IMPROVING FOREST LANDSCAPE MANAGEMENT IN BRITISH COLUMBIA: AN ATTITUDE SURVEY OF PROFESSIONAL FORESTERS

By

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ABSTRACT

Professional foresters, with their forestry programs and policies, have the complex task of managing the physical and visual forest environment in accordance with societal values, needs, and expectations. Since the introduction of a Ministry program on forest landscape management in British Columbia, very few attempts have been made to assess its impact on lay public and foresters. This study contributes to gaining a better understanding of professionals' opinions and attitudes towards forest landscape management by surveying foresters on a variety of issues. Two major objectives are to provide guidance for further improvements based on foresters' insights and to propose research needs in landscape management. The survey involved the design of a mail questionnaire in which eight hypotheses were tested. A sample of 300 professional foresters registered in British Columbia was randomly selected and contacted in the summer of 1986. After three months and two follow-up letters, 90 percent of them had returned a completed questionnaire.

The excellent response rate, overall and in each forest region, shows that foresters are concerned about forest landscape management. However, a very large majority admitted they had a relatively low level of knowledge of landscape management concepts, program, and policy. This was partly explained by the lack of information (including training programs and courses on landscape management) pertinent to British Columbia. In addition, the professional forestry school and the Ministry of Forests and Lands have not been very successful in promoting forest landscape management among the members of the profession. Considering that half of the foresters felt that it is highly important to have more training programs through continuing education, more university and technical courses, more field workshops, and more trained personnel for the purpose of improving landscape management, it is suggested that forestry schools and the Ministry provide more opportunities for professional education on the subject.

Not only is there a need for professional education in forest landscape management topics, but the study suggests that the public should be educated as well: nearly every forester felt that the general public has a poor understanding of forest management issues. The perceived lack of public understanding explains to a certain extent why close to half of the foresters felt that it is not very important to have more public participation in the planning process, despite the fact that about the same proportion indicated that the present level of public input into forest management decisions is not very satisfactory.

Finally, the study indicates a need for more professional involvement in forestry program development and improvement. For example, a large majority of foresters, including nearly half of the industry foresters, felt that not enough consideration is given to landscape management in forest harvesting decisions. A large majority, including a majority of those employed in the forest industry, felt that it is very important that the industry be more involved with forest landscape management. It appears, however, that more incentives are necessary to expect a reasonable level of involvement.

Responses and comments suggest that most foresters in British Columbia support forest landscape management. However, this widespread support is tempered with concerns about the potential and real impacts of landscape management on various forestry and social aspects. In summary, the overall findings point to a need for evaluating these impacts in economic, social, ecological, and technical terms and at both, the provincial and regional scale.

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CHAPTER I

INTRODUCTION

1.1 Thesis Overview

Forestry has long been a traditional profession, having its roots in the established archetypal needs of society: shelter, food, water, fuel, lumber, paper, fish and wildlife, recreation, and range. While these needs persist, their place in the social and economic structure has been greatly affected by society's changing values and expectations for its environmental, psychological, and economic requirements. Today, society is increasingly aware of and concerned about the quality of the forest environment as an ecological, social, and visual resource (Daniel and Boster, 1976; Hendee, 1984; Hough, 1984; Environment Canada, 1986a, 1986b).

The importance of managing the visual quality of forest landscapes has only been recently recognized in British Columbian forestry. Forest landscape management (FLM) concepts, principles, and techniques have been introduced by the Ministry of Forests and Lands in the form of a program which is supported by forest policy (B.C. Ministry of Forests, 1981, 1982).

The impact of FLM on the lay public, the perceived beneficiary of landscape management activities, and on the professional forester, the intermediary between these activities and the public, has yet to be measured in British Columbia. Although it is necessary to understand people's perceptions of managed and unmanaged forest landscapes, it is also essential to gauge foresters' attitudes towards the program and policy used to manage these landscapes. After all, it is the professional foresters, with their forestry tools, program and legislation, that have the complex task of integrating the management of the physical and visual resources with societal values, needs, and expectations. Knowledge from this professional group and the integration of foresters into program development leads to more sensitive, precise perceptions of causes of forest resources use conflicts, and more responsive

processes and improvement of forestry tools for solving land-use conflicts. The research described in this thesis contributes to both points by surveying and analyzing foresters' opinions and attitudes regarding a variety of issues related to FLM.

This thesis is organized into five chapters. This first chapter puts FLM into perspective and provides background information by relating the evolution of British Columbian forest landscapes, the rise of public concerns for the quality of these landscapes, and the key roles that professional foresters play in harmonizing economic growth with environmental concerns in forest management[1]. This overview leads to the research problems, goals and objectives, basic assumptions, and scope and limitations of the study.

The second chapter presents the theoretical rationale of the research problems that led to the survey design. It reviews relevant literature in four major areas: environmental quality, public perceptions of and attitudes towards the natural environment, the need for integrating the visual resource in forest management, and professional foresters' attitudes towards different FLM issues.

Chapter III, "Research Design", describes the research strategy adopted for this study and the major steps taken to design and implement the survey. It also presents the statistical plan for its analysis. The survey analysis and its interpretation is presented in Chapter IV, which also provides sections on response rates over time and the professional profile of the participants.

Finally, Chapter V summarizes the major findings and discusses the implications of this research for future improvements of forest landscape management in British Columbia.

1.2 Background

1.2.1 Evolution of British Columbia Forest Landscapes

The forests of British Columbia have played, without a doubt, a key role in the economic and social development of the province. There is also no question that the visual

[1]Appendix I presents more background information by defining key terms and briefly discussing theoretical notions relating to the purposes of this thesis.

character of the British Columbian (and Canadian) forests has been significantly modified since the time of European settlement, some 300 years ago.

The factors contributing to this visual change can be categorized as natural forces such as wild fires, insects, disease, landslides, and climate, and human forces which include mainly harvesting and related management practices[2], conversion of forests to other uses, utility/transport corridors, fires (i.e. neglect, arson, slashburn escape), dams and reservoirs, and pollution.

A report on the state of the Canadian environment (Environment Canada, 1986a) mentions that the major impact of forest management activities in Canada has been on the steep slopes of the Montane Cordillera ecozone, which encompasses most of British Columbia and the Eastern slopes of Alberta, and where over one-third of the harvesting is on a gradient greater than 51%. Such a gradient makes the landscape very visible so the predominance of timber harvesting, especially on the scale and by the methods used in British Columbia, has a great impact upon the forest landscapes.

1.2.2 Conflicts in Forest Management

Many Canadian studies have shown the ever-increasing awareness and concern of society for the state of the natural environment and the development of the resources (e.g. B.C. Ministry of Environment, 1982; Canadian Forestry Service, 1986; Environment Canada, 1986a, 1986b).

In British Columbia, this continuous growth of public concerns and criticisms has been particularly strong for the development of forest resources. Seven main interrelated but distinct reasons may explain why this situation has developed over time: (1) an increase in population has created a greater demand for and pressure on the resources and more opinions about how resources should be used; (2) the cumulative effects of intensive timber extraction has created serious and large scale environmental problems (e.g. water quality); (3) forest environments adjacent to urban areas have been gradually disappearing because of economic

[2]Related impacts of forest harvesting include forest roads and skidroads, which create strong linear and colour contrasts in the landscape, landings, and certain silvicultural practices.

and social development; (4) people's opportunity to visit the forests has increased considerably due to more leisure time, greater wealth, and improved transportation networks which have facilitated accessibility[3]; (5) more education; (6) better communication; and (7) societal values, needs and expectations towards the environment have changed significantly over the past decade.

With regard to this last point, much more people are seeking to enjoy the beauty, wildlife, recreational opportunities, and spiritual quality of life associated with forest landscapes (Canadian Forestry Service, 1986). In fact, the second largest industry in the province, tourism (B.C. Ministry of Tourism, Recreation, and Culture, 1987), is based largely upon the scenic attractions and outdoor recreational opportunities provided by the diverse biophysical background (Brooks, 1979). Thus, legitimate concerns for landscape quality[4] have become more and more important through the years as people come to expect living conditions, or simply experiences in natural environments that satisfy their needs for physical and mental well-being.

The shifting values in British Columbian and Canadian society have also placed new demands on the forest industry, all levels of government, and institutions in general, which "...go beyond simple economic performance" (Canadian Forestry Service, 1973). Indeed, one of the basic difficulties is that these shifts in attitudes have been occurring at different rates among different public and professional groups, agencies, and even in different regions of the country. Consequently, the absence of a common value system has created conflicts and has made decision-making and management by both the industry and government extremely difficult and highly controversial.

Conflicts also arise out of inappropriate decisions or managerial errors. A lack of information on landscape perception and management can lead to wrong or irrational decisions. In addition, conflicts arise from inappropriate solutions to problems. For example, foresters work with a particular set of tools; they establish standards and guidelines for

[3]To this effect, Dearden (1983) rightly points out the ironic fact that forest roads are partly responsible for the greater public awareness and criticism over harvesting practices, by leading large numbers of people to previously inaccessible forest areas.

[4]See definition of "visual quality" in Appendix I.

management practices; and often, decisions are based only on economic feasibility, perhaps because of a long established tradition. Many environmental problems could be avoided if more time was given to various development alternatives, to various blends, mixes, or alternative forms, shapes, patterns, and locations (Twiss, 1969). In support of this fact, the "State of the Environment Report for Canada" points out that "sound economic planning and sound environmental management do not,..., conflict; rather, they reinforce each other" (Environment Canada, 1986a, p.3), and this is for the benefit of both the natural and social environment. In addition, the Royal Commission on the Economic Union and Development Prospects for Canada (1985) reports:

> "... in Canada, with its rich resource heritage, there is no conflict, in the long term, between the stewardship, preservation and enhancement of the natural resource base and the growth prospects for the traditional resource industries. Consequently, we perceive a vital need to integrate environmental decisions and decisions related to economic development".

The increasing public concerns over the state or quality of the forest environment can be further interpreted as a reaction to the negative visual impacts that certain forest management practices create upon sensitive visual landscapes. Berntsen (1980) points this out by declaring "... the element of the environment that first gave rise to public concern about forest management (practices) was that of adverse visual effects" (p.2). For example, a major forest land issue in British Columbia is clearcutting and this controversy stems primarily from its adverse visual impact. In fact, "no other system of producing a forest leaves such a conspicuous mark on the landscape" (U.S.D.A. Forest Service, 1974, p.III-6).

A well-managed forest landscape can be visually attractive, but it is also true that inappropriate or poor practices in forest management can result in visual blights. With time, these adverse visual impacts become a rallying point, one to which other elements of environmental quality become attached, and these visual symbols have the potential to create unnecessary social conflicts and harm the forestry profession. Consequently, the visual management of forest landscapes has become a salient issue in forestry because a large segment of the population judges (or misjudges) forestry on the sole basis of visual perception, vague notions and feelings, and limited experience.

