops tend to be more susceptible to disease, fungi, insects, fires and blowdown, as well as requiring more energy and inputs in the form of fertilizers, herbicides and pesticides (Hammond, 1991). Site preparation and tending operations suppress normal biological processes, which are viewed as competition, but studies have indicated that these effects are short-term only (OEAB, 1994).

Policy-Related Issues

"Forest biodiversity is a concern because, on a world-wide basis, the number of species of plants and animals has been dramatically reduced, their genetic make-up simplified and community structure degraded" (OFPP, 1993, p.31). Managing the forest has implications on a local, regional and world-wide basis.

Maintaining current diversity means maintaining genetic diversity, species diversity, and ecosystem diversity. Planning to accomplish this must be performed at a variety of scales. A provincial policy could set broad goals and specific management plans could be set at the level of an area defined on an ecosystem basis (OFPP, 1993). This would allow for the maintenance of a balance of forest types and successional stages, which would in turn maintain the variety of habitat types (Hammond, 1991; OEAB, 1994; OFAH, undated). For this to happen it is necessary to have an ecological landscape classification system for which data on elements of the landscape and ecosystem are known. Forest managers could be instrumental in defining elements necessary for such a system, and for putting the system in place.

Decisions would have to be made on a provincial basis about whether limitations on regeneration of monoculture plantations are needed, or whether enough forest area is protected from harvest or left to regenerate naturally to produce a diverse system. This is not necessarily a decision to be left solely in the hands of forest managers, but some mechanism could be created within forest policy by which interested parties could contribute to the decision. The determination of what constitutes 'enough' natural forest, 'enough' diversity, is in many ways a political decision that should be made in the context of a scientific understanding of forest ecosystems.

3.7 Life-Support Systems

Importance

The importance of natural life-support systems is self-evident; without them, man's life forms, including human, would not survive. This aspect of the forest is recognized by the Canadian public as being crucial. In a 1991 survey, the most important value of the forest was stated to be the protection of water, air and soil, and the second most important was balancing the global ecosystem (Forestry Canada, 1992). People stated that by far the most important consideration in forest land use decisions had to be potential environmental impacts (Forestry Canada, 1992).

The Ontario Forest Policy Panel (1993), came to a similar conclusion. It found that the people of Ontario were "uncompromising around the protection of water, air and soil. The basic need to protect quality and purity always elicits a strong response" (OFPP, 1993, p.43).

Forest Requirements

Many of the life-support functions performed by the forest were discussed in previous sections. Forests protect wildlife and provide food and habitat, and support biodiversity. However, on a broader scale, the ecological processes operating within the forest ecosystems are essential to maintaining life on earth. Forests help maintain chemical balances of soil and water, stabilize climate, recycle nutrients, break down pollutants, clean air and water, and are vital to watershed protection, soil formation and carbon storage (CCFM, 1992a). They are likely to help mitigate the projected consequences of climate change, which is expected to have severe effects on water, air and soil (OFPP, 1993).

Effects of Forest Management Activities

Forests are naturally resilient systems which are capable of recovering after many, often severe, disturbances (CCFM, 1992a; Maini, 1989). However, any system has limits to its tolerance, and human interventions in the landscape have tended to be more widespread and more severe than natural disturbances. Because of the complexity of forest systems, it can be difficult to measure or even identify long-term, cumulative effects of some activities.

Harvesting can have negative effects on both soil and water quality, with clearcut harvesting having the most pronounced effects. There are serious concerns about reductions in soil fertility (Bourdages, 1993; Hammond, 1991; OEAB, 1994; OFPP, 1993). The use of heavy machinery causes soil compaction (Hammond, 1991; Maini,

1989; OEAB, 1994). Soil compaction, combined with the removal of the forest cover, leads to increased soil erosion (OEAB, 1994; OFPP, 1993). Removal of the forest cover also results in altered microclimates, with higher soil surface summer temperatures, lower humidity near the ground, and more access to wind (Hammond, 1991). Full-tree harvest systems result in less debris left on site, which could cause nutrient depletion in the long term (Hammond, 1991; OFPP, 1993).

Evidence of soil compaction and erosion which hinder regeneration has been documented in British Columbia, where the soils, topography, and climate are different than in Ontario. There is no evidence to date of widespread problems in Ontario, and there is some doubt about whether the British Columbia studies are transferable to Ontario (OEAB, 1994). Similarly, there are questions about whether changes in microclimates and reduced nutrient input are significant long-term effects, or whether they are temporary states that will not affect the long-term health of the forest.

There are similar questions about whether producing a shorter-rotation industrial crop will have long-term effects on soil nutrition (Hammond, 1991). Comparisons can be made between intensive forestry and agricultural practices, as both require heavy chemical inputs to produce a monoculture crop. Of course, even a short rotation period of 60-80 years makes it difficult to determine the effects of multiple harvests.

Harvesting, especially clearcutting, can also have a detrimental effect on water quality. Forests control runoff, purify water, and regulate stream flow and water temperature (Clawson, 1975). Harvesting increases stream flow, sharpens seasonal peaks, increases water temperature, changes the chemical and nutritional content of water

and increases sedimentation (Clawson, 1975; Dunster, 1987; Hammond, 1991). The severity and significance of these effects depend on the proximity of harvest to the water body, the size of the harvest area, the slope of the land, and the nature of the soil near the water bodies. It is often difficult to measure these effects. Results of harvest activities can be separated temporally and spatially from the causes, due to the size of watersheds (Hammond, 1991).

Other concerns about ecosystem health and life-support arising out of forest management practices relate to the use of chemical controls, which was discussed in Section 3.4, and the lack of regeneration effort (ORTEE, 1992a). Even in 1990, after promises and assurances by both government and industry, at least 20 percent of the annual harvest was not being regenerated adequately (Bourdages, 1990). This has implications for the local ecosystem, but also for global balances. It was estimated that in 1986 Canadian forests absorbed as much carbon dioxide from the atmosphere as would have been emitted from industrial activities (Bourdages, 1993). Mature trees absorb more than young trees. For example, a 100- year old beech tree that is 25 metres tall with a 15 metre crown would have to be replaced by 2700 young trees with a crown volume of 1 cubic metre to perform the same function (Roseland, 1992).

Policy-Related Issues

As stated previously, it is difficult to find evidence about whether the interventions in the forest landscape will have significant, long-term effects on ecosystem health, on any scale. However, because of the time involved to recreate a forest, if

people wait for definitive proof then it may be too late to reverse the effects. Policy/life-support linkages must be based upon a conservative perspective as an underestimation of the role of the forest in maintaining planetary life-support systems could result in serious, irreversible broad scale damage to ecosystem functioning.

"Our culture's genius for specialization and reductionism has compartmentalized renewable resource management into separate boxes, each devoted to a single resource" (Behan, 1990, pp. 12-13). This has caused many past and current problems. Focus on timber from the forest has meant that soils, water, wildlife, and other elements of the forest community have been ignored to a great extent. There seems to be a general consensus that it is necessary to move away from this type of management, and towards a holistic, ecosystem-based approach (Behan, 1990; Cortner and Moote, 1994; Dufour, 1991; Hammond, 1991; Maini, 1989; OFPP, 1993).

Holistic management is based on a philosophy different than that of multiple-use management, which attempts to achieve spatial and/or temporal separation of activities (Behan, 1990). Instead, it recognizes the forest as an interactive system, and its chief objective is to maintain the integrity of the system (Behan, 1990; Dufour, 1991; Hammond, 1991; Maini, 1989). As such, it focuses on states and conditions, rather than flows or stocks produced by the system (Cortner and Moote, 1994). It is anticipatory in nature, asking, 'if we do this, what will happen', rather than 'how much can people get from this' (Behan, 1990). Instead of regulating procedures, it is outcome-oriented, setting targets for quality (OFPP, 1993). However, there is a lack of theory and data about this type of management system (Cortner and Moote, 1994). Ecosystem functions

are not well understood, and little baseline data about the forest's current status is available. This being the case, forest policies could focus research in this area.

Current forest tenure systems could be changed so that forest management boundaries are determined on an ecosystem basis. Ecosystem management would be difficult or impossible if different forest-product companies were producing different management plans for sections of the same ecosystem.

These changes cannot be made immediately, due to constraints such as a lack of knowledge and current tenure arrangements. More immediate measures could be taken by regulating forest practices. Regulations could determine which forest harvest system would be used based on environmental considerations. Harvest could be timed to occur when sensitive soils are covered by snow. Water bodies and riparian areas could be protected by preventing harvest on steep slopes or near sensitive areas.

These would be interim measures to be used until an ecologically-based management system could be introduced. Ecologically-based forestry would protect not only life-support systems, but all other identified non-timber forest values, with the possible exception of some tourism/recreation and cultural/spiritual values.

3.8 Summary

In order to achieve the goal of this thesis, which is to evaluate the extent to which Ontario's forest policies address NTVs, it was necessary to investigate and define NTVs. NTVs were defined as benefits that depend on the forest, but which do not flow from timber harvesting or related activities. Six categories of NTVs were identified from

recent literature: tourism and recreation, cultural and spiritual values, old growth forests, wildlife, biodiversity, and life-support systems. The nature of these values, their relationship to the forest, and the nature of the NTV/forest policy interface was examined and described.

All of the NTVs require a forested landscape, although the elements of the forest that each requires vary from value to value. Forest management activities, which in Ontario currently relate primarily to the production of timber for industrial purposes, affect or have the potential to affect all of these values because they alter the forest landscape. Certain controls or regulations governing forest management activities are necessary if the NTVs are not to be negatively affected in any significant way. These controls, if they exist, will be found in Ontario's forest policies.

CHAPTER 4

ONTARIO'S FOREST POLICY

This chapter includes a review of the Ontario forest policies that were in place as of April, 1994. Section 4.1 provides a context for current forest policies by presenting a short history of the development of forest policies in Ontario. This is followed by a description of the current policy structure and the three levels at which policy is formed. Sections 4.3 to 4.5 summarize specific policy documents from each policy level. The documents selected for review illustrate the range of forest policies that influence forestry practices in Ontario and do not represent an exhaustive consideration of all forest policies. Further, only policies that govern forest management and also embody dimensions of NTVs identified in Chapter 3, are included. This approach is consistent with the objectives specified in Section 1.3. The review of Ontario forest policies builds upon the policy evaluation and NTV foundations set out in Chapters 2 and 3 respectively. That is, the summaries presented in this section focus upon how and to what extent the policies define and accommodate NTVs.

4.1 The Development of Ontario's Forest Policies

Ontario's forest policies have been developed over many years, and they are still in transition. The forces behind the changes are many and various (Table 4.1). Governments, since the time of European settlement, have been aware of the importance of the forests. Records of square timber exports appear as early as 1719 (Swift, 1983). In the early nineteenth century, European wars restricted British access to European

2

PM-1 3½"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT

PRECISIONSM RESOLUTION TARGETS

TABLE 4.1 A BRIEF HISTORY OF ONTARIO'S FOREST POLICY

TIME PERIOD	EVENTS
1700's	European interest in Ontario's forests for military purposes
1826	First government intervention: British issue timber licences
1867	Creation of Ontario Department of Crown Lands; continuation of licensing system
1929	Pulpwood Conservation Act passed; sustained yield directive not enforced
1920's/1930's	Fire protection system in place
1940's/1950's	Transition from harvest for lumber to harvest for pulp and paper
1947/1953	Forest Management Act/ Crown Timber Act passed; forest regeneration placed in hands of industry, but limited compliance or enforcement
1962	Regeneration activities become provincial responsibility
1972	OMNR created; mandate to manage lands and waters, natural resources
1972	Armson Report completed; evaluation of forest management activities in Ontario leads to decision to place regeneration activities back in hands of industry
1970's	Province-wide planning exercise to combine resource objectives into single plan under 'multiple use' concept
1979	Crown Timber Act amended to allow for management units in which regeneration activities are the responsibility of industry although costs borne by government
1980's/1990's	Class environmental assessment for timber management; increasing public pressure to change resource policies; concept of 'sustainable development' popularized and adopted by OMNR in resource policies

timber, and Canada became a key supplier of white pine, an important military material for the British. The first government intervention in the Canadian timber industry occurred in 1826, when British authorities recognized the potential source of revenue and began issuing licences to cut timber in return for a licence fee and a duty on cut wood (Swift, 1983).

With the advent of Confederation and the creation of Ontario's Department of Crown Lands in 1867, the responsibility for natural resources was assumed by the provincial government (OMNR, 1991c). The main purpose of the Department of Crown Lands was to provide funding for the provincial government via resource development and the system of licencing timber harvest started by the British was continued. Between 1867 and 1899, one-quarter of all government income came from the forests (OMNR, 1991c). However, the growth of the conservation movement in the early twentieth century led to a change in attitude towards resources, and a change in direction for the Department. This period saw the creation of many federal and provincial parks, and the beginnings of an inventory system for fish and wildlife populations. The concern for a more orderly utilization of resources led to the passage of the Pulpwood Conservation Act in 1929, which directed that forests were to be harvested on a sustained-yield basis (OMNR, 1987a). Unfortunately, this concern did not include the monitoring of practices enforcement of the Act (OMNR, 1987a).

These early government interventions related chiefly to timber harvest. By the 1920's and 1930's, a system of fire protection was also in place, to protect both the timber and the lives of people in the communities threatened by fires. It was not until

the middle of the twentieth century that forest regeneration became a matter for public policy. Prior to this, forests were seen as inexhaustible. Mills, used to process square timber from the pine forests, were easily transportable and they were moved from site to site following the timber supply. By the time the pine forests were dwindling, the pulp and paper industry had begun, and it commenced the utilization of different species. However, pulp and paper mills required large capital investments, and they were not transportable. This inability to move mills to new locations sparked industrial interest in forest regeneration as a means to ensure an adequate wood supply in close proximity to the mill.