Therefore, it can be deducted that forest resources and land-use conflicts are landscape management conflicts. The long history of timber harvesting in British Columbia combined with the more recent growing public concerns about resource/land uses, ecology, and conservation have tended to polarize attitudes and opinions among the professional groups, forest industry, government, interest groups, and general public. For example, controversies such as those involving the South Moresby Islands, Meares Island, and the Stein Valley serve as significant indications that forest and resource management practices need to be more harmonious with public interests and social values in the natural environment.

1.2.3 The Need for Integrating Visual Resource in Forest Management

Unfortunately, one forestry response to environmental conflict has been avoidance. For many years, because of actual and perceived demands for the more tangible resource benefits specifically attached to timber, the importance of non-timber values in forest management, such as the visual landscape resource, was thought to be comparatively less. As a result, the principal forest land management agency in the province, the B.C. Ministry of Forests and Lands, concentrated its policy formulations and management efforts more towards the continued flow and availability of those more tangible benefits of products, services, and uses than towards the maintenance of the quality of the environment and of forest landscapes.

However, the changing spatial and psychological relationships of the public to the forest and its management created a need for changes in the way forests of British Columbia were managed, and the Ministry of Forests and Lands had to investigate ways to harmonize and improve the various social functions of forest management. There was a need for changes and integration of visual to timber values.

The first change occurred in the form of a major revision of the forest legislation; the year 1978 can certainly be seen as the beginning of a new era in British Columbian forestry. For the first time in the history of the province, it was officially recognized and stated that the use of the timber resource ought to be coordinated and integrated with other forest-related resources including the visual quality of forest landscapes. The fundamental concept of integrated resources management became the foundation for the revised legislation.

The revised forest legislation and the growing public awareness of the importance of forest landscapes led the B.C. Ministry of Forests and Lands to develop and introduce the FLM program in 1978. Later, the Ministry's program took the shape of a handbook (B.C. Ministry of Forests, 1981), which was followed by the release of a forest policy on Forest Landscape Management (B.C. Ministry of Forests, 1982). In doing so, the Ministry of Forests and Lands became the single most important agency responsible for managing the visual resources of the province. In short, the program, through its policy, recognized that "logging, as the major operating phase in forest management, causes considerable visible changes in the forest landscape" and also, that the same forest landscape has an important role to play in providing social benefits to the people of British Columbia (B.C. Ministry of Forest, 1982, p.1).

The changes in the forest legislation and the introduction of the new FLM program did not come at the most opportune time and without adversity. At the time of the legislation revision, the Ministry and other management agencies were plagued with other problems and issues. The increased demand for timber, water, recreation, and the preservation of lands for wilderness took its toll on the Ministry. In addition, past and present economic constraints and serious internal cutbacks have left the program with little resources (human and financial) for its development.

1.2.4 Key Roles of Foresters in Landscape Forestry

Although it is clear that the public's attitudes towards the environment are important factors in decision-making (Saarinen, 1971), little is known about how the personal attitudes of foresters influence decision-making and the managing of the forest resources. For example, the perception of managers is moulded and influenced by "technical-educational background emphasizing production, efficiency and a biological perspective" (Stankey, 1976, p.252). Foresters also have strong professional identifications which tend to shape their perception of the environment and the way it should be managed. Thus, foresters see environmental problems and solutions in terms of their personal and professional role and their views may be further narrowed to the principal concerns of the agency which employs them (Marshall, 1966).

To develop and improve a forestry program such as FLM, it appears mandatory to involve foresters and know more about their views and attitudes towards specific issues. This

involvement, in addition to raising interest, provides important insights for program improvement and indications for additional professional education.

1.3 Statement of Research Project

Professional foresters, like any members of the public, have values and expectations concerning the uses of forest landscapes. What often happens is that their views and values are perceived by many as being in opposition to those of the public. Both professionals and public views are based on some different and also some similar sets of values; both views should be seen as complementary, for the benefit of the natural and social environments.

The introduction of FLM in British Columbia has obviously created an impact upon members of the forestry profession. What is this impact? Despite the fact that the FLM program has attempted to meet the needs of the lay public, interest groups, and forest industry, very little information exists about foresters' attitudes towards it.

Moreover, there seems to be a recognized need to consider visual resource values in forest management, but the apparent reactions from the forestry profession do not appear to reflect this need. Although landscape management is already practiced, limited budgets and a seeming reluctance by many foresters and forest companies to take the program seriously have hindered real achievement. At this point, several critical questions ought be raised and answered with factual evidence:

(1) How much do foresters know about FLM?

(2) What is their degree of satisfaction regarding the ways FLM is communicated to them and the public?

(3) Do foresters perceive FLM to be important for the people of British Columbia?

(4) How much do the foresters feel the public should be involved in forest and landscape planning?

(5) Do foresters perceive FLM to be useful in forest management?

(6) Is the present Ministry's policy on FLM perceived as being satisfactory?

(7) What do the professionals feel represent drawbacks to the implementation of the program?

(8) How do foresters feel about certain suggestions that could possibly improve FLM?

The questions above are important to answer before going further with the idea of landscape management through the program implemented in British Columbia. If this program is to be effective and appropriate for the provincial context, it must be understood and accepted by the forestry profession, and also be a reflection of the societal and professional needs. Internal professional controversy could seriously dilute the positive effects of the program on quality forest management and society.

1.3.1 Goal and Objectives

The primary goal of this study is to gain a better understanding of professional foresters' attitudes towards forest landscape management (FLM) and related issues in British Columbia.

The major research objectives are to:

(1) Develop a reliable tool for surveying foresters' attitudes towards FLM issues;

(2) Determine if attitudes vary among groups of foresters;

(3) Provide guidance for improvements in FLM based on foresters' attitudes and insights;

(4) Propose research needs and priorities in FLM.

1.3.2 Scope, Limitations, and Importance of the Study

The scope of this study is reasonably broad, and includes obtaining valid information. To help answer the research questions, the study involves the survey of 300 B.C. professional foresters using a mail questionnaire. The questionnaire explores foresters' knowledge, attitudes, and general behaviour with respect to FLM issues. These three categories of information, along with professional characteristics or profiles, are used to examine a number of variables which are believed to be important factors of consideration for the improvement of FLM. Seven basic issues form the main sections of the questionnaire:

(1) Current level of knowledge on three FLM topics: concepts, program, and policy.

(2) Importance of various sources of information to foresters' knowledge.

(3) Costs related to FLM.

(4) Potential contributions of FLM to forestry and social issues.

(5) Personal involvement with FLM techniques.

(6) Attitudes towards public involvement in planning decisions.

(7) Possible improvements of various aspects of forest landscape management.

This study is more exploratory than explanatory in the sense that it is oriented primarily toward the initial formulation, development and testing of hypotheses (see Chapter III). In more practical terms, this study seeks to clarify and articulate new associations between key variables that can be generalized to the whole population of professional foresters in British Columbia.

In addition, the study revolves exclusively around professional foresters because they represent a very important link between forest landscape management, the program, and the public, the primary beneficiaries of the program goals and objectives.

Although this study provides a first step for future improvements of forest landscape management, it is clear that additional perceptual research must be done at the public level to get a full and comprehensive grasp of the state of forest landscape management in British Columbia. Also, this study does not represent a program evaluation per se in that it does not assess outcomes or impacts of the program activities on the public. In its true sense, program evaluation involves the assessment of the effectiveness to achieve goals and objectives. Clearly, this represents an entirely different study. Such a program evaluation could constitute, however, a logical follow-up to this study.

The importance of this research lies in its potential for generating empirical knowledge of relationships and patterns that will help define the present state of FLM among the forestry professionals. The survey provides timely information and fills serious gaps for future developments and improvements of FLM. The suggestions for improvements combined with priorities for future research needs will also benefit interested members of the forestry profession and more particularly, forest managers, landscape foresters, and researchers.

Another important role of the survey lies in its potential to generate awareness among those who are surveyed. An increase in awareness of FLM constitutes in itself an improvement.

1.2.3 Basic Assumptions of the Study

One of the fundamental assumptions underlying this study, as well as the forest landscape management program, is that timber harvesting and related activities, and forest scenic or visual quality values can co-exist in certain areas. It is also assumed that landscape management can assist in resolving, or at least in easing, certain conflicts in land-uses, and help to present sound management practices based on landscape ecology and social values. Knowing the degree to which foresters understand and accept FLM, and what they feel could improve the program social, professional, and economic suitability, may ultimately reduce social conflicts between the visual impact of forest management practices and different groups of society.

Thus, FLM concepts and techniques are assumed to represent important and valid tools for maintaining and improving the visual quality of the forest environment by promoting better management practices. The public may perceive forestry much more positively if good management practices are better promoted visually in the field, and verbally by the members of the forestry profession.

Finally, it is assumed that professional foresters participation in program development such as forest landscape management should favour a better understanding of its concepts, principles, and techniques. Eventually, this increased understanding should bring beneficial changes in attitudes towards the visual quality aspects of professionals' work and lead to a better acceptance of and support for forest landscape management.

CHAPTER II

ENVIRONMENTAL QUALITY AND FOREST LANDSCAPE MANAGEMENT: A LITERATURE REVIEW

2.1 Introduction

Understanding professional foresters' attitudes towards forest landscape management (FLM) and related activities in British Columbia is the main focus of this thesis. This understanding also represents one foundation for FLM improvement.

However, for the results of this study to be significant, it must also draw from and build upon the broader areas of perceptions and attitudes on environmental quality and landscape management topics, where most research has focused in the past two decades. The purpose of this chapter is to present an overview of the literature pertinent to these areas of study in the context of FLM.

This chapter is divided into three sections. The first provides a simplified framework for the complex relationships between perceptions, attitudes, the natural environment, and FLM as a management alternative of the forest environment. As well, this general framework sets the stage for the subsequent two sections.

The second section puts the general state of the natural environment into perspective by presenting perceptual and attitudinal studies on environmental quality and forest resources management. The section ends with a discussion on the need for integrating landscape management into forest planning and management for the purpose of maintaining and enhancing the visual and overall quality of the forest environment.

The third section provides a more specific overview of professional foresters' attitudes towards visual resource and FLM. It presents an historical overview of professional foresters attitudes, starting in the early 1970s, at the time of the initial concern and confrontation over

the quality and productivity of the environment, currently better known as the "environmental movement". This review covers North American foresters' viewpoints and attitudes.

2.2 A General Framework

The increased interest in environmental and natural resource management has brought with it a proliferation of studies focusing on perception of and attitude towards different aspects of environmental quality. In fact, perceptions and attitudes appear to have emerged as key concepts in understanding how humans adapt to their environment (Saarinen, 1971). They also play a significant role in decision-making (Burton, 1971). Most of these studies, however, are unilateral in the sense that they mainly concentrate on obtaining information from the lay public to help professionals in decision-making and program development. Professionals' perceptions of and attitudes towards the natural and social environment also have a crucial role to play in environmental quality management and must not be overlooked in the process. In addition, several empirical studies have suggested that "experts" attitudes and perceptions regarding resource management and landscape quality are different from the ones of the lay public (Kaplan, 1973; Stankey, 1976; Anderson, 1978; Buhyoff *et al.*, 1978; Peine, 1979).

Burton (1971) presents a simple framework that suggests the complexity of the relationships involved in the perception of and attitude towards the environment, and he presents it as a "perception and attitude matrix" (Figure 2.1). This figure is briefly described and interpreted in the context of the present study. It also presents the framework taken for the subsequent review of the literature.

Burton's framework lists four groups of perceivers who reflect different perceptions of and attitudes towards the different components of the environment, including the visual landscape in this context, and its management alternatives: (1) the "lay public", which encompasses those directly affected, those indirectly affected, and those not affected by environmental/landscape quality, (2) the "technical experts", those who are directly involved in FLM such as landscape architects, landscape managers/foresters, (3) the "private managers", those professionals who work for the private industry or as consultants/contractors, and (4) the

"public managers", those professionals who work for the federal, provincial, or local government.

PERCEIVED / PERCEIVERS	ENVIRONMENT (Total environment, rivers, air, water, wildlife, cities, regions, neighbourhoods,etc.)	ALTERNATIVES (Technical, engineering, regulations, taxes, social instruments, etc.)
LAY PUBLIC (interest groups, those directly affected, those indirectly affected, those not affected)		
TECHNICAL EXPERTS (engineers, economists, ecologists, hydrologists, etc.)		
PRIVATE MANAGERS (by type of industry, location of ownership, size, etc.)		
PUBLIC MANAGERS (by level of government, federal, provincial, local, administrative, judicial, executive, legislative, etc.)		

Figure 2.1 - Perception and Attitude Matrix.

(Source: Burton, 1971, p.3)

These four types of perceivers represent only one way to subdivide the human element of the environment and certainly, other groupings would be possible in a broader context. Obviously, these sets of people have overlapping attitudes and perceptions that predispose them to behave in certain ways or make certain kinds of choices and decisions. These decisions affect not only the development and management of the total environment, but also its different physical and visual components.

In itself, FLM is only one management alternative among others, but is an integral part of the total forest management scheme. FLM concepts and techniques are proposed by technical experts, but ultimately, it is the private and public managers who must implement them, and it is the lay public who are the final beneficiary of the field results. To improve FLM as a forest management alternative, it is necessary to develop a better understanding of the perceptions and attitudes of the four groups of perceivers.

Although this study concentrates on perceptions and attitudes of public and private foresters, the next two sections of the review cover the four types of perceivers. The following section presents some studies that relate to the technical experts' assessments of the state of environmental quality at the international and national level. In addition, the section covers some studies relating to the lay public's perceptions and attitudes about environmental quality and forest resource management.

2.3 Environmental Quality in Perspective

Along with the proliferation of studies has been numerous special task forces focusing on human perception and attitude over the state of the environment (Schiff, 1971), and also about the way it is managed. Of the vast literature on the subject, the Declaration of the United Nations at the Stockholm Conference on the Human Environment provides a critical assessment of the relation of humans to their environment and offers directives for appropriate courses of action. A remarkable achievement of the 1972 Stockholm Conference has been the revelation of widespread awareness of the nature of the human predicament and of a desire to work towards the resolution of it. Consensus was achieved on several broad issues and the

Declaration of Principles certainly added to the meaning of environmental ethic and social development. Two of these principles are:

> Principle 1: Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations.
>
> Principle 8: Economic and social development is essential for ensuring a favourable living and working environment and for creating conditions on earth that are necessary for the improvement of the quality of life.

Applied to the forestry context, these two principles take on special meaning due to the traditional dichotomy between quality and quantity in the management of forest resources. Both principles are compatible and necessary for a sound development of the natural and social environment. Taking extremist positions on either principle usually creates unnecessary conflicts and fails to recognize the full potential of integrating ecological, social, and visual values in forest resources management.

Another important organization, the International Co-ordinating Council for the Man and the Biosphere (MAB), had its first session in 1971. The Committee recommended that a number of *ad hoc* panels of experts elaborate the scientific content of projects proposed under the MAB Programme. In 1973, one of the panel experts working on the project "Perception of Environmental Quality" produced a final report (Unesco, 1973) providing a number of suggestions on how research on the perception of environment quality might be tackled within the MAB Programme. One of the six priority research themes presented in that report was the "Perception of typical man-made landscapes of ecological, historical and aesthetic importance" (p.23). The objective of this research priority was "to investigate the perception of landscapes which have resulted from past human activity and which are of ecological, historical and aesthetic importance to various groups of people." It was then recognized that man-made landscapes represent various stages in the development of human cultures and of the society at large, and that these landscapes are "... increasingly threatened by changing technologies." An understanding of their perception by the various people associated with them aids in the development of programs for their conservation and integration into broad patterns of land use.

Up to now, many of the programs dealing with the management of visual resources, including the B.C. FLM program, have been developed or adapted without due considerations to people's perception of the landscape and of the management activities occurring upon it. Subsequent to the introduction of the provincial program, sporadic attempts have been made to gather the missing information but the efforts have been often illusive and in vain due to the lack of guidelines and proper methodologies that could be applied across the province. For a given time, however, there has been a wider recognition that more information is needed on how B.C. residents and tourists perceive forest landscapes and forest management practices (Dearden, 1983; Miller, 1984; Rennie, 1986a, 1986b; Bekker, 1987). Such input is recognized as being highly desirable and necessary for a sound management of B.C. forests.

In spite of the increased concern for the global assessment of environmental quality and natural resources, there has been a clear failure at the national and provincial levels to consider quality in the planning and management of the natural environment. Short term views on environmental politics have led to the more serious problem of development policies primarily oriented toward maximum exploitation of natural resources for immediate economic gains (Lachance, 1986). This recognition of failure recently led the United Nations to re-think new strategies that would help to forecast and prevent environmental degradations instead of simply bringing after-the-fact corrective "solutions". To address this possibility, the United Nations created a World Commission on Environment and Development in 1984. As a result, the Brundtland Report was released in April 1987 calling for a drastic change in values and for a cleaner development of the environmental resources (World Commission on Environment and Development, 1987). In other words, this major study on the future of the world environment passes on a strong message that most humanity has to change the way it lives or face disaster. The Commission suggests that on a global level, the world needs a United Nations declaration on environmental protection and sustainable development, including an international system for nations to avoid disputes on resource management. In addition, at the national level, the report calls for comprehensive environment and development policies, including national strategies on sustainable development.

In the Canadian situation, the federal government has only recognized recently that problems in environmental quality management are serious enough to justify specific actions. In response to a visit to Canada by the World Commission on Environment and Development in May 1986, Canada's Council of Resource and Environment Ministers appointed a National Task Force on Environment and Economy. This national study group reported to environment ministers in September 1987 (Report of the National Task Force on Environment and Economy, 1987). The group called for better cooperation and planning to increase harmony between the environment and economic development. In addition, "...governments, industry and academics should work more closely to promote environmentally sound economic development ...long term economic growth depends on a healthy environment ...so planning and management must be integrated" (p.2).

Also in 1986, the first report on the overall assessment of the state of the Canadian environment was published (Environment Canada, 1986a) and certainly constituted a landmark in itself.

2.3.1 Public Perceptions and Attitudes on Environmental Quality

Public perceptions and attitudes do affect the quality of the environment in several ways. Firstly, individuals can mobilize support for particular issues and exert considerable pressure on the private sector and government for changes in environmental policies (United Nations, 1987). Secondly, public perceptions and attitudes affect their personal behaviour towards the environment. Specific to this study, public perceptions of forestry and attitudes towards forest management can affect the way the forest environment is managed and these are often overlooked in the planning and management processes, and thus jeopardized important social and environmental values.

Many studies have dealt with public perceptions and attitudes of forestry in Canada and British Columbia since the beginning of the 1980's. For example, the first "State of the Environment Report for Canada" (Environment Canada, 1986a) presents the results of some formal national opinion surveys on Canadian perceptions of the environment in general, and of the forest environment in particular (see Chapter 12). Overall, Canadians are concerned about

the quality of their environment and of its decline, in fact, "... more so than almost any other issue" (Environment Canada, 1986b, p.20). However, there appears to be a shift in public attitudes on specific environmental matters. For example, a 1981/82 CROP survey data concerning perception of the relative importance of environmental problems shows that "Destruction of forests" was almost at the bottom of the list, at both the national and provincial levels. In addition, the sub-group of people in Western Canada presented the same pattern and trend that Canadians did as a whole. This is particularly interesting considering the importance and scale of forest harvesting in many parts of the country, especially in the province of British Columbia, and of the highly publicized controversies over clearcutting.

In an attempt to determine British Columbia public opinions on environmental issues, the B.C. Ministry of Environment (1982) conducted a survey of 400 people. The results showed considerable concern or interest in the quality of the environment amongst residents. In accordance with the national survey, British Columbians were equally concerned with the quality of the environment as with the quality of education, law enforcement, and health care.

The survey revealed that in 1982, about 63% of British Columbians were more concerned with the environment than they were five years earlier. Some of the reasons for this increase in concern were: "more aware of/interest in the environment and more public education" (21%); "more pollution in general" (15%); "environment/everything is worse now" (15%); and "not enough is being done, lack of regulations, lack of concern by officials" (12%). Once more, reasons such as "forestry reserve running out, clearing too much land" and "depletion of resources" took only a small share of the distribution with 3% and 2% respectively.

British Columbians were also asked about their specific concerns regarding the environment. Interestingly, approximately 40% of adults could not articulate any specific concerns about the environment. For the remainder, the range of concern expressed varied greatly, but pollution emerged as a common element. Specific forestry concerns like "overcutting trees/slashing" and "depletion of natural resources" were main reasons for only

7% of the population. In summary, the state of the forest environment was relatively of low concern for most British Columbians and Canadians in 1982.

During the summer of 1986, the Canadian Forestry Service conducted a public opinion poll within British Columbia on forestry issues (Canadian Forestry Service, 1986). This survey of 1000 people, completed by Decima Research Ltd., examined the attitudes of British Columbians towards the forestry sector and designated priorities for the development of forest management policy.

As one might expect, the majority of British Columbians (62%) considered the forest industry as making the most important contribution to the provincial economy, but 61% of them perceived that a diversification of the economy is also important. However, the survey clearly indicates that the large majority of people would not pursue diversification at the expense of further forestry development that could help improve practices and utilization. In fact, 70% of the respondents advocated spending more (47% "more" and 23% "much more") money in forestry development. A very interesting point was that a large majority of forestry activist groups e.g. environmentalists or heavy recreational users (20% overall) supported further spending on forestry: "...there is little perception of inherent conflict between sound industry practice and environmental goals" (p.12).