The 1947 Forest Management Act and the 1953 Crown Timber Act placed harvest and regeneration in the hands of the timber industry (OMNR, 1987a). Government quickly determined that regeneration practices were not being carried out, but no prosecutions were undertaken and no harvest licences were revoked. This is evidence of the power of the timber industry (MacKay, 1985). In 1962, regeneration was placed back in the hands of the province, and forest management became a policy objective of the Ontario government (Armson, 1976).

A new wave of environmental concern by the public in the 1960's and 1970's was a factor in the revamping of resource management planning in Ontario. This process began in 1972 with the creation of the Ontario Ministry of Natural Resources. This occurred at the same time that a timber supply crisis was imminent (MacKay, 1985). The timber industry therefore supported many of the government's initiatives, including enhanced fire protection, land classification and land use planning, and an inventory of

forest resources (Gillis and Roach, 1986). Whereas industry became active in the development of forest policies, the public conservation movement did not translate into a more specific concern about forests and forest policies (Gillis and Roach, 1986). This lack of interest by the public resulted in a strengthening of ties between government and industry, and a policy direction geared towards efficient and planned use of the timber resource.

As part of the revamping of forest management policies, the Ontario government commissioned an evaluation of forest management activities, resulting in the report Forest Management in Ontario, known as the 'Armson report' (Armson, 1976). Primarily concerned with the provision of an adequate timber supply, the report focused on the lack of regeneration success and the problems attendant on separating timber harvest and renewal activities. As a result of this report, the Crown Timber Act was amended in 1979 to place harvest and regeneration back in the hands of industry, although with approval for the plans prepared by industry remaining in the hands of the OMNR. Funding for regeneration activities was to remain the sole responsibility of the OMNR.

Another significant change to come out of the planning exercise of the 1970's came about not only because of public pressure, but also because of changes in the attitudes of resource managers. The concepts of 'multiple use' and 'integrated resource management', whereby a single land base is utilized to provide for different uses and different users, were adopted by the OMNR. For the first time, a single document that dealt with management objectives for all identified resources was produced for each

administrative area.

However, in the 1980's and 1990's, an increasingly sophisticated public again began to pressure the government for changes to its resource policies. This time public pressure was focused specifically on forest policies, unlike the conservation movement of the 1960's. Media coverage of vast clearcuts fuelled public criticism of forest management practices, not only as they related to timber supply, but also as they related to the overall health of the forest environment and the many benefits this environment supplied.

At the same time, the OMNR was involved in preparing for a class environmental assessment of its timber management planning process, as required under the Ontario Environmental Assessment Act (Government of Ontario, 1990b). It drafted a number of versions of its submission to the assessment board because of repeated criticisms from other government departments, in particular the Ministry of the Environment (Dunster and Gibson, 1989). This led to a number of changes in the practices and policies of the OMNR.

At the same time, the concept of 'sustainable development' took the world stage, with the publication of the so-called Brundtland Report, Our Common Future (WCED, 1987), and the occurrence of the 'Earth Summit', the United Nations Conference on Environment and Development in Brazil in 1992. The concept of sustainable development espoused through these venues and popularized by the media indicated a recognition that there were limits to the productive capacities of resources. Exploitation of these resources in the name of economic growth had to be controlled if the resources

were to continue to exist.

Governments supported and ratified some of the principles of sustainable development, the public and environmental groups lobbied for changes to forest practices, and timber shortages continued to occur, albeit on a local basis. The OMNR realized that their forest policies would have to change. As the 1990's opened, some of these changes started to occur. However, overhauling a complex system of forest policies is not something that could be accomplished overnight, and as a result, the current status of Ontario's forest policies is a mixture of the old and the new.

4.2 Ontario's Current Forest Policy Structure

The management of Ontario's forests is an extremely complex activity, and it is to be expected that the policies governing this activity will be equally complex. Policies must address goals and objectives at different scales, from the provincial to the local. They must be rigid enough so that directions for meeting objectives are clear, yet flexible enough to allow for the variability of the resource itself. Because of this, many different documents together comprise Ontario's forest policies. Ideally these documents would form an integrated whole.

Ontario's forest policies exist in a hierarchical structure of three levels (Table 4.2). At the top of the hierarchy are Provincial Policies set by the OMNR, which give philosophical direction and very broad, general goals which are to guide the management of resources under the jurisdiction of the Ministry. There are also, within this level, provincial policies guiding forest management specifically. The second level, Regional

TABLE 4.2 ONTARIO'S FOREST POLICY STRUCTURE

FOREST POLICY LEVEL	SPECIFIC POLICY DOCUMENTS
Provincial Policies a) General Resource Policies b) Forest Policies	Philosophy on Integrated Resource Management (OMNR, 1985b) Direction 90's (OMNR, 1991c) Sustainable Forests: A Canadian Commitment (CCFM, 1992a) Canada Forest Accord (CCFM, 1992c) Policy Framework for Sustainable Forests (OMNR, 1994b)
Regional and District Planning	Guidelines for Land Use Planning (OMNR, 1980) Strategic Land Use Plans (OMNR, various years) District Land Use Guidelines (OMNR, various years)
Resource Management Planning (Forestry)	Sustainable Forestry Program (OMNR, 1991) Crown Timber Act (Government of Ontario, 1990a) Policy for the Integration of Other Resource Values in Timber Management (OMNR, 1985a) Timber Management Planning Manual (OMNR, 1986a) Timber management manuals and guidelines, including silvicultural guides, operational manuals, guidelines non-timber values and habitat management: guidelines (OMNR, various years)

(adapted from OMNR, 1992, p.4)

and District Planning, involves the creation of separate plans for the three planning regions, and for each administrative district within each region (Fig. 4.1). These plans contain more specific goals and objectives for the different resources in the region or district. Implementation of the plans would theoretically result in the achievement of goals set at the Provincial Policy level.

The third level, Resource Management Planning, moves to the treatment of individual resources. It includes research strategies, legislation, administrative documents and manuals and guidelines which govern management of the resource on the ground. For forest policies, this level has both a spatial component and a subject component. Plans are created for discrete management units, called forest management units (FMUs) (Fig. 4.2) However, they are created using guidelines and manuals relating to different elements of the forest itself.

Ideally, planning at the lower levels of the hierarchy would be carried out to fulfil the goals set out at the higher levels. Resource management plans would be designed within the philosophical framework defined in resource policies. Meeting objectives in the plans for forest management units would result in meeting the objectives set out in the district plans, and ultimately the regional plans. The goals and objectives set out in the regional and district plans would have been designed to fulfil Provincial Policies. However, policy is not static, and changes can occur at different levels at different times.

Ontario is in the process of changing its forest policies. As of April, 1994, major changes had occurred in the areas of philosophical direction and general goals, reflected in new policies at the Provincial Policy level. However, lower level policies to

FIGURE 4.2 OMNR FOREST MANAGEMENT UNITS

(OEAB, 1994, p.30)

implement these new philosophies and achieve new goals are not yet in place. There is some indication in the new policies as to where more changes may occur, but Regional and District Planning documents in place as of April, 1994 were established under the 1970's provincial statements for forest policy and most Resource Management Planning documents were developed in the 1970's and 1980's to achieve the objectives in the Regional and District plans.

4.3. Provincial Policies

Statement of Philosophy on Integrated Resource Management (OMNR, 1985b):

Although not released as a formal statement until 1985, this document describes OMNR principles used in the land use planning exercise of the 1970's and 1980's. It is a brief statement composed of two pages, in which integrated resource management (IRM) is described in operational terms as a means to guide the multiple use of natural resources.

The document states that the goal of IRM is to coordinate OMNR resource management programs and activities so that long-term benefits are optimized and conflicts between programs are minimized. Multiple use is described as the best approach to optimizing benefits and minimizing conflicts. Natural resources and human resources are to be 'blended together' to achieve an optimum combination of benefits. Ministry staff is also directed to take into account the combinations of social, economic, and environmental impacts of activities.

Direction 90's (OMNR, 1991c):

Direction 90's, an official policy of the OMNR released in 1991, is a short, fifteen-page statement which provides an over-arching framework or blueprint that is to guide policy makers and resource managers in their decisions about how Ontario's resources are to be utilized. It is a document that is philosophical rather than operational in nature. It briefly defines the problems that have led to the need for a new policy direction, defines the principles of the new direction, and identifies several broad goals towards which resource management must be directed.

The problems defined in this document are of a general nature, as the policy is to provide direction rather than define specific solutions. Three main problems are identified: 1) views on how resources are to be used or not used have changed but management of the resources has not; 2) there are questions as to whether the environment can sustain current use, and 3) there are growing conflicts between users and uses which are becoming increasingly difficult to solve. A factor identified as compounding these problems is the lack of information about the status of resources, the values placed on resources, and the interrelationships between ecosystem components and between ecosystems and people.

This policy indicates that the solution to these problems is to be found in the concept of sustainable development. The principles of sustainable development are defined as:

- recognition of the connectivity and interdependence of all life
- the preservation of diversity, which leads to a diverse economy

- resource management that considers environmental, social, and economic factors
- recognition that resources have a finite production capacity
- the application of these principles in a way which is fair to all, including future generations.

Direction 90's states its goal as "To contribute to the environmental, social, and economic well-being of Ontario through the sustainable development of natural resources" (OMNR, 1991c, p.8). Supplementary goals include ensuring ecosystem health by protecting soil, aquatic resources, forest and wildlife resources, as well as their biological foundations; ensuring long-term sustainability of natural resources for the benefit of future generations; and protecting provincially significant natural heritage areas and biological features. The document then describes three supporting strategies which the OMNR has adopted to help achieve the stated goals. These strategies involve developing and studying partnerships in resource management, establishing in some quantifiable way the value or values of resources, and improving the knowledge base about natural resources.

It must be noted that in a later discussion paper, the OMNR stated that Direction 90's only augments planning principles defined by the OMNR in the 1970's (OMNR, 1992, p.18). This indicates that sustainable development does not replace policy directions set in the 1970's as illustrated in the IRM philosophy but is meant to stand alongside them.

Sustainable Forests: A Canadian Commitment (CCFM, 1992a), and Canada Forest Accord (CCFM, 1992c):

Both of these documents are national rather than provincial, but Ontario, through its Minister of Natural Resources, was a signatory to both and therefore indicated its support for the goals, principles and objectives contained in them. The documents are the result of a consensus-building exercise between provincial and federal governments, and they delineate strategic priorities for the next five years which are to guide provincial policies and actions.

The need for these relatively new policies results from changes in society's attitude towards its forests. The documents do not identify what the changes signify. The goal statement is much clearer: "To maintain and enhance the long-term health of our forest ecosystems, for the benefit of all living things, both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations" (CCFM, 1992a, p.7). More specifically, forest management is to include maintaining ecological processes, maintaining biodiversity, understanding the productive capacity of the forest, understanding different forest values, ensuring a healthy forest economy, ensuring the rights of aboriginal people, and ensuring that the public is involved not only in developing policy, but also in the preparation of the forest management plans themselves.

The policy identifies certain strategies that must be undertaken if these goals are to be reached, which relate to information gathering, the improvement of management planning, and changes to management practices. These strategies include completing an

ecological classification of all forested lands, developing a definition of biodiversity, establishing measurable objectives for the state of the forest, and establishing measurable targets for an optimal mix of uses. As well, forest management plans are to promote a holistic approach and consider soil, climate and wildlife conditions. Harvesting, renewal and protection practices are to be refined.

Policy Framework for Sustainable Forests (OMNR, 1994b):

One goal of the Ontario Sustainable Forestry Program initiated in 1991 (discussed further in Section 4.5) was to establish a new policy framework for forest management. After extensive public consultation, this framework was developed and released as an official policy in April, 1994.

Although there is no problem definition in the official policy statement, the report prepared for the Ministry by the panel established to develop the framework gives a number of reasons for the need for a new policy (OFPP, 1993). The panel identified public dissatisfaction with existing policies, which were felt to be out of step with new attitudes towards resource management. In addition, forest policies were not in line with the Ministry's own new philosophy of sustainable development, as expressed in Direction 90's. Ontario's forest policies focused on attitudes and issues from decades ago, and new issues and problems had emerged for which no policy existed.

The goal set out in this policy fits squarely within the sustainable development paradigm: "Our goal is to ensure the long-term health of our forest ecosystems for the benefit of local and global environments, while enabling present and future generations

to meet their material and social needs" (OMNR, 1994b, p.2). Central to this new policy is the principle that forests must be defined and managed as ecosystems, a concept that embraces all aspects of forest life. Managing forest ecosystems on a sustainable basis is seen as the key to sustaining any development based on the forest.

The policy goes on to describe principles and objectives for both forest sustainability and community and resource-use sustainability. Forest sustainability is described with reference to the need to maintain ecological processes and biodiversity. To achieve this, forests must be managed to conserve and enhance the quality of air, water and soil, and to conserve or enhance biodiversity. Disturbances caused by management interventions must emulate natural disturbances and landscape patterns, and must minimize environmental effects and effects on other values. Where this cannot be done, the forest should not be subject to harvest or other harmful management practices.

According to this policy, community and resource-use sustainability must also be a priority, but they must come second to the sustainability of the forest ecosystem. Many forest values are recognized, including industrial forestry, harvesting of non-timber forest goods, tourism, and cultural and spiritual values. The document states that forest management must include objectives for protecting or providing for these values, while maintaining forest sustainability.

To achieve these goals, ecosystem processes and ecosystem management must be more fully understood. The framework describes the need for establishing ecosystem boundaries for primary components of the forest, establishing targets for ecosystem conditions, and developing management strategies to achieve the targets.

4.4 Regional and District Planning

A province-wide land use planning exercise which utilized the concepts of multiple-use and IRM was initiated by the OMNR in the 1970's. Strategic Land Use Plans (SLUPs) were developed for each of the three planning regions in the province, and District Land Use Guidelines (DLUGs) were developed for most of the administrative districts within the regions. SLUPs and DLUGs are similar in philosophy and approach, and differ primarily in the spatial resolution of information, objectives, and strategies. These plans have not been superseded and are still central to resource management planning in the province. As plans they are primarily operational in nature, and they do not contain the policy element of problem definition. Each plan is prefaced with a description of the goal of the OMNR, but the main component of each plan is detailed production objectives for resources, with some discussion of strategies for attaining the objectives.