Certainly, one of the most interesting findings of the survey is that a significant minority (31%) of British Columbians consider the preservation of the provincial "heritage, wildlife, and beauty of nature" the single most important way the forests can be used to benefit the people of British Columbia. Only a slightly higher proportion (35%) said that "source of forestry jobs" was the way to benefit British Columbians. In addition, "providing building materials and paper products for home and business use" and "creating major attractions for the tourist industry" were expressed by 26% and 7% respectively of the survey respondents.

Overall, there seems to exist a clear dichotomy between the perceived importance of harvesting of the resource for economic well-being (61%) and preserving it for ecological and visual values (38%). However, a common ground does exist between these two extreme positions. For instance, an overwhelming majority (83%) believed that logging could co-exist

with fishing, wildlife and recreation on forest lands indicating that they feel that multiple uses of the forest are entirely compatible. More unusual is that the same proportion of environmental activists and frequent recreational users took an identical position on the issue. This attitude suggests that if proper considerations are given equally to timber and non-timber values in the planning and management processes, it is possible to satisfy different kinds of users and values on the same piece of land.

Another interesting point of the survey is the British Columbians' attitudes towards both Federal and Provincial governments' involvement in the management of the forests "in an environmentally-sound way". Virtually nobody declared that any level of government is too intrusive in protecting the environment. In fact, approximately 80% of the people (86% of the forestry activists and 79% of the frequent recreationists) said that the governments should be somewhat more or far more active in setting and enforcing environmental standards. This suggests that stronger policies related to quality of the forest environment are needed or at least, a better enforcement of the existing ones.

In terms of government and industry priorities in managing the forests, 67% of the British Columbians indicated that "improving reforestation after logging operations" should be the number one priority. "Protecting the environment during logging operations" appeared as being the number two priority for 54% of the people and surprisingly, "increasing the number of jobs in the forest industry" was the third priority specified.

To summarize, the results obtained from this latest survey show that indeed, there exists a wide recognition of the economic benefits of the forest industry in terms of personal and provincial prosperity. However, close behind this economic orientation are the non-timber values associated with the forest environment. In fact, attitudes on environmental or conservation issues have greatly changed in the past few years, to the point where 31% of British Columbians feel that the sole public benefit from forest should be preservation of the unique heritage, wildlife, and natural beauty.

The present actions taken to include non-timber values in forest management are perceived to be inadequate by the population of British Columbia. In this regard, more than

one out of two British Columbians felt that the forest industry's as well as the government's performance has been "irresponsible" in regard to environmental concerns. In short, a striking point of this survey is that an overwhelming majority (80%) of British Columbians contend that "... all levels of government must be more active in enforcing environmental standards". This recognition compliments beautifully the recommendations of the Brundtland Commission. An international, national, and provincial consensus seems to exist on the need to change some management approaches to improve the quality of the environment and this fact, in itself, constitutes a serious indicator of the future direction to take in forest management.

2.4 A Need for Visual Quality and Visual Resource Management

One of the central themes to emerge from the previous review of perceptual and attitudinal studies is that environmental quality is intimately associated with quality of life. Also, there is a well implanted and constantly growing body of literature that supports the fact that visual quality of the environment has indeed significant effects on quality of life and upon human performance and well-being (e.g. Ulrich, 1978; Porteous, 1982). Litton, considered by many as a pioneer in the fields of visual resource and FLM in the United States, has referred to the visual quality of the landscape as an essential component of environmental quality (1978). His long series of work on FLM and landscape perception (e.g. Litton 1968; 1972; 1974; 1979; 1982) has been based on the following premise: "...the landscape is a resource in its own right, with its visual integrity being connected to both natural processes and sensitive land management" (Litton, 1978, p.97). To say that the landscape is a visual resource is to admit to the integral tie between the physical aspects of the land and the human experience of it (Kaplan, 1985), which can be called "integrated human and natural resources management".

As was seen in the aforementioned discussion, attitude and perception studies show that quality of the forest environment takes on new value for the Canadian society as standard of living criteria are constantly reconsidered and as quality of life becomes a major societal goal. This changing psychological relationship of the public to the forest has been manifested in shifting public demands; the forest "utilitarian" or timber values of yesterday have gradually given way to value systems that more strongly emphasize recreation, aesthetics, and other

"appreciative" or non-timber values (Stankey, 1976). However, managerial recognition of these shifting values and demands on the part of the industry and government has been comparatively slow, thus creating conflicts over the management of the forest.

Since visual resources are inherently a part of both environmental quality and forest resource management, it is essential that public and private agencies attempting to manage these resources have tools available that allow them to make an objective assessment of the trade-offs inherent in timber and non-timber resource developments. Forest landscape management concepts and techniques have great opportunities to meet this challenge of integration of timber and visual values.

2.5 Professional Foresters's Attitudes

Professional foresters, like the lay public, have values and expectations for quality forest environment and the use of forest landscapes. In fact, the interest of foresters in visual resource values and FLM, although somewhat restrained at the beginning, is not new. As early as 1885, the German forester Heinrich von Salisch wrote a book on forest aesthetics. He considered the relationship between economic, aesthetic aspects of forestry, aesthetic effects of various forestry operations, and certain principles of landscape art that could be applied to practical forestry (cited in Rudolf, 1967).

The purpose of this section is to review the literature related to the views and attitudes of professional foresters regarding visual resource and FLM. More specifically, this section seeks to find from the literature the answer to the following question: What consistent attitudes or themes can be identified with respect to FLM as they are expressed by professional foresters? With very few exceptions, the present review is confined to North American publications of the last twenty years.

2.5.1 The U.S. Visual Management Systems

The importance of the forest in providing visual values or resources has long been recognized by American foresters, yet originally, forest management for that purpose often took the shape of simple suggestions with no real chance of implementation, in default of

legislation. For example, in 1918, Waugh prepared a publication for the U.S. Forest Service in which he remarked, "Foresters could not, if they would, deny the beauty of the landscape, and public enjoyment of that beauty are matters which must come into their account." (cited in Rudolf, 1967). Waugh went on to make suggestions for managing the landscape in different forest environments.

In more recent years, however, the great expansion of population in the United States, and the growing awareness and appreciation of environmental quality and of the forest's visual values have redirected priorities for professional managers, and stressed attention to the recreational and visual quality needs of the public. Such priorities have developed over time to an impressive series of legislative acts. Table 2.1 indicates five phases in American landscape policy development.

Table 2.1 - Evolution of American Landscape Policy.

LANDSCAPE DISPOSAL.....	1785, General Ordinance of 1785
	1855, Military Bounty Act
	1862, 1904, 1909, 1916, Homestead Acts
	1864, Morrill Act
	1873, Timber Culture Act
	1877, Desert Land Act
LANDSCAPE PRESERVATION.....	1864, Yosemite State Park
	1872, Yellowstone National Park
	1885, Adirondack Forest Preserve
	1906, Antiquities Act
	1916, National Park Service Created
	1964, Wilderness Act
RECREATION LANDSCAPES.....	1920±, State Park Movement
	1960, Multiple Use and Sustained Yield Act
	1962, Outdoor Recreation Resources Review Committee Report
	1965, Land and Water Conservation Fund Act
	1968, Wild and Scenic Rivers Act
	1968, National Recreation and Scenic Trails Act
AMELIORATE SCENIC ILLS.....	1965, White House Conference on Natural Beauty
	1965, Highway Beautification Act
	1970, 1977, Clean Air Act Amendments
	1977, Surface Mining Control and Reclamation Act
ENVIRONMENTAL PLANNING.....	1969, National Environmental Policy Act
	1972, Coastal Zone Management Act
	1974, Forest and Rangeland Renewable Resources Planning Act
	1976, Federal Land Policy and Management Act
	1976, National Forest Management Act

(Source: Zube, 1986, p.9)

The final phase of the evolution of policy, "environmental planning", has favoured the establishment of a policy and administrative environment in which aesthetics has to be considered in environmental decision-making along with economic and technical considerations (Zube, 1986).

Particularly, the 1969 National Environmental Policy Act (NEPA) made it clear that visual values and visual landscape quality had become a concern with all landscapes that were affected by federal design, planning, and management activities. Its major purpose has been to maintain and enhance environmental quality. The creation of subsequent acts, including two Forest Service acts, were based on the policies set forth in the NEPA and called for interdisciplinary planning teams and for consideration of a full array of resource values including the visual resource. Among the most important changes in natural resource management is the development of an Action Plan by the U.S.D.A. Forest Service (1971). This plan known as the "National Forests in a Quality Environment" was developed through a thorough review of silvicultural practices, and spells out 30 specific problems, including "Esthetics and Environmental Sensitivity", and the actions needed to resolve them (U.S.D.A. Forest Service, 1972b).

Following the events of NEPA, the National Forests management review, and the forest Acts, developments of visual resource management systems started to occur in three federal agencies in the United States: the Forest Service, the Bureau of Land Management (BLM), and the Soil Conservation Service. In fact, most developmental work was done in the 1970's and 1980's. The visual resource management systems were developed to deal with three classes of problems: (1) visual inventory and analysis systems for large landscape areas needing landscape planning; (2) systems for determining the degree of potential visual impact of management activities; and (3) systems for detailed evaluation of visual impact (Smardon, 1986). Obviously, a detailed review of these systems is beyond the scope of this study. Smardon, however, presents an excellent overview of the visual resource management systems within federal agencies. For more detailed information, the reader can also refer to reports by

the U.S.D.A. Forest Service (1971, 1972a, 1973, 1974a, 1980), the U.S.D.I. Bureau of Land Management (1980), and the U.S.D.A. Soil Conservation Service (1978).

A few years after the release of the U.S. Forest Service's visual resource management program, Fullerton (1976), as a public relations representative for a forest company, expressed serious concerns with regard to the adequacy of the communications scheme of the program designed to explain the principles of landscape management to resource managers and the general public. She raises very interesting points worth reviewing because of their applicability to the B.C. context.

First, according to Fullerton, the public appears to be misinformed and unaware of the care and attention given to visual values in forest management, and consequently she questions, "how can the Forest Service expect to achieve the respect it desires for this land management practice?" (p.24). Likewise, if the industry does not understand the basic concepts and principles of FLM, "how are we to avoid continuation of head-to-head conflicts with agency personnel and environmental critics?". In addition, she doubts the foresters outside the Forest Service are very much aware of, or really understand the program, despite the publication of many technical handbooks. She attributes this to the confusion created by the excessive use of professional landscape terms not in their working vocabulary. On the other hand, Fullerton mentions the great frustration existing among the Forest Service landscape professionals because they are not able to broaden the program to inform the people and the special, critical public.

These landscape professionals or landscape architects in the U.S. Forest Service were recently involved in a survey asking for their attitudes towards the Visual Management System (VMS) (Laughlin and Garcia, 1986). A mailed-in questionnaire[1] asked for their views of the System and its components, along with their perceptions of other Forest Service managers' and specialists' attitudes towards the System. Information was also gathered to answer the question: "Has the VMS helped to give stature to the visual resource as a factor in integrated resource planning?" (p.136).

[1]A rate of response of 95% was achieved for this mail questionnaire.

Although an internal survey can be considered bias to a certain extent, the findings show that 90% of the professionals agreed that the VMS has succeeded in quantifying the visual resource; 96% disagreed that it is a "passing fad"; and 68% disagreed that it has "major flaws". In addition, the landscape architects' perceptions of their office's staff towards the System indicated some lack of understanding on the part of the staff, despite the "strong acceptance" of the System. However, according to the survey, the staff do not always manifest this acceptance in practice. Finally, the study indicates that the VMS is perceived as having given visual resources a stature in the integrated resource planning process, despite the existence of many concerns for different parts of the System.

This study, either by design or by the lack of answers and comments on the part of the respondents, does not reveal anything about Fullerton's legitimate concern regarding the need for informing the public about landscape management. The authors of the survey, however, conclude by stating that "further research is needed on public attitudes toward, and expectations of, the forest landscape" (p.139).

2.5.2 The American Foresters' Attitudes

Smardon (1986) states that the incorporation of visual values into American forestry agencies' decision-making processes was often "...enthusiastically supported by key agency administrators" (p.144). The focus of this literature review, however, is on foresters' attitudes towards FLM.

Twenty years ago, Glascock (1967) asked the question, "How do professional foresters react to the rising tide of emphasis on natural beauty?" and denoted the little appreciation of American foresters of the "natural beauty" of the working forests, despite their knowledge of the existence of the inherent visual values of forests. As a contrast, he then presented the case in Europe where the "beauty" of these forests has been widely praised by foresters. Glascock suggested that the highly publicized vastness of parks and wilderness areas in the United States represent one important reason for such lack of consideration.

This overall attitude assessment was later confirmed in an 1966 attitude survey where 467 professional foresters, with approximately ten years experience, were asked to give their

opinions on 40 statements about forestry (Bond and Mawson, 1968)[2]. No specific statement had to do with visual values or FLM, but in the section on "Forestry Education", statement 7 asked foresters whether to agree or disagree on replacing some timber-related courses with those related to non-timber values. A majority of foresters (64%) answered in the negative; about a quarter (26%) agreed; and around 10% of them had no opinion on the issue. However, approximately 66% of the foresters disagreed with advocating more courses in timber management, surveying and silviculture at the undergraduate level (Statement 5). In light of other statements of the survey, the authors explain this seeming discrepancy by saying that "...the forester considers himself to be a manager of the entire forest resource, but that he does not appear to have much faith in his abilities to manage for products other than timber, except perhaps for recreation" (p.184).

The survey also indicated a willingness from a large majority of foresters to incorporate courses that enable them to deal with the forest as a business enterprise and enable them to understand the opinions and needs of the general public: 62% of the foresters agreed on having more courses in the social sciences. Again there seems to be a contradiction in foresters' attitudes because an overwhelming majority (84%) agreed on statement 12, which stipulated that "good forestry consists of those practices that make for the most complete utilization of the site and the fullest development of the forest." This strongly suggests that foresters, at least at the time of the survey, were relating "good" forestry to quantity only, no mention being made to quality forest management and/or visual and social values in forest management.

In summary, the authors of the survey concluded, quite lucidly, that the forestry profession is in a "...state of confusion concerning its goals and can gradually reorient and focus on these goals only through refinements in the formal, forestry education process" (p.186).

Glascock (1974) declares that many forestry programs need input from the foresters involved, but too often their opinions are guessed at, or worse, assumed from only a few complaints. Over the years, the Society of American Foresters (SAF) has been particularly interested in the opinions and attitudes of its members towards different forestry issues, with

[2]The authors note the "extraordinary" rate of response for the mail survey, to which 71% of the foresters responded.

the idea that such information may be important for decision-making and policy shaping. To this end, the SAF has conducted six nationwide Member Opinion Surveys (MOS)[3] - in 1974, 1975, 1976, 1978, 1980, and 1982, in an effort to provide such information on a continuous basis. Summaries of the results of these surveys were periodically published in the Journal of Forestry[4].

Although exactly comparable information on certain issues is not available from all six surveys[5], certain trends can be extrapolated from certain recurrent themes. One of these themes, and the one that is the most pertinent to this study, is the relative importance of priorities that SAF members have placed on forestry issues and environmental programs. It is not always clear, though, whether "importance" means importance of the issue as a research problem of forestry, importance by reason of being made into a public issue by various groups, importance that the SAF speaks out most on the issues, importance in fulfilling the forestry profession's responsibility to society, or more logically, a combination of the four. In addition, Glascock (1979) raises the point that comparability of the different rankings of issues is hampered by varying lists of issues from survey to survey, and also by different wordings in certain issues. Despite these technicalities, general patterns of member interest and concern can still be detected.

Table 2.2 summarizes the ranking of forestry issues, in order of decreasing importance, over the period covered by the first five surveys[6]. The following discusses these results and highlights some particularities of individual surveys pertinent to the purposes of this study.

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[3]For each survey, with the exception of the 1980 one, the questionnaire was mailed to every member (census-type) of the Society of American Foresters with his/her annual dues billing. The 1980 MOS was a sample survey (systematic-type) with questionnaires going to 10% of the members. The rates of response were as follows: (1974) 32%; (1975) 22%; (1976) 35%; (1978) 29%; (1980) 85%; and (1982) 27%.

[4]For more details, the reader can refer directly to these summaries: the 1974 MOS: Glascock, 1975 and Le Master, 1975; the 1975 MOS: Glascock, 1976 and Le Master, 1976; the 1976 MOS: Glascock, 1977a and 1977b; the 1978 MOS: Glascock, 1979; the 1980 MOS: Stoneburner, 1980; and the 1982 MOS: Knox, 1983 and Barber, 1983.

[5]The reason for this lies in the difference in the number and wording of questions from survey to survey.

[6]The 1982 survey is excluded because it departed somewhat from the ranking procedure by listing 18 issues and asking members to indicate the desirability of developing new or revised SAF positions.

The table shows that the first overall priority has been the "use of silvicultural systems" in forest management. This issue has also been referred to as the "appropriate use of timber harvesting techniques, including clearcutting." This attitude clearly reflects the highly publicized controversy of the 1970's concerning clearcutting and its "aesthetic disaster" in U.S. National Forests (e.g. Schorr, 1971). Many foresters had responded to the critics by questioning the whole issue of clearcutting and its abuse by some public foresters (Crafts, 1973; Trimble, 1975). Others, like Salter (1972), talk about the viewpoint of concerned professional foresters in that "the public is only partially informed; they don't understand the whole problem; and they come to premature, erroneous conclusions based only on what they see." (p.25). In fact, Table 2.2 shows that this "lack of public knowledge" was listed as the number one priority in 1976. Therein lies the whole problem for foresters; what they see is different to what the public sees. Sadler presents one solution to this difference in visual perception that would help to polish the foresters' image: improving the appearance of the forests. Other foresters have also discussed the need for managing clearcutting with the landscape and the obligation of the forestry profession to acquaint the public with landscape management efforts (McGee, 1970; Connaughton, 1970).

Table 2.2 - Ranking of forestry issues for five Members Opinion Surveys (in order of decreasing importance).[1]

Issue	1974	1975	1976	1978	1980
Wilderness allocation	5[2]	3	14[2]	2	1
Biomass as energy source			7[2]	9	2
Nonindustrial private forestry ..		9	5[2]	5	3
Use of silvicultural systems	1[2]	1	2	3	4[2]
Forest taxation			8	4	5[2]
Use of chemicals	7	12[2]	6	6[2]	6[2]
National policy on forestry					7
Wood residue utilization	11	6	4	8	8
Public land management and allocation in Alaska				7	9
Land-use planning	3	2	3	1	10[2]
Lack of public knowledge	6	11	1		

[1]Blanks indicate that the issue was not listed for ranking.
[2]Issue stated differently.

This foresters' attitude towards the visual values in the forest was also reflected for the first time in the 1976 MOS, where they were asked to state additional forestry issue which should be included in the priorities list. The need for "improving forest land management for aesthetics and wilderness use" was among the most mentioned issues. This general attitude certainly contributed to the development of the U.S. Visual Management System.

Interest in the subject of continuing education in forestry was manifested by a large number of foresters over the six Member Opinion Surveys. For example, in 1982, 89% of them expressed their desire for developing a certification program for continuing education. An interesting point of this issue lies in the topics for education. Among those who showed a strong interest in courses, workshops, or technical conferences, 57% opted for "silvicultural practices" and 29% for "land-use planning and design."

In 1974, the Pennsylvania State University's Department of Planning Studies in Continuing Education carried out a nationwide survey where 2500 foresters and an equal number of other natural resource personnel were asked about their needs for continuing education in forestry[7] (George *et al.*, 1974). The survey showed foresters' awareness of the need to keep abreast of changing social and political pressures that influence their jobs. They expressed their desires for continuing education and according to the authors, "the most interesting result of the survey was that 86% of the respondent foresters wanted more training in the general areas of ecology and environmental management" (p.289). In addition, 82% and 81% of the foresters indicated that they "should have" or "could use" training in, respectively "Pollution and Environmental Quality" and "Interrelationships of the Natural Resource Scientist, Social Scientist, and Planner".

As a final result, the survey clearly indicates the significant changes required in updating practices. Foresters wanted commitments on the part of their employers to their continuing education as an "accepted, regularly programmed, and substantial part of their employment" (p.290). It appears that "uncoordinated" reading of periodicals and reports is not

[7] The mail-in questionnaire was completed by 2,446 professionals for a rate of response of 49%.

enough. Also, occasional workshops and seminars do not seem to fulfill foresters' needs as well as on-the-job training which is often too infrequent, narrow and uncoordinated in approach.

Costs of landscape management, often referred to as environmental considerations, on timber harvesting and regeneration has been another issue raised by foresters and other professionals. This issue needs to be taken very seriously since perceived and/or real cost can greatly influence the level to which landscape management practices are implemented and even to which a FLM program is accepted.

The range of attitudes on this topic is fairly broad, reflecting the lack of factual information. For example, one argument often heard is that developing quality landscape costs a great deal of money. Another is that increasing the visual quality of the forest landscape may cost little in lost revenues from economic yields, but cost more in planning time. Many foresters approach FLM and other environmental management activities as "constraints" or "externalities" to deal with by obligation. Others acknowledge the cost as simply the cost of doing business should be accepted as an integral part of the development process.