SLUPs and DLUGs indicate that there is a recognition by the OMNR that Crown resources belong to the people of Ontario and that they must be managed to benefit these people. They were developed to help achieve the OMNR goal, which is "To provide opportunities for outdoor recreation and resource development for the continuous social and economic benefit of the people of Ontario, and to administer, protect and conserve public lands and waters" (OMNR, 1982, p.i). The various departments within the OMNR, including those for land management, outdoor recreation, and resource products, are to work together to achieve the stated goal, being governed by concerns of economic efficiency, overall social benefits, and environmental protection.

SLUPs and DLUGs were meant to provide a systematic approach to resource allocation, and give a framework within which related OMNR programs could operate efficiently and harmoniously. Specifically, the plans are used to determine the allocation of discrete areas of land and/or water for particular resource-based uses. Guidelines were developed by the Ministry to help make these determinations (OMNR, 1980).

The guidelines stated that all objectives were to be quantified. They state that the most efficient use of land must be made to achieve the objectives, although the sense in which efficiency is meant is not stated. Present uses must be the starting point for developing plans. As a general rule, use should be assigned to highest capability areas, although only that area necessary to achieve the objectives should be allocated. At the same time, plans must recognize the productive capacity and development or use capacity of resources.

The guidelines also set out minimum information requirements which would be required to develop plans. Plans had to include information on the people, natural resources, present uses, current and potential Areas of Natural or Scientific Interest (ANSIs), existing plans, and any resource-related problems in each region or district. Statistics for natural resources were to include potential supply as well as current supply. Each plan had to include objectives to be reached by the year 2000 for forestry, mining, commercial fur, fisheries, wildlife (mainly game species), parks, cottages, Crown land recreation, and land and water management. The regional objectives are divided and assigned in the district plans.

Each plan has specific goals, objectives and strategies for individual resources,

but also includes more general policies relating to the environment and lands and waters. The environment is to be maintained and where new developments are undertaken, adverse environmental impacts are to be minimized or the environment rehabilitated where necessary. The OMNR is to facilitate the orderly development and conservation of lands and waters for the social and economic benefit of the people of Ontario. The allocation of lands and waters to ensure efficient use and high revenues is of paramount concern. No specific directions are given as to how these goals are to be achieved, although the concept of multiple use is supported.

With regards to forestry, plans contain information on the location of different tree species, and forest management plans currently in place. Areas of highest capability for forest production are determined by the use of the Canada Land Inventory, which identifies potential capability of the land for producing commercial timber, rather than the quality of forest currently in existence on the land.

The OMNR's goal for forestry is "to provide a continuous contribution to the economy by forest-based industries and to provide for other uses of the forest through sound management practices" (OMNR, 1982). Objectives or targets are described in terms of cubic metres of timber. For example, the Northwestern Ontario Strategic Land Use Plan (OMNR, 1982) targets production of 10.4 to 12.5 million cubic metres of conifers and 1.2 million cubic metres of hardwood by the year 2000. The Thunder Bay District Land Use Guidelines (OMNR, 1983) targets 1.25 to 1.5 million cubic metres of conifer and .3 to .4 million cubic metres of hardwood. Quantified objectives in the forestry sections are given for timber only; no quantified objectives are given for 'other

uses of the forest', which are not defined at all.

In these plans, separate sections relate to several elements which were identified as non-timber values in Chapter 3 of this thesis. These include wildlife, separated into commercial fur, fisheries and wildlife in these plans, and tourism and recreation. These plans contain target numbers for commercial fur-bearing mammals, deer, moose, caribou, bear, small game, waterfowl, rare and endangered species, and several species of fish, including lake trout. Target numbers are given for cottage lots on Crown land to be made available to the public, but no quantified recreation targets were developed.

4.5 Resource Management Planning (Forestry)

The policy level of resource management planning for forestry currently has two main components, one directed towards research, and the other directed towards preparation of the timber management plans for each forest management unit. The research component arose out of the Sustainable Forestry Program announced by the OMNR in 1991. This is not to say that research did not occur prior to 1991, but that since 1991 research moved in the direction set out by the OMNR in its provincial policy Direction 90's. On the other hand, documentation for the preparation of the timber management plans grew out of planning directions from the 1970's and 1980's. This section will commence with a discussion of the Sustainable Forestry Program; subsequent policies discussed relate to the preparation of the timber management plans and include legislation, administrative documents and timber management manuals and guidelines.

Sustainable Forestry Program (OMNR, 1993b):

The OMNR defined the need for this new program as arising out of a need for solving the many conflicts caused by competing demands being made on the forest resource (OMNR, 1993b). To address this problem, the Ministry described a need for different kinds of information: scientific information about the forest, information about people's perception of the forest and how it should be used, information about the economic values of different uses of the forest, and information about different types of forest management.

Investigation of silvicultural practices includes a long-term ecosystem research project, with the objective of classifying forests on an ecosystem basis and determining the implications of silviculture for genetic diversity. Concurrently, genetic diversity guidelines are being developed. Another element of silvicultural research is studying alternatives to chemical herbicides for controlling non-timber vegetation. The objective of reducing aerial spraying by 20 percent in the first year of the project was met, and researchers are continuing to study the use of sheep grazing, cover crops and biological controls. There is also a project underway to study the impacts of herbicides on moose browse, snowshoe hares and boreal streams. The results of these studies are to become part of a public education program, to make the public more aware of actual forest management activities and their effects.

Old growth forests are a particular focus of the Sustainable Forestry Program (OMNR, 1993b). Scientific information is being gathered to determine the nature and importance of old growth, and particularly its role in the ecosystem. The Forest

Fragmentation and Biodiversity project is focusing on red and white pine to study effects of fragmentation and the role of old growth in biodiversity. The OMNR has also set up an advisory committee to develop, with extensive public consultation, strategies for conserving and managing old growth red and white pine (OGPAC, 1993a; OGPAC, 1993b). The Ministry's reaction to the committee report has not yet been released.

A forest audit was completed as part of the Sustainable Forestry Program (OMNR, 1992d; OMNR, 1993c). The audit was performed by an independent committee to study regeneration results in the boreal forest. Completed in 1993, the study found that virtually all sites logged between 1970 and 1985 are regenerating to boreal species, but the composition of these species is changing. Where natural regeneration took place, the forest was shifting from spruce and pine to poplar and white birch. At the time of the audit, the forest had changed from 57 percent pure conifer and 6 percent pure hardwood to 40 percent pure conifer and 19 percent pure hardwood. Treated sites resembled the original forest more than untreated sites. To date there does not appear to be any work to determine what implications this might have for other forest values such as wildlife habitat.

Economic studies involve quantifying values for non-timber forest uses and developing a new forest revenue system based on a user-pay principle (OMNR, 1993a). A new, adaptive timber production policy is being developed, and problems within the timber industry are being studied. In terms of management strategies, the OMNR is studying different types of partnerships under the Community Forestry project (OMNR, 1992c). This involves four pilot projects in which local and community involvement in

forest management are increased.

One of the key elements of the Sustainable Forestry Program was the development of a new forest policy framework, which was to include principles to guide policy development and forest management practices. After extensive public consultation by an independent panel, a report was presented to the Ministry (OFPP, 1993). The Ministry subsequently released the new framework, which was discussed in Section 4.3.

Crown Timber Act, Revised Statutes of Ontario, 1980, Chapter 109, as amended by 1986, Chapter 64, s.11 (Government of Ontario, 1990a):

The Crown Timber Act is a legally enforceable statute which sets out some of the requirements for timber management plans. The Act deals specifically with timber, although it frequently refers to forest management. It is relevant to this thesis as one of the documents that governs the main human intervention in the forest. Of chief interest are the sections regarding authority given to the OMNR, tenure types, and funding for silviculture.

The Act gives the OMNR the authority to prescribe the form and content of the Timber Management Planning Manual, which is the key document governing the actual resource management plans. One of the few criteria set out in the Act is that timber must be managed on a sustained yield basis, which is described as achieving a continuous approximate balance between growth of timber and timber cut. However, the OMNR appears to believe that this definition, if taken literally, would only be appropriate for a 'normal forest', which has equally productive areas in all age classes up to rotation age

(OEAB, 1994). In Ontario, where mature or over-mature classes are over-represented, this definition would result in a significant reduction of the allowable harvest. The OMNR has defined sustained yield as providing a continuous and predictable supply of timber to industry (OEAB, 1994).

In terms of tenure, the Crown Timber Act sets out three management unit types. On Crown Management Units the OMNR prepares the timber management plan, and may carry out operations or licence operations to private companies on a short-term basis. On Company Management Units, timber industry companies which are given exclusive rights to conduct operations on a particular unit prepare the plans and carry out harvest activities, while the OMNR is responsible for regeneration. Together the Crown and Company Management Units account for about 30 percent of commercially productive Crown forest lands in Ontario.

Forests administered under Forest Management Agreements (FMAs) cover 70 percent of land licenced for commercial timber production in Ontario. FMAs give responsibility for harvest and regeneration activities to the timber industry. Industry prepares the management plan according to OMNR guidelines, and the plan is subject to OMNR approval. Silviculture activities are carried out by industry according to standards and practices set out by the OMNR, and these activities are funded by the OMNR. FMAs are subject to a performance review every five years, and compliance monitoring of activities is mandatory. However, there are no formal standards or guidelines for measuring compliance or determining penalties for non-compliance.

Funding for regeneration is set by the OMNR and Cabinet on an annual basis.

No firm financial commitment for regeneration exists in the Act, and funds come from general revenue. Funding has declined from \$45.6 million in 1990/91, to \$39.7 million in 1991/92, to \$33.4 million in 1992/93 (OEAB, 1994).

A Policy for the Integration of Other Resource Values in Timber Management (OMNR-Policy and Planning Secretariat, 1985a):

This policy sets out the rationale and administrative requirements for dealing with non-timber values in the context of timber management. This policy defines the problem leading to the need for the policy as an excess of timber tied up in unnecessary reserves. Prior to this policy the OMNR designated standard-sized reserves, usually 400 feet, around shorelines and travel corridors, to accommodate other values such as fisheries, scenic views and habitat. The OMNR determined that these reserves were not always appropriate for protecting these values, and they tied up merchantable timber. Therefore, the goal of this policy was to increase the amount of timber available for harvest, while protecting other values and contributing to their management. This was to be accomplished by determining site-specific solutions. The process is detailed in an addendum, which describes the 'Areas of Concern' planning process.

The primary method used by the OMNR for protecting non-timber values lies with the management of so-called 'Areas of Concern' (AOCs). AOCs are geographically defined sites wherein other forest values that may be affected by timber operations are located. These areas are identified for each FMU, and comprehensive planning must take place for each AOC. It is worth examining the selection process and management

The provision for other uses is dealt with primarily under the AOC planning process detailed above. The AOC planning process was developed to protect non-timber values, but management of the forest outside the AOCs will also affect non-timber values. Much of the Timber Management Planning Manual covers management of the forest subject to normal operations. The plan for timber operations is generally developed by or under the supervision of an experienced, professional forester in the employ of the timber company. Information is kept by the company and by the OMNR on current forest conditions and the results of previous activities. Timber management plans must set out in advance the entire silvicultural system for each area to be logged, including harvest method, site preparation, type of regeneration, and tending activities. The use of the appropriate silvicultural guides, developed by the OMNR using current scientific knowledge, is mandatory (OEAB, 1994). These guidelines are technical in nature, and do not deal with broader issues such as the maintenance of biodiversity. In addition, the plans are developed only in the context of the individual forest management unit, rather than looking at planning that is optimal for the province.

Timber Management Manuals and Guidelines:

The many provincial manuals and guidelines for forest management, a list of which is contained in Table 4.3, were developed as tools to guide professional and technical staff of the OMNR and the timber industry, while allowing for flexibility of management dictated by different forest conditions. All of these documents were developed exclusively by the OMNR, with the exception of the guidelines for tourism

FIGURE 4.3
INTEGRATING OTHER VALUES IN TIMBER MANAGEMENT PLANNING

(adapted from OMNR, 1987b, p.11)

Band Councils, native communities and organizations, and individual members of the public with a known interest in timber management planning for the particular management unit (OEAB, 1994). General public notices are placed in local media. Participants may comment on identified AOCs, make suggestions for other AOCs, and here and later in the process they may suggest management prescriptions for the AOCs.

At this stage, the five-year operational plan is created, and AOCs within the operational areas are identified. Again, opportunities for the identification of specific AOCs are provided for other government ministries, the tourism industry, interest groups, and the public at large. Next, a map of AOCs is created, which can be superimposed on the maps which portray areas of proposed timber operations. It is accompanied by a description of the resource value to be protected.

All areas outside the AOCs are termed areas of normal operations and are not subject to comprehensive planning, but there are environmental guidelines for practices in these areas which must be followed. AOCs are subject to comprehensive planning. This means that a decision must be made for each AOC as to what timber operations can be carried out while still protecting the non-timber value. First, the question is asked as to whether timber operations can be carried out, while protecting the resource value. Then, if operations can be carried out, the nature of the operations must be determined. As illustrated in Figure 4.3, the choices are normal operations, modified operations, no operation, or modified access provisions.

Operational prescriptions for some specialized areas, many of which become AOCs, are set out in various management guidelines, operational manuals, and habitat

manuals. It is mandatory to use these manuals and guidelines, which are discussed more fully at the end of this section, in the preparation of the timber plans. The choice of management prescriptions used in each AOC is made by the timber company with the approval of the OMNR. Details of the evaluation of the different management options must be documented in the plan. Public consultation at this point in the process allows for comments on the chosen prescriptions, but the final decision is in the hands of the OMNR. A request for a 'bump-up' requiring an environmental assessment for a particular AOC is the only recourse the public has if there is disagreement as to a management decision.