The precise costs of planning and managing for visual values in forestry cannot be or has not yet been determined. However, many studies have attempted to estimate these costs (e.g. Streeby, 1970; McDonald and Whiteley, 1972; Kemper and Davis, 1976; Fight and Randall, 1980). These studies conclude that landscape management considerations do bring additional costs to the forest management scheme. Obviously, the costs vary widely with the particular area under consideration and depend on many variables, both physical and social. Nevertheless, Streeby points out, these costs may be either pluses or minuses on the balance sheet, and that managers should recognize this fact. He cites, as an example, that a "scenic management scheme" may in fact, increase range carrying capacity or water values. Even timber harvesting may be greater than expected if visual values are considered. Kemper and Davis conclude that "...the costs of increased environmental care are substantial enough to warrant detailed quantification and consideration in public timber policy deliberation" (p.761).

In the early 1970s, the Society of American Foresters formed the Committee on Forest Policy to study the most appropriate levels of financing forestry programs. This Committee

required an increased availability of financial resources for foresters to prescribe and apply forest management practices that would "...produce adequate quantities, qualities and varieties of outputs from any forest ownership" (Beale, 1974, p.595). To achieve its objectives, the Committee had four initial principles towards developing criteria for policy decisions. Two of these principles were closely related to the topic of this study: (1) the quantity, quality and variety of forest land benefits are related to the levels of financing forestry programs; and (2) the public worth of intangible forest benefits cannot always be determined through the market place. However, Beale emphasizes that it is highly important that financing of forestry programs consider intangible as well as tangible forest benefits.

2.5.3 The B.C. Forest Landscape Management Program

Unlike the United States, Canada does not have nationwide Visual Management Systems. Instead, some provinces have adopted design guidelines for forest management with basic considerations to landscapes (e.g. Ontario Ministry of Natural Resources, 1973; Quebec Ministry of Energy and Resources, 1986). Other provinces, with more important, or at least more visible landscape issues, have adopted official programs and policies dealing with FLM (e.g. B.C. Ministry of Forests, 1981, 1982; Alberta Ministry of Natural Resources, 1986).

In the specific case of British Columbia, FLM acquired an official status following the revised forest legislation in 1978, when the Ministry of Forests began to put more emphasis on recreation management, including the management of the scenic values of forest landscapes (see Appendix II). As a result, the FLM program was developed and adapted primarily from the U.S. Forest Service's Visual Management System.

As stated in the handbook, the overall goal of the B.C. program is "to retain or enhance forest landscape values in keeping with the concepts and principles of integrated resource management" (p.8). To achieve this goal, a series of objectives are accomplished by putting special emphasis on forest landscape inventories, incorporating landscape considerations into integrated resource planning, instituting landscape management practices, and conducting and encouraging training for Ministry and forest industry personnel. By recognizing the forest industry's major influence in landscape modification, the Ministry has also the objective of

soliciting the industry participation, as well as the public's, in planning and operational implementation of forest landscape principles.

The organization for FLM implementation in British Columbia comprises the following structure. The FLM program is administrated through the Recreation Management Program, now part of the Integrated Resource Management Branch. At present, the Ministry staff has four full-time Landscape Coordinators, in the Vancouver, Kamloops, Nelson, and Prince Rupert forest regions, and a Landscape Manager, located in Victoria. The Landscape Manager provides coordination and guidance to Landscape Coordinators, while the latter provide technical assistance to Ministry staff in each of the forest districts. The Resource Officers in the districts carry out landscape management practices on a more or less routine basis.

2.5.4 The Canadian Foresters' Attitudes

If level of interest for a discipline, or its acceptance as a discipline, can be judged through publications in professional journals, it can be said that Canadian foresters' interest in visual resource management and FLM has been minimal in the past years.

During the literature review of the two principal forestry journals in Canada, The Forestry Chronicle and The Canadian Journal of Forest Research, it became obvious that virtually no major work related to foresters' attitudes towards visual or landscape management issues had been done in any province. However, the review for the past 20 years has revealed some isolated cases of professionals' reactions or viewpoints concerning issues directly or indirectly related to FLM.

Perhaps one of the first contacts between Canadian foresters and FLM issues occurred at the 1965 meeting of the Southern Ontario Canadian Institute of Forestry Section. Who else but an American forester presented a paper on private woodlands and aesthetic timber harvesting. He stated: "Professional foresters should take leadership in developing principles and practices for what might be termed aesthetic forest management..." (Hamilton, 1966 p.164). He then proposed specific forest practices applicable to Ontario to meet, as he says, "tomorrow's problem" and "future harvesting" (p.165-166). It appears that Ontarian foresters took him very seriously because they were the first, in Canada, to develop management

principles, criteria and guidelines to integrate forestry practices with aesthetics, recreation and wildlife management (Ontario Ministry of Natural Resources, 1973).

Coincidentally, a National Committee on Forest Land was established in the same year as Hamilton's visit to Ontario. One year later, in 1967, this committee appointed a Sub-Committee on Multiple-Use. This sub-committee was directed "to review, evaluate, and adapt concepts and applications of multiple use and integrated resource management", and "to make recommendations concerning their relationships to land management in Canada" (Stanton, 1970)[8].

In the resulting report entitled "Towards Integrated Resource Management", the authors indicate the need for integrated resources management because of the increasing public pressure on Canada's land resources to produce a greater variety of social values. However, they also express their concerns in adopting this concept because of the prevailing attitudes and opinions of foresters and other professionals on such matters as social problems, environmental quality, legislation, professional staffing levels, and planning for land management. They were particularly concerned with the "traditional single resource thinking of foresters and others." Clearly, this report identifies the biggest challenges to the foresters in adapting their values and attitudes to the "...increasing public insistence on the provision of additional (or perhaps others) values from the same land..." (Stanton, 1970, p.199). They were also concerned about a forestry education system to provide foresters with tools to integrate these additional values in forest management. They concluded: "Failure to anticipate and plan effectively for this situation invites confusion, if not chaos." (Stanton, 1970, p.199). When looking at today's forestry situation in Canada, it can be safely said that forestry, as an education system and a grouping of professional foresters, has failed to rectify the problems identified by the Sub-Committee on Multiple-Use.

Manning (1970) also discusses the crucial role of forestry education in shaping foresters' attitudes towards environmental decision-making. He specifically points out the need

[8]Stanton (1970) condensed the sub-committee's report prepared by Jeffrey et al. in 1969.

for additional competence in the area of the social sciences, including aesthetics, in future forestry education.

In 1972, the Canadian Pulp and Paper Association sponsored a seminar on the Forest Environment at Lakehead University (Brophy, 1972). The 100 delegates, mainly foresters from all ten provinces, showed a consensus on the directions for action and required "a balanced program between commodity uses and non-commodity uses." Two areas of concern included the visual impact of harvesting operations and good housekeeping.

The need for integrating non-timber to timber values has also been recently revived through an independent audit of forest management in Ontario. Baskerville's report (1986), seen by many as one of the most intensive investigation into forestry practices that has ever occurred in Canada, highlights many critically weak points in the present forest planning scheme, including the isolation of timber management from non-timber values[9]. For Baskerville, sound forest management is more holistic and incorporates all these factors.

Technical papers on landscape management have appeared sporadically in The Forestry Chronicle. For example, Hamill (1971) introduces foresters to some techniques for studying and classifying forest wildlands for recreational potential and scenery; Buck (1971) presents the results of trial cuttings along shoreline to preserve aesthetics values; and Angelo (1980) uses computers in the visual analysis of landscape alterations.

As a final point, in reviewing viewpoints and methods on the appraisal of aesthetic values of forests, the Canadian Forestry Service (Murtha and Greco, 1975) had to rely mainly on American literature. The poor Canadian contribution in the field caused the authors to recommend that an evaluation system for forest aesthetics be tested and implemented in the Canadian situation as part of biophysical land inventories.

2.6 Summary and Conclusion

Forest resources and land-use conflicts are landscape management conflicts. When environmental problems first became overwhelmingly apparent, several years ago, it became

[9]This particular point seems to be of great interest to foresters because it has been referred to on many occasions in The Forestry Chronicle e.g. Vol. 63 Nos. 1-2-3-4.

obvious that the quality of the natural environment affected everyone's life in many ways. It also became apparent that the visual quality of the environment was playing an essential role in "sound environmental management" and in quality of life (Litton, 1978).

In the context of today's social and environmental conditions, different groups at various levels have taken steps to integrate environmental resources and values in the management of the natural environment. One very important step has been the recognition of the quality of the landscape as a legitimate and integral component of environmental quality management, whether it is referred to as visual, scenic or aesthetic.

In the specific context of British Columbia, the recognition of visual values in forest resources management is a major improvement for forestry in general. As a new forestry discipline, FLM has evolved from concepts, principles, and techniques that still require validations, modifications, and improvements for the context of British Columbia to assure a better integration into forest management. While many professional attitude studies have been completed in the area of visual resource management in the United States, it is also important to recognize that many critical questions related to foresters' views and attitudes still remain unanswered in British Columbia and in Canada.

The literature review presented in this chapter has highlighted some of the important issues facing the development and integration of FLM in the social, professional, and natural environment. These issues or themes represent an important basis for the formulation of the hypotheses and the design of this study, which are presented in the next chapter.

CHAPTER III

RESEARCH DESIGN

3.1 Overview

This study involved a survey of 300 professional foresters on their opinions and attitudes towards forest landscape management (FLM) in British Columbia. The survey was conducted by mail during the summer of 1986. The first section of this chapter discusses the development of the research strategy. Subsequent sections discuss hypothesis formulations, questionnaire design, survey pretest procedure, sample and sampling method, treatment of non-respondents, and questionnaire implementation. The final section describes the statistical plan for the survey analysis.

3.2 Research Strategy

The exploratory nature of this study was a determining factor in developing the research strategy. Early in the process, research approach and method were identified as two different entities, and this proved to be very useful for the overall conception of the study. Backstrom and Hursh-Cesar (1981) explicitly state that different research approaches produce different kinds of information, whereas research methods determine the manner in which information or data is collected.

3.2.1 The Research Approach

The approach leading to the selection of the research method considered four main criteria:

a) Availability of information

It was apparent from the literature that there was almost no empirical data which could answer the research questions. Thus, it was necessary to gather the necessary information directly from the "field".

b) Reasons for the needed information

The present study seeks to throw additional light on the interrelationships between a forestry discipline, i.e. FLM, a technical program, and a professional group. In dealing with human attitudes and perceptions, it is imperative to know what foresters think and do in relation to FLM.

c) Type of population

As mentioned earlier, this research tries to describe a specialized population: the professional foresters practicing in British Columbia. This criterion determines the kind and level of information that can be obtained.

d) Resources available

The availability of resources such as time and money is a technical concern that needs accurate assessment; their availability soon defines the rigid framework of any study. A realistic assessment of time, money, staff, supplies and equipment permits one to decide upon the best method with the given constraints.

In this case, each resource was very limited so the approach was chosen and planned accordingly. The scale and even the objectives of the study had to be adjusted to the resources available without jeopardizing the quality and meaning of the results.

3.2.2 Selection of the Research Method

Knowledge of existing information and criteria for meeting study objectives, combined with a realistic assessment of the resources available, form the foundation for the selection of the research method. Under the circumstances, a survey was believed to be the optimal way to obtain relevant data. More specifically, because of time and money limitation, interviewing appeared the most suitable method.

From the possible modes of interviewing, a mail questionnaire was selected for three reasons: (1) it is the most inexpensive kind of survey in terms of absolute cost ($/respondent); (2) it allows the presentation of more pictorial and technical content which was necessary in this survey; and (3) it is relatively free both of the biases of interviewers and of any threat that

interviewers may present to people. Furthermore, it was expected that the homogeneous and specialized population would lead to a high response rate which, in fact, was achieved.

3.3 Hypotheses Formulations

This study was designed to investigate a number of fundamental problems from which hypotheses were derived. These hypotheses were based on the literature, discussions with foresters, and personal feelings concerning the current situation of FLM in British Columbia.

Many hypotheses relating to various implicit and explicit properties of FLM and the foresters could have been chosen. However, major practical difficulties, including limitations on the number and complexity of questions that can be asked in a mail questionnaire prevented extensive testing of a wide array of these hypotheses. In this first attempt to secure general information on the state of landscape management in British Columbia, the questionnaire was designed around eight hypotheses. This section examines the research hypotheses one by one and explains the rationale for their formulation.

HYPOTHESIS I -- Levels of Knowledge

A majority of foresters have a relatively low level of knowledge of forest landscape management.

Knowledge is a prerequisite to understanding. The review of the American literature revealed that although the U.S. Visual Management System has been in place for a certain number of years, and that many related publications have been published, doubts remain as to the comprehension by foresters of the technical content.

Since FLM is a relatively new discipline in British Columbian forestry, it is mandatory to determine how much is known by professional foresters. The first hypothesis explores this knowledge at three different levels: concepts, program, and policy. Hypothesis I assumes that the level of integration of FLM in the planning and management process as well as its understanding and acceptance by professional foresters can be partly determined by the foresters' self-assessment of knowledge of these three aspects.

HYPOTHESIS II -- Sources of Knowledge

Foresters' level of knowledge of forest landscape management is a function of limited information.

This hypothesis is closely related to the first one. The expected overall low level of knowledge on the three aspects of FLM studied is probably due to the limited quantity of information available to foresters. A lack of interest in the subject is also believed to contribute to foresters' expected low level of knowledge.

The literature has also revealed that certain sources of information were not sufficient for professionals to keep abreast of new developments. It suggested the need for continuing education courses to deal particularly with non-timber values. Hypothesis II explores the importance of certain sources to inform the foresters and which of these sources they would like to see given more emphasis.

HYPOTHESIS III -- Costs

A large majority of foresters perceive forest landscape management practices as imposing undue additional costs on the forest industry.

Professional foresters, among others, have always been concerned with costs related to forest management practices. For many years, the word was minimum costs for maximum economic profits. Based on this tradition, Hypothesis III postulates that landscape management costs are perceived by a majority as a burden for the forest industry, although it is suspected that a minority of foresters will perceive those costs as legitimate.

HYPOTHESIS IV -- Potential Contributions

A very large majority of foresters perceive forest landscape management as being a much greater contributor to social than to forestry issues.

One of the purposes of the study is to learn more about how professional foresters perceive the usefulness of forest landscape management concepts and techniques to solve social and forestry issues. Another way to look at this point is what could be the potentials of forest landscape management to achieve different social and forestry purposes.

HYPOTHESIS V -- Integrated Resources Management

A majority of foresters feels that it is moderately possible to retain forest landscape values and manage the forest according to the integrated resource management concept.

HYPOTHESIS VI -- Personal Involvement

An overwhelming majority of foresters have a low level of personal involvement with forest landscape management techniques.

In its broadest sense, FLM as a forestry discipline should be present, on a routine basis, in the mind of professionals who deal with forest management practices, both at the administrative and field levels. As reported by Ramage (1987), without a willing attitude from superiors, special environmental considerations can not be successful in the field. He adds that "few employees in the field will do more than give lip service to good environmental planning and management if they know their bosses give it low priority" (p.21).

Hypothesis VI reflects two assumptions. First, that the present level of integration of FLM into the planning and management schemes can be examined, in part, by the perceived opportunities for foresters to use landscape management concepts and principles. Second, that the acceptance of FLM into the process can be assessed, in a way, by the support that the foresters are provided by decision-makers or their superiors.

HYPOTHESIS VII -- Public Involvement

A majority of foresters do not desire public involvement in the forest planning and decision-making processes.

A very sensitive and much discussed issue in forestry is the level of participation or involvement that the public should have in the planning and decision-making processes. The series of questions used to test Hypothesis VII explores different facets of this issue.

As a forest management discipline, FLM requires, probably more than any other forest management activities, perceptual and/or preference input from the general public and specific interest groups. Indeed, the necessity of public input is a well recognized issue. However, for different reasons, political in particular, no real and extended efforts are put in public involvement. Evidently, very little effort is made to secure information about how the people of British Columbia perceive the visual quality of unmanaged and managed forest landscapes. Frequently, landscape management decisions are based on personal beliefs or even on studies originating from other countries; such bases are inappropriate because of the importance of context (place and values) of any perceptual study.

Any environmental conflict has a commonalty: lack of mutual understanding of technical and societal parameters among the parties involved, usually the public and representatives of professional groups and/or organizations such as the government or industry. The public generally lacks technical knowledge concerning forest management principles and ecological "behaviour" of the ecosystem. To influence management decisions, the public should be informed of the technical issues. On the other hand, professionals in general also lack an understanding of forest environment societal values. A comfortable climate of participation would involve informing professionals about social values and behaviour in regard to the forest.

HYPOTHESES VIII -- Attitude Variations

Foresters having similar professional profiles hold similar attitudes towards different aspects of forest landscape management.

Hypothesis VIII tackles the second study objective -- the variation in attitudes among different groups of foresters. It is assumed that certain issues presented in the questionnaire will be viewed differently by sub-groups of foresters. This variation in attitudes should clarify the general state of FLM in British Columbia.

To test the above eight hypotheses, fifty one variables were built around 22 questions. Of those questions, four independent variables were used to break down the other variables, the dependent ones, to explain certain characters of sub-groups of foresters. The four independent variables included the following professional characteristics (profiles) of the respondents: primary occupation, employer category, years of experience, and forest region.

3.4 Questionnaire Design

Despite the limitations of mail questionnaires, several techniques have shown that they can effectively be used to gather information and adequately represent specific populations. Early in the design process, it was evident that considerable rigor had to be exercised if questions and responses were to produce useful and valid results.

For the questionnaire design of this survey, it was decided to rely insofar as possible on the "Total Design Method" (TDM) presented by Dillman (1978). The main tenet underlying

the TDM approach is that in order to maximize both the quantity and quality of responses, careful attention must be given to every detail that might affect response behaviour. Consequently, the TDM relies on a "theoretically based view of why people do and do not respond to questionnaires and a well-confirmed belief that attention to administrative details is essential to conducting successful surveys" (Dillman, 1978, p. viii).

Dillman's method for mail questionnaire design was built and refined through the course of nearly fifty surveys undertaken by himself and several other researchers. This extensive testing and refinement convincingly demonstrated that a response rate of about 75% could consistently be attained with the general public and that a percentage around 90% was even possible with specialized populations.

The design of a questionnaire involves much more than just the presentation of questions to a group of people; it also involves human psychology. The TDM presents an array of tools which permit administrative or design details to be tied to human behaviour, and this is the reason why it is possible to achieve good results. Consequently, the TDM is flexible and adaptable to specific research needs and constraints.

3.4.1 Design Considerations

This section presents the main considerations taken in the design phase of the study. It is understood that many other design factors were considered but these are not explicitly introduced for the sake of brevity. For more details on the TDM approach, the reader can refer directly to Dillman's work. Backstrom and Hursh-Cesar (1981) also provided very useful suggestions to question wording and questionnaire lay-out.

The primary concern when designing the questionnaire (see Appendix III) was to reduce the cost to the respondents. To achieve this, four main points were considered:

(1) decrease time for completion;

(2) decrease mental effort for comprehension;

(3) decrease sources of embarrassment;

(4) eliminate any direct monetary cost.

One of the consequences of this first concern was to plan the physical layout of the questionnaire in every detail to ensure not only an ease of answering, but also that data was obtained efficiently, accurately, completely, and in a usable form.

The questions were ordered in a logical manner as much as possible: the questions on knowledge at the beginning, and the concluding questions on possible improvements near the end. The professional profile questions appeared at the conclusion. Questions with long series of items or variables were distributed evenly throughout the questionnaire. Finally, it was important to build a sense of flow and continuity, and this was achieved by using transition statements between the sections forming the main themes of the study.

In addition, the first question was designed to "grab" the attention of the respondents. It tried to follow as closely as possible several basic criteria proposed by Dillman:

(1) be easy to answer to convey a sense of easiness and quickness;

(2) relate to <u>all</u> the respondents; if not, they might think that the remaining questions do not apply and throw the questionnaire away;

(3) clearly relate to the survey topic;

(4) "force" the respondents to think about landscape management, and set the mood for the remainder of the questionnaire;

(5) convey a sense of neutrality; and,

(6) provide a visual stimulus, such as maps.

A second important concern was to increase the reward to the respondents essentially by making the questionnaire interesting, in content and in appearance, and also in showing positive regard and appreciation. In complement, as an incentive, the respondents were promised a copy of the report upon request.

The remainder of the questions were regrouped by sections, which served to test the eight hypotheses introduced in the previous section. The section on possible improvements of FLM (see Question 19 of the questionnaire) represents the cornerstone of the study. The question proposes different ways to improve some of the major variables covered earlier in the questionnaire. It was also assumed that foresters would have other ideas for improvements so

an open-ended question was added. As revealed later, this provided very interesting and thought-provoking suggestions.

As a final design consideration, although it is assumed that FLM represents a legitimate and worthwhile discipline in forestry, plenty of space and opportunities to express opposite views were given to the respondents and these constituted valid and important input in the study.

3.4.2 Limitations of the Questionnaire

In designing the questionnaire, the limitations of the medium being used had to be consistently kept in mind. Such limitations included: no control over the respondent and his/her possible substitution, possible slow and low return, probability of unknown bias from refusals, high sensitivity to wording and construction procedures, and possible bias from a higher number of respondents having great interests in forest landscape management.

3.5 Measurement of Variables

All the variables or questions asking for measures of intensity of feeling, importance, and satisfaction were measured using a Likert five-point scale with an increasing level starting at 1 and ending at 5. This type of scaling is considered appropriate for knowledge and attitude measurements, and produces ordinal data (Youngman, 1979). Furthermore, when necessary, a "Don't Know" (9) category was provided and also, some questions requested for further explanations, suggestions, or comments.