Management prescriptions for AOCs are not permanent, but remain in place only for the period of the five-year operational plan. However, compliance monitoring by OMNR staff is required for every AOC for which modified operations have been designated, so there is some assurance that the prescription will be followed for the five-year period.

Timber Management Planning Manual (OMNR, 1986a):

This document could be said to have the most direct effect on how forests are managed in Ontario, as it prescribes the form and content of timber management plans. The 1986 version of the manual replaced earlier manuals used for different tenure systems, after the OMNR decided to go from short-term operational plans to 20-year renewable management plans. In addition, the passage of the Ontario Environmental Assessment Act in 1975 pointed to a need to modify management to allow for public

consultation and environmental considerations.

Timber management plans, known as forest management agreements when covering Forest Management Agreement forests, are documents that indicate where and when timber operations will be carried out, and how the operations will be conducted. They cover a twenty-year time horizon, and are renewable every five years. Areas suitable for timber operations are identified for the full twenty years. A more detailed plan, including scheduled harvest and regeneration activities, covers a five-year period, and specific work schedules are determined annually. A plan is created for each forest management unit (FMU).

The goal of forest management as identified in the Manual is the same as that identified in the regional and district planning documents: "to provide for an optimum continuous contribution to the economy by forest-based industries consistent with sound environmental practices, and to provide for other uses of the forest" (OMNR, 1986a, p.1). The aim of timber plans is to ensure a continuous flow of timber products, but it is also the policy of the OMNR to recognize and take into account other resource values in addition to timber values when making decisions about timber operations (OMNR, 1986a). However, the Manual explicitly states that although the timber production objective can be stated quantitatively, the other objectives, of sound environmental practices and providing for other uses, can only be described in qualitative terms (OMNR, 1986). In fact, these latter two elements of the goal statement are not dealt with as objectives in the Manual, but rather they are described as constraints to timber production.

TABLE 4.3 TIMBER MANAGEMENT MANUALS AND GUIDELINES

TYPE OF DOCUMENT	SPECIFIC MANUAL/GUIDELINE
Silvicultural Guides	<p>A Silvicultural Guide to the Jack Pine Working Group</p> <p>A Silvicultural Guide to the Spruce Working Group</p> <p>A Silvicultural Guide to the Poplar Working Group</p> <p>A Silvicultural Guide to the Tolerant Hardwoods Working Group</p>
Operational Manuals	<p>Aerial Spraying for Forest Management- An Operational Manual</p> <p>Resource Access Roads Policy and Implementation Strategies and Guidelines</p> <p>Prescribed Burn Planning Manual</p> <p>Environmental Guidelines for Access Roads and Water Crossings</p> <p>Code of Practice for Timber Management Operations in Riparian Areas*</p>
Guidelines for Non-Timber Values	<p>Timber Management Guidelines for the Protection of Tourism Values*</p> <p>Timber Management Guidelines for the Protection of Cultural Heritage Resources*</p> <p>Timber Management Guidelines for the Protection of Fish Habitat*</p> <p>Timber Management Guidelines for the Provision of Moose Habitat*</p>
Habitat Management Guidelines	<p>Management Guidelines and Recommendations for Osprey in Ontario</p> <p>Habitat Management for Ontario's Forest Nesting Accipiters, Buteos, and Eagles</p> <p>Habitat Management Guidelines for Cavity Nesting Birds in Ontario</p> <p>Management Guidelines for the Protection of Heronries in Ontario</p> <p>Habitat Management Guidelines for Warblers of Ontario's Northern Coniferous Forests, Mixed Forests, or Southern Hardwood Forests</p> <p>Habitat Management Guidelines for Bats of Ontario</p> <p>Bald Eagle Habitat Management Guidelines</p> <p>Bald Eagle and Golden Hawk Habitat Management Guidelines</p>

(adapted from OEAB, 1994, pp.502-503) (*- summarized in Section 4.5)

values and cultural and heritage resources. The use of these manuals and guidelines is mandatory. Several of these manuals address NTV issues directly, and these are discussed in more detail than those which have a less direct impact on NTVs.

a) Silvicultural Guides and Operational Manuals

Silvicultural guides describe the characteristics of different tree species and the accepted silvicultural practices relating to each. They are used to develop silvicultural ground rules specific to each management unit (OEAB, 1994). There is no linkage between units, so overall provincial objectives for particular species are not targeted within the units. Also, there are questions about the effects of newer harvesting methods such as full-tree harvesting which are not addressed in these manuals. This is important, as the use of this system has expanded from 15% of harvest in 1985 to 64% of harvest in 1989, and it may be higher now (OEAB, 1994, p.185).

Operational manuals cover aerial spraying of insecticides and herbicides, fire management, building of access roads, and operations in riparian areas. Regarding aerial spraying, all pesticides are approved under the Pesticides Act, and the OMNR's policy is to use alternatives to chemicals where feasible. This manual also sets out the sizes of buffer zones that must be used around areas being sprayed, and requirements for giving notice about spraying operations. The Prescribed Burn Planning Manual is primarily technical in nature and does not relate to the subject of this thesis.

The guidelines for access roads and for timber management in riparian areas address environmental concerns. The access road guidelines were developed to address erosion and sedimentation problems, and mitigation measures such as seeding slopes.

using rip-rap, and installing drainage ditches are suggested.

The Code of Practice for Timber Management in Riparian Areas (OMNR, 1991b) was developed after a need to expressly protect water quality was identified by the OMNR and the Ministry of the Environment through the environmental assessment process. Its goal is described as protecting water quality by describing good forestry practices to be performed in riparian areas. It sets out factors to be considered, including slope, soil characteristics, vegetative cover, season of operation, and equipment to be used. It lists several specific prescriptions, such as the elimination of felling trees or depositing debris into water bodies, and following slope contours for harvest operations. However, the document is very broad in nature, stressing items for consideration rather than specific prescriptions.

b) Guidelines for Non-Timber Values and Habitat Management Guidelines

The guidelines for the protection of other values in timber management were developed to help implement OMNR's IRM policy and the subsequent policy for integrating other resource values in timber management. These guidelines identify a range of methods by which the effects of timber operations can be prevented, minimized, or mitigated.

Currently, there are guidelines for only four non-timber values: tourism, cultural heritage resources, moose habitat, and fish habitat. These are supplemented by a number of more technical habitat management guidelines which are limited to bird and bat habitats. The choice of what values should be covered by these guidelines is made internally by the OMNR. The choice is determined by the social or economic

importance of the resource value, the significance of possible effects of timber management, and whether the value is commonly found across a large area of the province and is amenable to provincial as opposed to a local, site-specific approach (OMNR, 1987a).

The Timber Management Guidelines for the Protection of Tourism Values (OMNR, 1987b) describe the previous policy of maintaining standard 400 foot reserves as a waste of valuable timber and a way of avoiding true management responsibility. The guidelines were developed to help implement government policy regarding the integration of resource management and to provide guidance for site-specific solutions. The guidelines, developed by the OMNR in consultation with the Ministry of Tourism and Recreation, describe the process that must be followed while planning timber operations in identified tourism AOCs. Application of this process, including consultation with the tourism industry, is mandatory, but no specific prescriptions are mandatory.

The principles to be applied to protect tourism values mainly relate to maintaining visual quality and the appearance of remoteness. The landscape within the AOC is to be analyzed for visual quality. Suggestions are given as to how to maintain this quality, through the location, size, and shape of cuts, reserves, and regeneration blocks, and timing operations for noise control. There are suggestions for determining locations where no timber operations should be carried out.

The Timber Management Guidelines for the Protection of Cultural and Heritage Resources (OMNR, 1991a) were developed in conjunction with the Ministry of Culture

and Communications and are similar in nature to the tourism guidelines. The process for determining appropriate management strategies for identified AOCs is described, and prescriptions such as restricting or delaying harvest are suggested. Cultural heritage resources are defined, and different categories of these resources are identified. Potential effects of timber management activities are described. The planning process for identifying these resources is described, as is the process for determining specific timber management prescriptions for identified sites. A number of alternative management prescriptions are described.

The Timber Management Guidelines for the Protection of Fish Habitat (OMNR, 1988c) are the most detailed of the guidelines, perhaps because the Ministry is the lead agency administering the federal Fisheries Act, which prohibits any undertaking that results in harmful alteration to fish habitat (OMNR, 1988c). Managing fisheries has historically been one of the main duties of the OMNR, whose fisheries department has identified the economic and social benefits from fish as being of significant importance (OMNR, 1988c).

Even with this long history of fisheries management, there is little information available for Ontario regarding the effects of timber management activities on fish habitat, although the Guidelines state that studies elsewhere indicate there are potential harmful effects. The Guidelines discuss fish habitat requirements and the potential effects of timber activities, as well as factors that will influence decisions about these activities. Management prescriptions such as reserves related to the slope of shorelines, the limitation of activities around trout lakes, and a limit to harvest of 50 percent of the

shoreline of non-trout lakes, are given. Although these guidelines affect only lakes of 10 ha or larger, it is believed that this, in conjunction with the practices for riparian areas, will be sufficient to protect fisheries.

The Timber Management Guidelines for the Provision of Moose Habitat (OMNR, 1988d) are also quite detailed, reflecting again the long history of the management of game species by the OMNR. These guidelines, which affect the boreal forest, and guidelines for deer habitat (in development), which affect the Great Lakes-St. Lawrence forests, are part of what the Ministry refers to as a 'featured-species' approach to habitat management (OEAB, 1994). It is believed that following these guidelines will protect the habitat of approximately 70 percent of the wildlife in the managed forest areas of Ontario. Wildlife requiring specialized, unique habitats are not covered by this approach.

Specifically, the moose guidelines were developed to provide rather than simply protect moose habitat, because of a concern about declining populations. Specific prescriptions are given, including maintaining a 120 metre reserve around aquatic feeding sites, having clearcuts restricted to 30 ha to 130 ha in areas of high moose production capability, and restricting clearcuts to 260 ha in the remainder of moose habitat areas. These cutting restrictions can only be exceeded under unusual circumstances, such as insect infestation, and these cases must all be documented.

The habitat management guidelines are restricted to coverage of habitats for a number of bird species and bats. They are technical manuals which suggest timber management strategies which relate primarily to harvesting whereby trees in which the

identified species are nesting are protected from harvest.

4.6 Summary

Ontario's forest policies have evolved over many decades, and are still evolving. The 1990s are an active phase in forest policy development. It is apparent that policies apply at several spatial scales. At the broadest Provincial Policy level, documents tend to be of a more general nature, and give direction to planning at the lower levels by describing general goals and a philosophy towards resource management. At the Regional and District levels, goals are refined and specific objectives for individual resources are determined. At the Resource Management level, provincial manuals and guidelines give specific directions for the creation of forest management plans which are created for each forest management unit. These plans are to be used to fulfil the goals and objectives set out in the Regional and District levels.

CHAPTER 5

EVALUATION OF ONTARIO'S FOREST POLICY

This chapter presents the analysis of the extent to which non-timber values are considered in Ontario's forest policy. Section 5.1 provides a review of the research strategy used in the thesis. Section 5.2 contains evaluations of the non-timber dimensions in the policy documents at each of the three levels of Ontario's forest policy. The next section reviews the policy in aggregate from an NTV perspective, illustrating the degree to which Ontario forest policies collectively address each of the NTVs. Section 5.4 examines the level of policy integration. Section 5.5 ends the chapter with a summary of the main findings of this policy analysis.

5.1 Research Strategy Review

The purpose of this thesis is to evaluate the extent to which OMNR's forest policy addresses NTVs in forest management. Several steps were necessary to perform this evaluation. An evaluation framework and evaluation criteria had to be devised, non-timber values had to be identified, and existing forest policies had to be described.

There are many approaches to policy evaluation, but the approach most appropriate for this evaluation focuses on policy development rather than the more conventional evaluations which examine the results of policies (Chapter 2, Fig. 2.2). To this end, an approach was chosen which has both an ethical and a rational component. An evaluation that is concerned with what should be in a policy is inherently ethical, and this thesis makes the point that forests are resources which are publicly owned, and

therefore should be managed in a way which reflects the values of the public. At the same time, it is necessary to determine the nature of these values, and the nature of the relationship between the forest, forest management, and the identified NTVs. This involves a more empirical or rational assessment of forest values.

The identification of NTVs relevant for Ontario, tourism and recreation, cultural and spiritual values, old growth forests, wildlife, biodiversity, and life-support systems, was completed in Chapter 3. The next research component involved identifying and describing the elements of Ontario's forest policy documents as they relate to NTVs, which was the subject of Chapter 4. Finally, the policy evaluation framework set up in Chapter 2 is employed to guide the evaluation of Ontario forest policy outlined in Chapter 4 relative to the NTVs identified in Chapter 3. This analysis of Ontario's forest policy is presented here in Chapter 5.

5.2 Ontario Forest Policy Evaluation

The evaluation of the individual policies utilizes two sets of evaluation criteria, described in Section 2.4.2. The level of NTV coverage is described and ratings are assigned for each document. The ratings are displayed in three tables, one for each policy level: Provincial Policy Evaluation (Table 5.1, p.129), Regional and District Planning Evaluation (Table 5.2, p.135), and Resource Management Planning (Forestry) Evaluation (Table 5.3, p.139). In addition, where individual policy elements can be identified within the documents, the elements are evaluated according to the criteria set out in Section 2.4.2.

5.2.1 Evaluation of Provincial Policies

Statement of Philosophy on Integrated Resource Management (OMNR, 1985b)

The overall goals expressed in this document are to optimize benefits and minimize land use conflicts arising out of resource use. It supports IRM as a means to allow and plan for multiple uses of the land base.

In this approach, human use of resources appears to take priority over environmental health. Resource values which have economic benefits for human users, including tourism and some wildlife-related activities, are addressed as part of IRM, whereas more qualitative values such as old growth forests or biodiversity receive less attention. The brief mention of environmental impacts indicates the environmental components of resources are subservient to the utilization of resources. Although social and environmental impacts are to be taken into account, there is no indication as to how this should be done, whereas the steps for integrating management of resource use are explicit. Optimization of benefits, which is not defined but appears to refer to economic benefits, is paramount. Overall, NTVs tend to be beyond the scope of this IRM statement. It is more concerned with administration of resources to provide economic benefits, and only implicitly addresses issues relating to tourism and recreation and wildlife.

Direction 90's (OMNR, 1991c)

The problem definition in Direction 90's refers only very generally to a change in perception of natural resources, a concern about possible overuse of resources, and

TABLE 5.1 PROVINCIAL POLICIES EVALUATION

Policy Document	Non-Timber Value					
	Tourism and Recreation	Cultural and Spiritual Values	Old Growth Forests	Wildlife	Biodiversity	Life-Support Systems
Statement of Philosophy on IRM	1	0	0	1	0	0
Direction 90's	1	1	1	1	2	3
Sustainable Forests/ Canada Forest Accord	1	2	1	2	2	2
Policy Framework for Sustainable Forests	2	2	1	2	2	3

KEY:

3: comprehensive coverage

2: explicit but incomplete coverage

1: implicit incomplete coverage

0: no coverage

(R): coverage only in research directives

(Note: evaluation process and criteria are presented in Section 2.4.2.)

growing conflicts about resource use. It does not specifically refer to the importance of or protection of NTVs, but does imply a recognition that resource management should take into account new perceptions and values, and the views of different users of natural resources. However, the absence of a comprehensive problem definition makes it less likely that all problem dimensions will be addressed.

The policy indicates that the solution to these problems lies with the practice of sustainable development, and states that OMNR's new goal is to contribute to the environmental, social and economic well-being of Ontario through the sustainable development of its natural resources. Direction 90's clearly places priority on maintaining the viability of the resource. Sustainable development includes ensuring ecosystem health, which directly addresses life-support values and indirectly addresses some wildlife habitat concerns. Another principle of sustainable development is the preservation of biodiversity. Tourism, old growth forests, and cultural and spiritual values could only be said to be included in this policy by the broadest interpretation.

Strategies described in the policy relate primarily to acquiring knowledge about natural resources and about the values people place on resources. Given that this is intended to be a document that guides the direction of more specific resource policies, it is not surprising that implementation strategies are not included.

It is difficult to determine from this document how the OMNR perceives the problems it wants to solve. There is neither a clear statement defining the new views on resource management, nor is there an indication of why conflicts are occurring. It is clear that the Ministry wants to address the question about over-use of resources,

although the terminology indicates that there is some question as to whether resources are in fact being over-utilized.

An additional flaw in the policy is the lack of linkages between the goals and defined problems. However, the document does point the way towards consideration of multiple values and new perspectives in resource management. Direction 90's clearly places a priority on the maintenance of life-support systems and also identifies the importance of biodiversity. The other four NTVs, tourism and recreation, cultural and spiritual values, old growth forests and wildlife are addressed only indirectly in this policy.

Sustainable Forests: A Canadian Commitment (CCFM, 1992a) and Canada Forest Accord (CCFM, 1992c)

The problem definition in these policies refers only to a change in public attitude towards forests, but this is indicative of a recognition of the importance of public values in resource management. The goal statement gives priority to maintaining the long-term health of forest ecosystems, while also indicating the importance of economic, social and cultural values of the forest. Of the six NTVs identified in Chapter 3, there are goals directly related to life-support (defined in the document as 'ecological processes'), biodiversity, cultural values and wildlife.

Although these goals are not translated into quantified objectives, these policies do articulate strategies for achieving the goals, with the objective of meeting these goals within five years. For life-support goals, the strategies involve completing an ecological

classification of forested lands and establishing measurable objectives for the state of the forest. A definition for biodiversity is to be developed. The documents direct that wildlife conditions and environmental conditions such as soil quality are to be taken into account in forest management plans.

These policies do not specifically mention tourism and recreation values or old growth forests. They could, however, be said to be covered indirectly, under goals for economic, social and cultural opportunities, and maintaining ecological processes. Nonetheless, the protection or provision of these values is less likely to be a priority as they are not explicitly mentioned. These policies do not develop strategies for protecting cultural and spiritual values, and these NTVs are not considered indirectly in the strategy statements for other NTVs.

More generally, these policies refer to establishing measurable targets for an optimal mix of uses. The term 'optimal' is not defined, but the policies recognize the importance of accommodating multiple users of Ontario's forests. This also indicates that priorities for different uses must be determined, although it is clear that any usage comes second to maintaining a healthy forest ecosystem. Overall, these two documents directly address cultural and spiritual values, wildlife, biodiversity and life-support systems, although the coverage is not comprehensive. Tourism and recreation and old growth forests are only covered indirectly.

Policy Framework for Sustainable Forests (OMNR, 1994b)

Problems identified in this policy include public dissatisfaction with resource management, a need to address newly identified issues and attitudes, and a need to bring forest policies in line with Direction 90's. These problems can all be addressed, according to this policy, by directing forest management by the principles of sustainable development. NTVs explicitly addressed by this policy are life-support systems (called ecological processes in this document), biodiversity, wildlife (covered under 'non-timber forest goods' in this document), cultural and spiritual values, and tourism. Recreation and old growth forests are not considered.

Maintenance of the health of the forest ecosystems and ecological processes is the primary goal expressed in this document. The policy goes into more detail regarding the protection of this value than any other. Specifically, the framework identifies the need for understanding ecosystem processes and establishing targets for ecosystem conditions, and directs that forests be managed to protect air, soil and water. This is to be accomplished by ensuring that management actions mimic natural disturbances and landscape patterns.

The policy does not address the fact that management on an ecosystem basis would require a significant change in forest management units (FMUs). Existing FMUs are not devised on an ecosystem basis, nor are OMNR regional and district boundaries. Furthermore, the current licencing system locks the province into a long-term renewable tenure system and the opportunity to restructure the FMUs along ecosystem boundaries is quite limited over the short-term. Overall, this could prove to be a serious barrier to

the establishment of a forest management system based on ecosystem properties. Hence, the transition to forest ecosystem management units is impeded by prevailing institutional structures as well as an incomplete knowledge of forest ecosystem functions.

NTVs other than life-support functions are not dealt with comprehensively by the OMNR sustainable forestry framework. The policy does state that forest management must include objectives for protecting or providing for other values, but it does not establish which agencies should be charged with ensuring these NTVs are considered in provincial forest policy. Forest managers should not be expected to establish targets for values such as tourism and wildlife, so there is a need for mechanisms that explicitly link forest policy to other resource policies. However, the Policy Framework for Sustainable Forests does not suggest implicitly or explicitly means for linking either resource policies or policy levels to ensure that the full range of timber and non-timber values are considered in the forest management process. This lack of direction in the area of multi-resource linkages at the highest level of Ontario's forest policy could have serious implications for the future development of such links. A lack of commitment at this level would make it unlikely that such links would be established.

5.2.2 Evaluation of Regional and District Planning

Strategic Land Use Plans (SLUPs) and District Land Use Guidelines (DLUGs) contain goals, objectives and strategies for natural resources under the jurisdiction of the OMNR. The documents state that the overall goal of the OMNR is to provide opportunities for outdoor recreation and resource development, while protecting public

TABLE 5.2 REGIONAL AND DISTRICT PLANNING EVALUATION

Policy Document	Non-Timber Value					
	Tourism and Recreation	Cultural and Spiritual Values	Old Growth Forests	Wildlife	Biodiversity	Life-Support Systems
SLUPs and DLUGs	3	2	0	2	0	1

KEY:

3: comprehensive coverage

2: explicit but incomplete coverage

1: implicit incomplete coverage

0: no coverage

(R): coverage only in research directives

(Note: evaluation process and criteria are described in Section 2.4.2)

lands and waters.

In the sections on forestry, timber production is the main goal, and the only measurable objective. NTVs are barely mentioned. However, several NTVs are treated as resources in their own right and are dealt with in separate sections.

The goal for tourism is to provide economic benefits while recognizing the carrying capacity of the environment. Potential management issues such as increased access reducing the sense of remoteness, conflicts with other resource users and a need for scenic beauty are recognized. Specific policies for planning access roads for forestry

indicate that tourism and recreation needs must be taken into account. Areas identified as important scenic resources may be designated as modified management areas, although it is made clear that this is not to preclude timber harvest activities. Furthermore, the SLUPs and DLUGs do not provide adequate mechanisms for avoiding potential conflicts between noise from routine forestry operations and recreational activities.

Cultural and spiritual values are identified in several sections of the SLUPs and DLUGs, although no goals or objectives are given for them. The only strategy for protecting them is to identify special sites or features with the input of the Ministry of Citizenship and Culture, and to designate them as possible modified management areas. There is no reference to the special needs of aboriginal peoples, and the timber access roads policy does not address cultural needs for isolation.

Wildlife is dealt with extensively in separate sections on commercial fur, fisheries, and wildlife. In all cases, the goals stress the economic benefits of wildlife. Other than endangered species, only commercial or sport species are dealt with explicitly. Objectives are given for population sizes and harvest numbers, or, in the case of fisheries, for numbers of fishing opportunities. There are also peripheral references to viewing opportunities, and scientific, educational, aesthetic and cultural benefits, but there are no quantified objectives for them. The primary strategy to reach wildlife objectives is to protect or manipulate habitat. References to managing forestry activities include preventing the deposition of material into water bodies and maintaining a variety of vegetation and age-classes in the forest. Problems related to access are dealt with by including input from wildlife managers in locating access roads. Specialized habitats are

to be protected by identifying them as modified management areas. Note that although forestry activities are mentioned in the wildlife sections, wildlife is not referred to in the forestry sections.

There are sections for general policies on both the environment and lands and waters, and it might be expected that overall environmental health, and by extension life-support values, would be explicit goals in these sections. In the environment section there is a statement that the OMNR is committed to maintaining or improving environmental quality at a broad level. However, the goal is to minimize adverse environmental impacts or rehabilitate areas as required where new developments are undertaken. Even stronger is the statement that the OMNR's paramount concern in lands and waters is allocation to ensure most efficient use and highest revenues. Conservation is subservient to orderly development. In this context, the protection or maintenance of life-support systems is acknowledged but viewed as subservient to economic utilization of Ontario's natural resources.

The other two NTVs, old growth forests and biodiversity, are not considered, directly or indirectly, in the SLUPs and DLUGs. These values have been identified as priorities only recently, so it is not surprising that they are not included in policies that were developed in the 1970's and early 1980's.

A number of NTVs are recognized in these documents, and there is an attempt to integrate the management of the different resources, but the integration occurs only at a superficial level. There is some recognition that particular management activities can affect other resources, such as timber harvesting effects on moose habitat. However,

there is no recognition of how overall resource management strategies used to achieve stated objectives will affect other resources. For example, timber production targets are not related to the size of the area that will be cut and the impact this will have on the amount or type of habitat available. Renewal activities that will support harvest targets yet maintain habitat are not referred to. In addition, there is no link between the necessity for planning timber access roads and the role of the forest in providing tourism and wildlife opportunities.

Another weakness is that the plans cover only those resources which are quantifiable and that have traditionally been managed by the OMNR such as tourism and economically beneficial wildlife species. The goals and objectives of the SLUPs and DLUGs are therefore very narrowly defined. Given the consistent stress placed on optimum use and economic benefits, and a lack of stress on environmental health, it is easy to see that management priorities under these documents would favor resource utilization over conservation when conflicts occur.

5.2.3 Evaluation of Resource Management Planning (Forestry)

Sustainable Forestry Program (OMNR, 1993b)

Although this policy is intended to address conflicts arising out of competing demands on the forest, most of the strategies described relate to increasing knowledge about the forest and its use rather than explicitly mediating or resolving conflicts. In terms of NTVs, the policy identifies projects relating to life-support systems, biodiversity and old growth forests, but does not address tourism and recreation or cultural and

TABLE 5.3 RESOURCE MANAGEMENT PLANNING (FORESTRY) EVALUATION

Policy Document	Non-Timber Value					
	Tourism and Recreation	Cultural and Spiritual Values	Old Growth Forests	Wildlife	Biodiversity	Life-Support Systems
Sustainable Forestry Program	0	0	2(R)	1(R)	2(R)	2(R)
Crown Timber Act	-	-	-	-	-	-
Policy for the Integration of Other Resource Values in Timber Management	1	1	0	1	0	0
Timber Management Planning Manual	1	1	1	1	1	1
Timber Management Manuals and Guidelines	3	2	0	2	0	1

KEY:

3: comprehensive coverage

2: explicit but incomplete coverage

1: implicit incomplete coverage

0: no coverage

(R): coverage only in research directives

-: addresses only timber issues; affects but does not address NTVs

(Note: evaluation process and criteria are described in Section 2.4.2.)

spiritual values and addresses wildlife in a very limited manner.

The program describes studies which would provide an economic quantification of NTVs. The rationale underpinning the need for economic assessments of NTVs is not stated explicitly, but it would presumably be used to establish a basis for comparing alternative uses of the forest. It could therefore be used in the conflict resolution process by assisting with setting priorities. The document does not review the inherent limitations associated with assigning economic values to non-market benefits and it would appear that no alternatives to economic quantification are being explored.

Research to support forest management includes classification of forests on an ecosystem basis, finding alternatives to chemical pesticides, and determining the role of old growth forests in ecosystem functioning. Biodiversity projects include developing guidelines for measuring genetic diversity and studying the implications of silvicultural activities for diversity. Regarding old growth forests, studies are being undertaken to determine their nature and importance, the effects of ecosystem fragmentation, and possible conservation and management strategies for red and white pine.

Cultural and spiritual values and tourism and recreation are not covered by this policy, and wildlife is only mentioned in the context of the implications of herbicide use on food source quantity and quality. It must be noted that there are other agencies (the Ministry of Culture and Communications, the Ministry of Tourism and Recreation, and the wildlife branch of the OMNR respectively) whose responsibility it is to gather data on these values, so their omission in this program is to be expected. However, the Sustainable Forestry Program does not provide a mechanism by which other agencies or

policies can be linked to forest policy.

Crown Timber Act, Revised Statutes of Ontario, 1980, Chapter 109, as amended by 1986, Chapter 64, s.11 (Government of Ontario, 1990b)

This Act is the only legislation governing forest management in Ontario. As it relates almost exclusively to timber production, it is an indication of the priority placed on the timber dimensions of the forest resource. It affects NTVs indirectly by governing tenure systems and silvicultural funding. It provides for a tenure system in which the preparation of forest management plans is in the hands of the timber industry for the majority of FMUs, with checks and balances supplied by the OMNR. The Act designates the timber industry as responsible for the content of forest management plans, with OMNR responsibility limited to ensuring its guidelines are followed. The nature of the tenure system, in which industries are given twenty-year leases which are renewable indefinitely, places additional control in the hands of the timber industry.

The Act sets funding guidelines for silviculture. Funding is determined annually on the basis of available funding rather than by considering a regeneration to harvest ratio, landscape rehabilitation, or any biological needs. As is evident from Chapter 3, silvicultural activities are recognized as being absolutely essential for the protection of many NTVs and so the lack of a permanent, predictable, legislated funding mechanism for silviculture is a major weakness in Ontario's forest policy.

A Policy for the Integration of Other Resource Values in Timber Management (OMNR Policy and Planning Secretariat, 1985a)

The problem definition in this policy states explicitly that too much timber was being tied up in permanent standard-sized reserves, which were used to protect non-timber resource values. These reserves prevented any timber operations from occurring. The assumption was made that non-timber forest resource values could be protected while being subject to timber management operations, although forest operations might have to be modified to account for NTVs. Clearly, this policy was designed to protect timber production rather than NTVs. The planning process for identifying other values and determining appropriate timber management strategies in these areas relies on identifying Areas of Concern (AOCs). Additional information on the AOC process is presented in Section 4.5, but briefly, the process is based on selecting identifiable sites in which NTVs that could be affected by timber operations are located, and then developing timber management strategies to protect the NTV.

There are a number of problems with this method of protecting NTVs. First of all, it can only be used to protect values that are associated with particular sites. This would exclude values such as biodiversity and life-support, and would be difficult to use to protect habitats of wide-ranging species, such as wolves. Also, the NTVs are not being managed to enhance broader objectives for the use of Ontario's forest resources. In this context, NTVs are treated strictly as constraints to timber harvest. A third concern is the absence of guidelines establishing when NTV concerns ought to prevail in decisions regarding timber operations. Under these arrangements, decisions regarding

NTVs are largely discretionary and made on an ad-hoc, site specific basis. The approach clearly removes NTVs from the broader context of managing forests for multiple uses.

Another implication of site-specific decision-making is that choices are not made in the context of broader provincial goals for the forest resource. The actual integration of timber management and NTVs occurs at this local plan level, but provincial procedures to guide these decisions are presently incomplete. Forest managers are required to consult provincial procedures as part of the forest management process, but there is considerable latitude in the application of the guidelines and recommended procedures for identifying and protecting AOCs, and therefore the guidelines can be applied unevenly. Currently, the emphasis is on consideration of NTVs within the AOC context, rather than explicitly ensuring that NTVs are protected.

Finally, the process for identifying AOCs is problematic. Information previously gathered by the OMNR during the regional and district planning exercise is used extensively in this process. This information was originally gathered for internal use by the OMNR and it was used in conjunction with traditional OMNR management activities such as management of game species. Information relating to other NTVs is not well represented in these OMNR files. Although this deficiency is moderated to some extent by public consultation, the public cannot be expected to independently fund and execute data collection programs for other NTVs. Also, public consultation is usually limited to the local forest management area and therefore NTVs relating to broader spatial issues such as biodiversity and life-support may not be identified at this level.

Timber Management Planning Manual (OMNR, 1986a)

This manual views the forest resource explicitly from a timber perspective with a goal of maintaining a continuous contribution to the economy by forest-based industries. It also refers to 'sound environmental practices' and 'providing for other uses of the forest' but these perspectives are secondary to timber management. The manual states that objectives for timber must be quantified in timber management plans, but other goals for forest management can only be described in qualitative terms. The distinction between quantitatively and qualitatively specified goals reinforces the importance of timber values over NTVs. Arguments based on qualitative data are inevitably easier to refute and ignore. In addition, timber management is cast in the context of objectives whereas NTVs, even in the limited context of this manual, are described only as broad goals. This means that it is more difficult to create management strategies for achieving NTV goals than for reaching explicit, measurable timber objectives.

With regards to timber management, the manual does not address issues relating to clearcut sizes and shapes, protection of older stands or particular species, ecosystem fragmentation, site impoverishment, or maintenance of existing age classes and species mixes. There is no reference to ecosystem maintenance or management, which is not surprising given that management plans are for areas which are not ecosystem-based. Other timber management activities identified in Chapter 3 as affecting or having the potential to affect NTVs, such as siting access roads, pesticide use, and timber operations in environmentally sensitive areas, are discussed mainly within the context of maintaining industrial timber supplies. Some of these are dealt with more explicitly in the various

management manuals and guidelines, discussed in the following section.

Timber Management Manuals and Guidelines (OMNR, various) (Refer to Table 4.3 in Chapter 4 for a complete list of manuals and guidelines.)

a) Silvicultural Guides and Operational Manuals:

The silvicultural guides present recommended practices for harvesting, regeneration and tending operations and are written relative to different forest species, such as jack pine, spruce and poplar. They are used to develop detailed operational plans for each FMU. The manuals provide no guidance for co-ordinating operational plans among FMUs and overall provincial objectives for particular tree species are not targeted to specific units. Under these institutional arrangements the guidelines are not capable of addressing broadly based issues relating to biodiversity. Also, there are questions about the environmental effects of newer systems such as full-tree harvesting which are not addressed in these manuals. This is important as the use of this harvesting system has expanded from 15 percent of harvest in 1985 to 64 percent of harvest in 1989 (OEAB, 1994). The silvicultural guides do not specifically address management of old growth forests, and therefore do not provide mechanisms for addressing this NTV.

The manual for aerial spraying addresses environmental health and safety concerns by restricting the choice of pesticides to those approved under the Pesticides Act, and prescribing buffer zones and notice requirements. However, concerns about long-term indirect effects on animal populations are not addressed.

The guidelines for roads and operations in riparian areas address environmental

concerns, and in particular erosion and sedimentation problems. Although these guidelines do not refer explicitly to protection of life-support systems, they do cover a limited number of the forest management concerns which can impact this NTV. The guidelines for operations in riparian areas (together with those for the protection of fish habitat) require consideration of slope, soil and vegetative cover. The guidelines for roads do not consider implications of increased access for tourism, wildlife or cultural values.

b) Guidelines for Non-Timber Values and Habitat Management Guidelines

The Timber Management Guidelines for the Protection of Tourism Values (OMNR, 1987b) explicitly recognize the importance of the tourism industry, and the necessity of maintaining the visual quality of the forest and the sense of remoteness. The manual outlines several ways of managing timber harvesting in areas adjacent to tourism and recreation sites, including protecting scenic views from harvesting, having clearcuts follow landform contours and angling cut strips to prevent views into clearcut areas. The manual also recommends where forest reserves would be most appropriate. This includes areas immediately adjacent to tourist accommodations, scenic navigable channels and scenic tourist roads. Guidelines for managing noise impacts, including restricting timber operations to times when tourism and recreation activities are not occurring and the identification of 'tolerable' noise levels, are included in the document. The guidelines describe the potential for harming tourism operations by providing increased access through timber access roads and discusses measures for closing the roads by removing culverts or adding berms across entryways. The guidelines do not discuss the

preservation of old growth stands which have been identified as a tourist attraction.

The guidelines also make clear the fact that both the timber industry and the tourism industry have a responsibility for ensuring that the guidelines work. Timber managers must take into account tourism values, and the tourism industry must identify and define forest values important to their sector and provide advice on timber management strategies. Collaboration between the two industries is essential.

The Timber Management Guidelines for the Protection of Cultural Heritage Resources (OMNR, 1991a) recognize the importance of the forest as a location of cultural sites, although the document refers specifically to use-sites which can be defined geographically. It therefore does not recognize those cultural and spiritual values which depend on the general health of the forest ecosystem. Adverse effects of timber operations on cultural and heritage sites are identified, including destruction from road building, harvesting, site preparation and regeneration. Increased access is said to have the potential effect of increasing damage from vandalism, but threats to cultural identities owing to increased access are not mentioned. Needs of aboriginal communities are not given special consideration in the guidelines.

Management strategies to protect cultural heritage resources are limited to protecting geographically defined sites through the AOC planning process. However, the document goes beyond suggesting the employment of particular management strategies, and describes strategies for improving the database of cultural sites, awareness of these values by timber managers, and awareness of the timber management planning process by heritage planners. To enlarge the database, heritage planners are to be assigned to

be part of the timber management planning process and consultation with the Ministry of Culture and Communications, heritage organizations, and native groups is mandatory.

Overall, this document addresses cultural and spiritual elements of NTVs which are directly tied to specific sites but it fails to cover more broadly-based values relating to the overall health of the forest and the role of healthy forest ecosystems in protecting cultural and spiritual values.

The Timber Management Guidelines for the Protection of Fish Habitat (OMNR, 1988c), the Timber Management Guidelines for the Provision of Moose Habitat (OMNR, 1988d), and the various Habitat Management Manuals (OMNR, various dates), all relate to wildlife as defined in Chapter 3. The guidelines for fish habitat, together with those for managing operations in riparian areas, are expected to protect aquatic species and help contribute to the protection of animals which rely on a clean water supply. The guidelines are specific about operations on sloped sites, sites with sensitive soils and poorly vegetated sites when they are in close proximity to a body of water. More general guidelines cover water bodies which are crucial habitat for commercial and/or sport fish. Species of fish which do not have a recognized economic value are not explicitly covered by the guidelines and neither are animals such as amphibians, although many will be protected as they rely on similar elements of the environment as support commercial and sport fisheries.

The guidelines for moose habitat recognize that timber operations can damage moose habitat, but also have the potential to increase it. The guidelines specify maximum sizes for clearcuts, provisions for travel corridors, sites where reserves are

necessary, regeneration prescriptions and access road restrictions. They incorporate specific moose population objectives, established by the wildlife department of the OMNR, although they are not translated to the scale of forest management units.

The various Habitat Management Guidelines provide specific management prescriptions for protecting the habitats of specific bird and bat species which have been identified as being at risk from timber operations. No mammals or other animals which require specialized habitats are covered by the guidelines.

These guidelines do not explicitly recognize the importance of wildlife except in an economic sense. They are directed towards protection of particular habitat elements for individual species and do not address issues of forest size and diversity. Forest fragmentation and conversion of forests to different species through regeneration efforts are not discussed, and damage to sensitive areas is only covered in the context of riparian areas. Although there is some evidence of planning coordination between the forestry and wildlife branches of the OMNR, it may be this has helped to reinforce the priority given to economically important species, particularly those related to hunting and fishing.

The timber management guidelines and manuals for the protection of NTVs are limited in number and focus. Tourism and recreation are covered comprehensively in the guidelines, as are those cultural heritage resources which can be geographically defined. Old growth forests and biodiversity are not covered in any guidelines. Few elements of life-support systems are addressed and then only in a limited manner, through the protection of water resources in the guidelines for protecting fish habitat. The guidelines for wildlife habitat relate primarily to the protection of economically

beneficial species. None of the guidelines explicitly identify objectives for NTVs. Rather, the guidelines treat the protection of NTVs as a constraint to industrial timber production.

5.3 An NTV Perspective

Analysis presented in Section 5.2 evaluated specific OMNR forest policies. While this approach allows for a systematic assessment of individual policies, it does not provide insight into the extent to which the policies in aggregate recognize NTVs. Table 5.4 draws upon the previous analyses and illustrates the degree to which NTVs are represented at each policy level. An examination of OMNR forest policy from the perspective of each of the NTVs follows in this section.

5.3.1 Tourism and Recreation

Tourism and recreation are not addressed explicitly by Provincial level policies. However, the tenets of sustainable development promoted at this level would theoretically support the maintenance of these activities as part of a diverse economy which does not adversely affect the environment in a significant way. The promotion of an ecologically intact environment does not necessarily address the dimension of visual quality which is a key element of tourism and recreation activities. While a certain amount of clearcutting, for example, may not impair ecological functions, it could have a significant effect on how the forest is perceived by those expecting a pristine environment in which to pursue their activities.

TABLE 5.4 SUMMARY OF NTV COVERAGE IN ONTARIO'S FOREST POLICY

Policy Level	Non-Timber Value					
	Tourism and Recreation	Cultural and Spiritual Values	Old Growth Forests	Wildlife	Biodiversity	Life-Support Systems
Provincial Policies	1	2	2	1	2	3
Regional and District Planning	3	2	0	2	0	1
Resource Management Planning	3	2	2(R)	2/1(R)	2(R)	1/ 2(R)

KEY:

3: comprehensive coverage

2: explicit but incomplete coverage

1: implicit incomplete coverage

0: no coverage

(R): coverage only in research directives

(Note: evaluation process and criteria are described in Section 2.4.2.)

Both the Regional and District Planning and the Resource Management Planning levels deal with tourism and recreation explicitly. At both levels, economic benefits stemming from tourism and recreation are recognized. SLUPs and DLUGs present explicit and quantitative objectives for selected tourism and recreation activities, and identify the forest as an important element for the provision of these activities. Maintaining the visual quality of the forest and a sense of remoteness, and anticipating

potential problems with access roads are identified as forest management issues. Opportunities exist for both the tourism industry and the Ministry of Tourism and Recreation, as well as local users of the forest resource, to provide input into the forest management process by identifying tourism and recreation areas and suggesting harvesting, access, and regeneration prescriptions that would not conflict with tourism and recreation opportunities.

Not addressed at any level is the concern about maintaining old growth, which is considered to be a tourist attraction, although this is dealt with in another context. Similarly, the nature and amount of regeneration, also identified as forest management issues which affect tourism and recreation values, is not addressed in Ontario's forest policy. Until some mechanism exists to secure funding for regeneration activities, it is unlikely that this issue will be resolved.

Tourism and recreation are dealt with comprehensively at the Regional and District and Resource Management levels in Ontario's forest policy, and only indirectly at the Provincial level. The OMNR has a long history of managing for tourism and recreation values as well as for timber, so this may account for the relatively thorough coverage of these NTVs in forest policy. Relative to other NTVs, tourism and recreation receives the most thorough coverage in Ontario's forest policies.

OMNR's historical involvement in tourism and recreation may also account for the explicit statement of responsibility in the tourism guidelines, ie, the tourism industry must identify and define the values for its activities, and the forest managers must collaborate with industry to find management solutions. Another contributing factor is

that most tourism and recreation values can be geographically defined and can therefore be managed by the traditional means employed by the OMNR through the AOC planning process. Overall most of the dimensions of tourism and recreation identified in Chapter 3 have been addressed in Ontario's forest policy, including maintaining visual quality of the forest, consideration of the implications of logging roads on remote tourism sites, and managing forestry operations to reduce the impacts of industry-generated noise. Issues related to protecting older stands and to increasing regeneration efforts were not addressed.

5.3.2 Cultural and Spiritual Values

Cultural and spiritual values are identified as important dimensions of the forest landscape within Provincial level policies but no quantitative objectives regarding the provision of these values and no strategies for protecting cultural and spiritual values are articulated. This policy level stresses the importance of maintaining forest ecologies and biodiversity, which, if implemented, would address a number of dimensions of cultural and spiritual values identified in Chapter 3. Cultural and spiritual values which depend on the overall health of the forest resource would be addressed by these policies. These include the cultural needs of many aboriginal groups which are tied to traditional activities such as trapping, fishing, and gathering medicinal plants.

The approach of maintaining ecological health and biodiversity in the forest is not carried through to the rest of the forest policies. SLUPs, DLUGs and the cultural heritage resource guidelines call for the identification of individual sites that are

significant with respect to cultural and spiritual values. Once identified, these sites can then be the subject of specific management prescriptions, including protection from harvesting and planning forestry roads to avoid the sites. These policies address most of the concerns related to cultural and spiritual values which can be geographically determined. In particular, input is sought from aboriginal groups, other local groups with an interest in cultural heritage resources, and the Ministry of Culture and Communications for identifying cultural heritage sites and determining timber management prescriptions which will protect the sites.

Although both elements of cultural and spiritual values, that is, the general ecological health of the forest environment and the protection of specific sites, are addressed, coverage of this value could not be said to be comprehensive. As yet, there are no objectives or strategies in place to protect forest ecology, but ongoing research is directed at defining and classifying forest ecosystems and biodiversity. Until there are more specific management directions in place, these values will not necessarily be protected. Policies for protecting specific sites define strategies for protection but do not contain measurable objectives for management so that evaluating the long-term success in protecting cultural and spiritual values is problematic.

Overall, all three policy levels are assessed as having explicit but incomplete coverage of cultural and spiritual values but for differing reasons. At the Provincial level, this evaluation is based on the fact that policies address cultural and spiritual values related to ecosystem health and biodiversity, although objectives and strategies for protecting cultural and spiritual values are not articulated. At the other two levels, this

assessment reflects the fact that strategies for protecting cultural and spiritual values which are linked to specific sites are defined, but values dependent on forest ecosystem health are not addressed.

5.3.3 Old Growth Forests

Provincial level policies identify old growth forests as an important element of the forest, although the reasons for this designation are not elaborated. There is a recognition that old growth means different things to different people, and that criteria for old growth may vary from species to species. The Provincial policies indicate that there is a need for defining old growth and this is addressed at the Resource Management Planning policy level under the Sustainable Forestry Program. In addition, studies have been designed under the Sustainable Forestry Program to determine the role of old growth in the broader forest ecosystem and effects of fragmentation on old growth stands. These studies are ongoing and therefore on-the-ground management directives are not yet in place.

The only existing strategy for protecting old growth forests is the designation of individual stands under the AOC provisions. This is clearly a temporary measure, as stands change over time. The AOC system does not address the necessity of protecting all successional stages, and it is more likely to address local concerns than provincial priorities. Until a definition exists and provincial objectives are determined and translated to the management unit level, old growth forests remain at risk. This lack of clearly stated objectives is the basis for an overall evaluation of explicit but incomplete

coverage at the Provincial and Resource Management policy levels. Regional and District level policies do not presently address issues relating to old growth forests.

5.3.4 Wildlife

The identification and protection of wildlife values in forest policy is uneven, although the OMNR has traditionally managed both wildlife and forests. Species with commercial value are the subject of the most comprehensive protection, whereas other non-commercial species receive considerably less attention.

Wildlife is referred to only peripherally at the Provincial level. However, directives to maintain ecological integrity and preserve biodiversity indirectly contribute to the protection of essential habitat properties for most species. In addition, research through the Sustainable Forestry Program addresses issues of fragmentation and site impoverishment, two other key habitat properties. Until these policies are translated into more specific objectives and management strategies, they will probably lack effectiveness. The implicit inclusion of wildlife at the Provincial level suggests a continued interest in this NTV, but the absence of more specific objectives suggests wildlife is not fully protected by policies at this most senior level.

At the Regional and District Planning and Resource Management Planning levels, specific objectives and strategies do exist, but they affect a limited number of wildlife species. Commercial and endangered species of mammals, birds and fish are given quantified targets for each region and district, and strategies for reaching the targets are described. Presently there are guidelines for timber management to protect fish habitat,

moose habitat, riparian areas, and some specialized bird and bat habitats. This species by species approach has obvious limitations. Although there is some overlap in habitat requirements between species, this approach is unlikely to cover all habitat requirements.

Several dimensions of the wildlife value do not appear to be addressed at all. These include concerns about ecological conversion of the forest and the effects of increased access on human-intolerant species. The issue of ecological conversion is most appropriately dealt with at the provincial level, although guidelines will have to be translated to the spatial scale of the forest management unit. Funding for regeneration activities would have to be secure. The problem of access may have to be dealt with through the designation of wilderness reserves, which is outside the responsibilities of forest managers.

This problem of jurisdiction and shared or differentiated responsibilities is not addressed within the context of protecting wildlife values in the forest. Clearly, it is necessary for these responsibilities to be made explicit. Forest managers cannot make decisions about habitat protection without information on habitat requirements. Alternatively, it should be a shared decision as to whether ecosystem management would provide better wildlife protection, and if so, how this can be accomplished.

Overall, Provincial level policies are assessed as having implicit and incomplete coverage of wildlife values because those dimensions of wildlife protection related to habitat are addressed through the goals of maintaining ecological integrity and biodiversity, but no specific objectives for wildlife are articulated. Explicit but incomplete coverage of wildlife values occurs at the other two policy levels because

specific objectives and strategies for wildlife are described, but they relate to a limited number of wildlife species.

5.3.5 Biodiversity

Biodiversity has been identified as a key element of the forest at the Provincial Policy level, but as yet no management objectives or strategies for protection are in place. The Sustainable Forestry Program has research initiatives to develop guidelines for biodiversity and to determine the implications for silvicultural activities. These initiatives are still at the research stage. Regional and District Management policies and Resource Management Planning policies do not as yet address the issue of biodiversity beyond the development of research strategies.

Biodiversity has only recently been identified as a NTV, and this is reflected in Ontario's forest policy. Until the nature of its importance is more fully understood and until a practical definition can be determined, it will be difficult to manage for this value. However, evidence already exists that ecological conversion is taking place in the boreal forest, and steps could be taken to manage harvesting and regeneration so that species which are planted are the same as those which were harvested. Again, this requires a commitment to artificial regeneration which will be difficult to ensure until secure silvicultural funding is in place.

5.3.6 Life-Support Systems

This NTV is recognized as the key forest value in Provincial level policies. At this level greater emphasis is placed on this NTV than on any of the other five NTVs. Maintaining ecosystem processes is consistently identified as the main goal of resource management. Below this policy level, it is identified at the Resource Management level under the Sustainable Development Program as the subject of research initiatives.

The research initiatives relate mainly to gaining more knowledge about ecosystem processes, and classifying forests on an ecosystem basis. There is no strategy as yet for establishing objectives for the state of the forest and its capacity to act as a major contributor to life-support systems. A more crucial omission is that institutional barriers to ecosystem management are not identified. Existing forest tenures, which are for renewable twenty-year periods, cover forest management units which bear little resemblance to ecosystem boundaries. Changing this system would be extremely difficult, and there is no indication that any attempts are being made to even investigate the possibilities of such changes.

In the short-term, management of timber operations to minimize environmental effects will help maintain life-support systems. Comprehensive guidelines exist to protect riparian areas and water bodies, and to utilize chemical controls safely. Elsewhere in Ontario's forest policy, guidelines to maintain life-support systems are not well-developed. However, training of foresters does include environmental protection in forestry. In the long term, the lack of regulation governing the amount of regeneration activity to be performed could have serious implications for life-support systems, and in

particular those related to climatic control and carbon sequestering.

The life-support system NTV is expressed clearly and comprehensively at the Provincial Policy level, however it is not well represented at lower policy levels. Resource Management level policies provide mechanisms to undertake research into forest-related life-support systems, but this NTV does not receive comprehensive coverage at the lower two policy levels. Research initiatives into forestry and life-support systems is directed under the Sustainable Forestry Program at the Resource Management level, but this represents rather limited coverage. Regional and District Management policies are in contrast to those at the other two levels as they currently do not address life-support systems except through the most general references to maintaining environmental quality, which is clearly subservient to economic utilization of resources.

5.4 Policy Integration

To be effective, a policy or group of policies should work together to form a cohesive whole. Policy documents should express a similar philosophical context, and linkages among documents should be explicit. This is generally not the case for Ontario's forest policy.

There is a dramatic philosophical shift evident in policy documents. The newer policies, primarily the Provincial Policies and the Sustainable Forestry Program at the Resource Management Planning level, give primacy to the health of the resource. Utilization of natural resources is seen as necessary for providing economic and social

benefits, but resource use must come second to ecosystem health if these benefits are to be sustained. This philosophy is more likely to engender protection of life-support systems, biodiversity, wildlife, and some cultural and spiritual values than former policies aimed at specific subsectors in the forest resource.

The philosophy expressed at the Regional and District Planning level and the Resource Management Planning level is oriented to a greater degree than Provincial level policies to human use of resources, and in particular to economic benefits derived from resource use. The Regional and District Planning and Resource Management Planning policy levels are mandated to turn broad philosophical goals into practical objectives and strategies. At the same time, objectives are specified only for traditionally recognized, economically beneficial NTVs, such as tourism and game species. Management under this philosophy tends to be reductionist in nature, attempting to protect individual, locally identified, geographically defined values. This is in complete contrast to the philosophy of sustainable development expressed at the Provincial Policy level, which supports a holistic approach.

The conventional OMNR approach to set policy objectives for specific aspects of forestry and the holistic approach to forest management are not mutually exclusive. Some NTVs are better protected by identifying specific sites where they occur and determining management prescriptions, while other values depend on the overall health of the forest. However, there does not appear to have been an attempt to integrate the two approaches, and there is no explicit statement that both approaches are necessary. Instead, two approaches, with different and often opposing goals, exist side by side

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giving management direction.

In addition to problems with the philosophies expressed within the policies, there are problems of a more technical nature. The problem definitions in most documents at the Provincial Policy level are vague and general. In most cases the documents state that policies are stimulated by increasing conflicts between resource users and changes in perceptions about how forest resources should be used. Sources of conflicts are not identified, and new perceptions are not described. This being the case, it is often difficult to determine which specific problems the policies are attempting to solve. Policy goals are not linked explicitly to the problems they are purportedly attempting to solve, and in fact the issue of resource use conflicts is not addressed in any goals or objectives.

The goals expressed at the Provincial Policy level are very different from those expressed at the other two policy levels, as might be expected given the two different philosophies they represent. Only those goals which relate to traditional forest uses are translated into explicit, measurable objectives. This is done in the SLUPs and DLUGs and includes targets for timber production, tourism and recreation opportunities, and some wildlife populations. Management for these measurable objectives is to be accomplished through IRM, but this practice as expressed in the documents has a number of shortcomings.

First, management of different resources is not linked spatially. Tourism and recreation is managed provincially, wildlife at the regional and district levels, and forests production at the level of forest management units. Because of this, administration which is adaptive and can react to changes to the different resources is difficult. Newer policies

advocate resource management on an ecosystem basis, but necessary institutional changes have not yet been addressed.

Even within the context of forestry management itself, there are problems with the objectives. Timber targets are established by distributing the provincial wood production objective (which is for the year 2020) between the regions and then the districts (within the SLUPs and DLUGs, for the year 2000). Aggregation of timber supply potential from the forest management unit and upwards is not undertaken and therefore it is not feasible to determine whether targets can be met (Baskerville, 1986).

Strategies at the Resource Management Planning level are linked directly to timber production objectives, but not to other resource objectives. Instead, other values are treated as a constraint to timber production. Whether this continues to be an appropriate management strategy depends on whether timber production continues to be the main priority for forest management and the dominant activity on most of Ontario's forested lands. If the direction of the Provincial Policies is to be followed, objectives and strategies designed to manage forests to maintain ecological integrity, sustain or enhance biodiversity, and protect or increase old growth will have to be devised.

On the other hand, protection or enhancement of values such as tourism and recreation, cultural and spiritual values, and wildlife, which are not under the jurisdiction of forest managers and forest policy makers, require strong ties with the agencies under whose jurisdiction they fall. Linkages will have to occur laterally, between agencies, as well as vertically, within agencies. This occurs to some extent now through participation of different agencies in the AOC planning process. However, as many of these values

are important at the provincial level as well as the local level, some interaction between these agencies should occur at higher levels of the policy process in addition to the Resource Management level.

5.5 Summary

Many of the NTV dimensions identified in Chapter 3 are covered in Ontario's forest policy, but the coverage is far from comprehensive. Those values of a more general nature, which rely on overall forest health, are covered directly or indirectly at the Provincial Policy level. These include life-support systems, biodiversity, some wildlife values, and some cultural and spiritual values, and to a limited extent, old growth forests. However, these policies have yet to be translated into objectives and strategies which guide forest-level management decisions.

Those values which are more traditional, provide economic benefits, and can be defined geographically are the subject of policies at the Regional and District Planning level and the Resource Management Planning level. These values include tourism and recreation, some cultural and spiritual values, and some wildlife values. The policies contain specific objectives and strategies which guide management processes and decisions. However, the onus for identifying sites where these values occur is on people at the local forest management unit level, which will not necessarily result in provincial objectives being met.

There are problems with the integration of policies, both philosophically and technically. Provincial philosophies and goals are not translated into specific objectives;

objectives and strategies are not designed to meet provincial goals. At least part of this is due to the fact that the review of Ontario's forest policy is not complete. Research into the areas of ecosystem processes and biodiversity may result in new objectives and strategies, but these do not as yet exist. Also, there do not appear to be initiatives directed towards key areas of silvicultural funding and reforming existing tenure systems. These two areas may well be crucial for the new philosophy of sustainable development to be put into action.

CHAPTER 6

SUMMARY AND CONCLUSIONS

This chapter revisits the research context, summarizes the main findings of the thesis and suggests directions for future research.

6.1 The Research Context

Ontario's forests are expected to satisfy a wide variety of demands, which have changed over time. From the time of European settlement Ontario's forests have been viewed primarily as sources of timber. Later they also became locations for recreational activities and tourism. Now forests embody or provide many values, including tourism and recreation, cultural and spiritual values, old growth forests, wildlife, biodiversity, and life-support systems.

The majority of forested lands in Ontario are provincial Crown lands, which are managed by the Ontario Ministry of Natural Resources (OMNR). As the lands and forests are publicly owned, an increasingly vocal public has expressed a desire that management of the resource reflect their values. The importance of the forest for providing timber is generally recognized, and the OMNR has a long history of timber management. However, non-timber values of the forest have been identified more recently, and there has been criticism that OMNR's forest policy does not account for these values. Therefore, the purpose of this thesis was to determine the extent to which non-timber values (NTV)s are addressed in Ontario's forest policy. The fulfilment of four research objectives was deemed necessary to accomplish this purpose. The four

objectives related to the establishment of an appropriate research framework, the identification and description of NTVs, a summary of non-timber dimensions in Ontario's current forest policy, and the evaluation of the policy relative to identified NTVs.

6.2 Main Findings

6.2.1 Evaluation Framework

In order to evaluate Ontario's forest policy relative to exogenously defined NTVs, it was necessary to develop an appropriate evaluation framework. Conventional approaches to evaluation usually do not scrutinize how policy problems and goals are defined. Instead, conventional approaches evaluate alternative solutions for achieving stated goals, policy results, or consistency among policies, policy documents and policy elements. In the context of this thesis traditional evaluations are not suitable. It was necessary to look outside the policy process to identify NTVs which should be represented in Ontario's forest policy. Only then could Ontario's forest policies be examined from the perspective of how NTVs are considered in the policies.

The policy evaluation framework established for this thesis set out a process whereby NTVs were defined exogenously and then Ontario's forest policies were described. The policies were then evaluated relative to the identified NTVs. Criteria established for the evaluation concerned the comprehensiveness of NTV coverage, the presence or absence of characteristics within policy elements, and the presence or absence of policy linkages.

6.2.2 NTV Dimensions

A review of scientific literature and government documents revealed six broad categories of NTVs. Tourism and recreation are concerned primarily with the visual qualities of the forest resource. Cultural and spiritual values rely on the protection of individual sites within the forest but are also concerned with broader issues of forest health, particularly from an aboriginal perspective. Old growth forests have been identified as a forest element which plays a scientific and educational role, but are also the subject of emotional attachment by the public. Wildlife, which contributes to economic, spiritual, scientific and education values in Ontario, is dependent upon virtually all elements of the forest landscape. The structure and composition of forests contributes to biodiversity of both plant and animal life, and biodiversity is identified as a key requirement for stability and resiliency of ecosystems. Finally, forests are key contributors to life-support systems which are necessary for maintaining life on earth.

6.2.3 Ontario's Forest Policy

Ontario's forest policy can logically be divided into three broad levels. Provincial level policies give philosophical direction and broad, general goals which are to guide management of resources under the jurisdiction of the OMNR. Newer policies endorse sustainable development as the philosophy under which resources should be managed, whereas older policies endorse integrated resource management for primarily economic benefits. Regional and District policies, consisting mainly of land use plans, contain explicit goals and objectives for different resources in each OMNR administrative region

and district. Resource Management policies are composed of more specific strategies and function primarily to guide the creation of plans which govern the management of resources on the ground.

6.2.4 Evaluation of Ontario's Forest Policy

No single NTV is covered extensively at all policy levels of Ontario's forest policy. The Provincial Policy level expresses a relatively recent philosophical perspective towards resource management, that of sustainable development. This is a perspective which recognizes that human use of resources is necessary, but if benefits are to continue to flow from resources then the resources themselves must be protected. Under this perspective human use of resources is allowed only to the extent it does not compromise the health and function of the resource. The goal expressed in the Provincial level policies is to maintain the health of the resource. The NTV addressed most comprehensively at this policy level is life-support systems. Biodiversity, old growth forests and cultural and spiritual values are covered less comprehensively, and tourism and recreation and wildlife are addressed only indirectly.

The goals expressed at the Provincial Policy level have not been translated into objectives and strategies, and therefore on-the-ground management practices are unlikely to reflect the stated philosophy. The philosophy of sustainable development was only adopted by the OMNR in 1991 (1994 for forestry specifically), and it is directed towards managing resource elements which are not well understood, such as biodiversity and ecosystem functions. Also, because these elements are difficult to quantify and cannot

for the most part be geographically defined, it is difficult to determine measurable objectives and plan management strategies to protect them. For this reason, research has been directed towards understanding biodiversity and life-support values.

The two lower policy levels, Regional and District Planning and Resource Management Planning (excepting the Sustainable Forestry Program), reflect a management philosophy which promotes human use of resources. Under this philosophy, resources are managed to provide benefits, particularly economic benefits, to human users. Although there is some indication that management of forest resources is to recognize resource production limits, management tends to be driven by demands for timber-related resources. This reflects the view of resource management which was generally accepted up until the last decade. NTVs which are covered at the Regional and District Planning and Resource Management Planning levels include tourism and recreation, cultural and spiritual sites, and wildlife values related to activities such as fishing and hunting. Other NTVs, such as life-support systems, receive an implicit recognition, whereas old growth forests and biodiversity are addressed only in research components at the lower two policy levels.

Specific objectives and detailed management strategies exist at the lower two policy levels, making it more likely that management practices will reflect management philosophies that promote resource utility. However, there are differences between the two levels as well. Objectives expressed for NTVs in the SLUPs and DLUGs at the Regional and District Planning level become constraints to timber production at the Resource Management Planning level. This is indicative of a continuing bias towards

timber management rather than forest management by the OMNR.

The only quantified objectives for forestry in the Resource Management Planning documents are for timber production. The only legislation relates to timber production. Timber production figures tend to be demand-driven rather than based on environmental considerations including the productive capacity of the forest. The Crown Timber Act (Government of Ontario, 1990a) focuses on amount of harvest rather than governing regeneration. These factors pose serious constraints to effective management for NTVs.

Other constraints to protecting NTVs exist in Ontario's forest policy. Links between policy levels are weak. This is due in part to the fact that Provincial Policies are new and the other policy levels have yet to be reviewed and restructured according to adjustments in the upper level policies. However, other problems relating to the management of Ontario's forests are more fundamental. Forest resources and the use of forests are managed at a variety of spatial scales, making it difficult to ensure that the full range of timber and non-timber objectives for use of the forest resource are considered in an integrated fashion. Newer policies recommend that resource management should be handled at the scale of ecosystems but institutional constraints such as long-term forest tenure commitments impede such a transition.

Another issue which has not been fully addressed in Ontario's forest policy is the necessity for linkages among resource management agencies. There are explicit requirements for cooperation between tourism and forestry agencies and between cultural resource and forestry agencies. Similar statements designating responsibilities have not been made with regards to wildlife, old growth forests, biodiversity and life-support:

systems.

Throughout Ontario's forest policy there is a clear indication that NTVs are recognized and that timber management practices can affect these values. What is not made clear is the delineation of responsibilities for defining the different values, setting objectives and determining different forest management prescriptions. It was evident from Chapter 3 that the public has high expectations with respect to forest management. However, it may be that some of these expectations should be fulfilled by agencies outside the forest management domain, or by other agencies working in cooperation with forest managers. Given that public criticisms have influenced policy changes to some degree, public education in the area of jurisdictional issues in forestry could be addressed within the framework of forest policy.

Ontario has made a conscious effort to address NTVs in its forest policy. Coverage of tourism and recreation is quite comprehensive. Geographically defined dimensions of cultural and spiritual values are addressed, as are economically important dimensions of wildlife. Coverage of more recently identified NTVs such as old growth forests, biodiversity and life-support systems is less comprehensive, although new resource management philosophies indicate that this may change in the future. However, difficulties arising from management at different spatial scales, problems with linkages between policies, existing institutional arrangements and a lack of clarity in defining responsibilities may compromise the effectiveness of policy coverage of NTVs.

6.3 Extensions

This investigation reveals that NTV coverage in Ontario's forest policy is neither complete nor comprehensive, and indicates that other avenues may have to be explored with regards to the protection of NTVs. There are questions relating to the integration of NTVs and forest management that this thesis does not address but which could be investigated to add to the understanding of NTV protection. A brief discussion of these other avenues follows.

Constraints to NTV Coverage

The findings in this thesis indicate that demands for the protection of NTVs in forest management in Ontario are growing but existing coverage of these values is far from complete. There may be a number of reasons for this condition. Constraints to NTV coverage in forest policy could include a lack of knowledge about NTVs or a strong timber bias by forest policy-makers and managers, for example. In addition, political pressure by the forest industry, pressure from forest resource-dependent communities or a fear of the loss of revenues from timber production could also contribute to a lack of NTV coverage.

Perhaps the key element in this regard is the demand for timber and timber products. As long as the demand continues to grow, NTVs which are in conflict with timber operations will be difficult to protect. This is a complex issue which extends beyond the bounds of forest management and forest policy. Reducing timber demand has implications for international trade, provincial revenues and local employment, among

others. All of these should be understood if the interaction between timber demand and NTV protection is to be addressed.

The Question of Priority

Making decisions about the use of a scarce resource, particularly one such as a forest which is expected to satisfy a broad range of often incompatible uses, requires assigning priorities to the different uses. This issue has several facets. There is the question of who should determine the priorities. Several of the NTVs identified in this thesis, including life-support systems and biodiversity, have significance on a large, even global scale. Others, such as tourism, may have more significance at the local level. Priorities may vary from region to region. The determination of the scale at which priorities should be assigned is crucial for developing management policies which can address NTVs.

A second facet of this issue is the determination of the priorities themselves. Because of the importance and strong presence of the timber industry in Ontario, priorities would have to be established not only among NTVs but also between NTVs and timber production. If the demand for timber and the jobs and revenues it produces is deemed to be paramount then forest management will be very different than if values such as life-support systems are deemed to be of the highest priority.

Non-Crown Land Forests

This thesis deals specifically with policies for Crown lands in Ontario, but the provision of NTVs on non-Crown lands such as private or municipal lands could also be explored. Although non-Crown land forests make up a relatively small portion of forest lands in Ontario, they tend to be concentrated in the southern part of the province closer to population centres, and therefore could be critical resources with respect to the provision of recreational and tourism opportunities, for example. Research into what values these forests could potentially satisfy and the extent to which non-Crown forests could contribute to satisfying non-timber demands on Ontario's forests would be valuable.

Exploring Forest Management Practices

For reasons expressed in Chapters 1 and 2, research in this thesis was restricted to the stages of policy formulation rather than policy implementation. The determination must also be made as to whether forest management practices follow forest policies. The level of concern about forest management expressed by the public and the media may indicate that the level of protection for some NTVs as expressed in forest policy is not being carried through to actual forest management practices. Conversely, it may be that policies are being followed but they are insufficient for providing the expected level of protection. Research in these areas could help to determine whether changes should be made in policy directions or in the implementation, monitoring and enforcement of policies.

APPENDIX 1**ACRONYMS**

ANSI	Areas of Natural and Scientific Interest
AOC	Areas of Concern
CCFM	Canadian Council of Forest Ministers
CWF	Canadian Wildlife Federation
FFT	Forests for Tomorrow
FMA	Forest Management Agreement
FMU	Forest Management Unit
IRM	Integrated Resource Management
NTV	Non-Timber Value
OEAB	Ontario Environmental Assessment Board
OFAH	Ontario Federation of Anglers and Hunters
OFPP	Ontario Forest Policy Panel
OGPAC	Old Growth Policy Advisory Committee
OMNR	Ontario Ministry of Natural Resources
ORTEE	Ontario Round Table on Environment and Economy

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