For the purposes of analysis and reporting, the five categories were collapsed and re-defined into three more manageable ones: Low (1-2), Moderate (3), High (4-5). Exceptionally, because of the nature of certain questions, it was necessary to leave the "Not at All" (1) category as it was so in such cases, the regrouping was done as follows: Not at All (1), Moderate (2-3), High (4-5).

The questions that presented a list of answers (nominal level of measurement) were regrouped into broader categories to increase the number of respondents in each "new" category. This has been done to facilitate the subsequent statistical analyses.

3.6 Pretest Procedures

After 13 extensive revisions, the questionnaire was pilot tested before finalization. This stage of the design was crucial to detect any construction defects and to see if the respondents had any problems with answering the questions. The questionnaire was directed to the same type of respondents that formed the sample and also to potential users of the data. Consequently, eight professional foresters, including two landscape foresters, were asked to answer the questionnaire in a face to face interview, whenever possible. In addition to polishing existing questions, the involvement of the two specialists in forest landscape management provided very useful insights into the content of the questionnaire. The TDM approach strongly recommends the physical presence of the researcher while the pre-testers are answering the questionnaire for two main reasons: (1) to get "verbal feedback" on difficult points as soon as they appear; and (2) to observe the respondents, "nonverbal feedback", for hesitation before answering, erasures, skipping questions that are returned to later, and so on.

Also, Dillman has developed a specific set of TDM pretest procedures that greatly improves questionnaire quality. The procedures are based on recognition that any pretest of a mail survey must answer several key questions. Appendix IV introduces the five special questions that were added at the end of the pilot questionnaire. The main changes made as a result of the pilot test included: addition of new questions; deletion of questions; re-wording of existing questions; re-ordering of the questions; and revision of the general formatting of the questionnaire.

As a final note, despite the small scale of the pretest, due to cost and time constraints, it provided extremely useful insights and guidance for the subsequent reviews of the questionnaire.

3.7 Sampling Method and Sample Size

The sample was selected with two main concerns in mind: (1) that the number and kinds of professionals in the sample be sufficiently representative of the whole population of professional foresters; and (2) that each individual in the population has a known equal chance of being selected. The resulting probability sample was thus free of personal judgments and

biases. In theory, by eliminating human biases, only errors occurring randomly should affect the sample drawn and sampling error is the precision measure that indicates how close the sample is to the "true population".

The choice of the sampling method used in this survey, a systematic random sampling, was dictated by the alphabetically listed names of the professional foresters, including trainees and pupils, presently registered in British Columbia. In addition, to ensure sound and valid inferences of the results from the sample chosen to the whole population, it was essential to select the respondents randomly from a complete list of members. This guaranteed that the sample would be representative of the population. The list was made available for this study through the British Columbia Association of Professional Foresters office located in Vancouver.

There is no definite way to decide upon a sample size. Besides sample precision (or level of accuracy desired), several other factors had to be taken into consideration: homogeneity of the population, prior information about the characteristics of the population, sampling procedure, resources available, number of data analysis levels, geographical dispersion of the population, type of measurement (rating scale) used, and the response expected (Dillman, 1978; Jolliffe, 1986).

Although the population was believed to be relatively homogeneous in terms of professional education and interest, i.e. forestry, its dispersion over the province demanded a relatively large sample. Different geographic terrains and conditions, for example the Coastal Mountains versus the Interior Plateau, dictate, to a certain extent, the kinds and intensities of forest landscape management issues that foresters experience. Consequently, a large sample was necessary to represent the six forest regions of the province.

The recommended sample size for a 95% level of confidence with 6% sampling error (assuming a 50/50 split on the dependent variables) is 267 (DeVeus, 1986, p.63). In simpler terms, there is a 95% confidence that the attitudes and perceptions expressed in this survey are within six percentage points of the attitudes and perceptions that would be obtained if all B.C. professional foresters had been surveyed. Since the main concern of this study is to present results that would be sufficiently precise to reflect general attitudes and perceptions, it

was concluded that a sampling error of 6% or in other words, an allowed difference between groups of 6 percentage points, would be sufficient. For example, if 50% of the sample answered 4 (Very Much) for one question, this means that because of the sampling error, between 44 and 56% of the total population would in fact answer 4 for the question.

In addition, Dillman (1978) suggests that 300 questionnaires usually represent an optimal number that one individual, with limited time and budget, can handle efficiently. Knowing the fact that a response rate can be as high as 90% when dealing with a specialized population (Dillman, 1978), it was decided to select 300 names from the list with the hope that the final sample size would be around the pre-calculated 267. The official number of the sample size for the 1986 Survey of Professional Foresters was 264.

To get a total of 300 names using the systematic random sampling method, the total number of professional foresters registered at the time (2,263) was divided by that pre-determined sampling size in order to pick every nth person of the list, i.e. the 7th. The sampling started at a random point chosen from a random table.

Backstrom and Hursh-Cesar (1981), and many others, point out that a careful systematic random sampling helps to ensure elimination of unintentional bias. To reduce further sampling errors, two additional precautions were taken: (1) each selected index card, containing one name and address, was photocopied to avoid translation errors; and (2) all selected names and addresses were subsequently cross-checked, and corrected if necessary, with the latest release of the 1986 members list of the Association of British Columbia Professional Foresters. This last precaution certainly reduced the number of non-respondents caused by moving.

3.8 Treatment of Non-Respondents

After a brief overview of the literature, no real consensus seemed to exist on the issue: "Does the non-respondent group bias the survey results?"

On the one hand, there is a widely accepted assumption that late respondents, those who return questionnaires after special efforts such as the usual follow-ups, display similar attitudes and perceptions to non-respondents (Kivlin, 1965; Leslie, 1972). On the other hand,

there is a school of thought stipulating that late respondents do not provide a reliable basis for estimating the characteristics of non-respondents (Ellis *et al.*, 1970; Brown *et al.*, 1980; Wellman *et al.*, 1981).

Obviously, the solution to the problem of non-respondent bias is to try to reduce the percentage of non-respondents by using extensive follow-ups. Another proposition is to indirectly secure information about the non-respondents in order to verify if they differ from the respondents and then, to check if non-respondent bias does really exist.

Certainly, the above question on non-respondent bias can be reformulated to better reflect the present study of professional foresters: "Does the non-respondent group in a specialized population bias the survey results?" After studying the question, Becker and Iliff (1983) conclude that when sampling an homogeneous population[1], it is not necessary to obtain a high response rate to avoid non-response bias. This implies that extensive follow-ups may not be necessary after all. They also indicate that non-respondents were not found to be significantly different than respondents from the same population. Several other studies support these findings and also show the advantages of using mailed questionnaires with homogeneous groups (Wallace, 1954; Gibson and Hawkins, 1968; Burdge and Field, 1979).

The approach taken in this study borrowed from the two schools of thought by getting as many questionnaires back as possible using timely and relatively forceful follow-up letters. This approach certainly helped to get a very high rate of response that made non-respondent bias minimal. Consequently, no special attempts were made to secure information on non-respondent characteristics, either by using the telephone or sending a special short questionnaire to get basic data on key variables.

3.9 Final Package and Implementation

The final version of the questionnaire was photo-reduced and assembled in a 5 x 8" booklet format for ease of use and convenience (see Appendix III). A simple, but effective cover page was designed to render the questionnaire more attractive: it consisted of a forest stand

[1]Homogeneous populations mean people with common interests and in this study, professional foresters are believed to share a common interest i.e. forestry.

profile, the title of the study, some basic information about the study, and a contact address. The back cover was purposely simple. It consisted of an invitation to make additional comments on forest landscape management and/or the survey research, an appreciation statement, and plenty of white space. No questions were presented either on the front or the back page. Ample space was provided throughout the questionnaire for written comments and was effectively used by many respondents. These comments were transcribed verbatim, shuffled, and sorted to extract and analyze the essential points.

The covering letter (see Appendix V) included with the questionnaire represented the major link between the researcher and the respondents. It had the crucial role of convincing the respondents that the study was worthwhile enough for them to spend their time answering the questionnaire. The letter was written strictly following Dillman's procedures. It had a specific set of objectives: (1) explain what the study was about; (2) convince the respondents of the usefulness of the study; (3) convince them that their responses were important and that no one else could be substituted; (4) explain that they were chosen randomly from the list of B.C. Professional Foresters; (5) promise complete confidentiality; (6) specify where the results were to be made available and promise a copy of the results upon request; and lastly, (7) provide a contact name and address for more information or questions. Finally, to obtain the highest response rate possible, the covering letter was personalized using the name of the respondents, and each was individually signed.

The final package sent to the 300 professional foresters consisted of one copy of the questionnaire, the covering letter, and a stamped, pre-addressed return envelope. For a more personalized package, first-class stamps were used on both the main and return envelopes.

The actual survey was conducted over a three-month period starting June 20, 1986 and ending September 11, 1986. The survey duration was slightly lengthened in September to assure that foresters involved in summer fieldwork would be reached.

The follow-up procedures were substantially modified from Dillman's for logistic purposes. Instead of the proposed postcard reminder sent one week after the initial mailing, a first personalized follow-up letter was sent after two weeks, i.e. July 7, 1986 (see Appendix

VI). The short letter served both to thank those who had responded and to re-emphasize for those who had not responded the importance of filling out the questionnaire so that an accurate representation of views and opinions of B.C. professional foresters could be obtained. In the event that some non-respondents were missed because of seasonal fieldwork, the second and final follow-up letter was sent later than originally planned, on September 11, with another replacement questionnaire and stamped, pre-addressed return envelope. The letter was slightly more emphatic and did mention the encouraging large number of questionnaires returned so far by their colleagues (see Appendix VII).

3.10 Statistical Plan for the Survey Analysis

This section describes the types of data collected and the methods used for their analyses. It is organized into four parts. The character of the data and the way they were coded are discussed in the first and second sections respectively. The third section explains the rationale for choosing the statistical tests used for the different levels of measurement and their particular limitations. The final part introduces the method used to test the significance of the results.

3.10.1 Characterization of the Data

To a certain extent, the goals and objectives of the study helped to determine the levels of measurement required to obtain appropriate data. The data were collected in the form of nominal and ordinal levels of measurement. In turn, the levels of measurement helped to determine the types of statistical tests (and the strength of these tests) used in analysis. An important point is that a higher level of measurement (ordinal) offers more powerful tests than a lower level (nominal), and this increases the level of certainty of conclusions. In this study, the most powerful statistical tests available were chosen whenever possible.

3.10.2 Coding of the Results

Most of the answers on the questionnaire were already in the form of numbers so they were entered directly into a computer file to perform statistical tests. Each variable on the questionnaire was assigned a name, description, and data field and was recorded in a codebook.

A coding reliability check was done on about 10% of the entries. In this case, an error free coding below 97% (arbitrary chosen) was not considered acceptable. Even under this stringent threshold, no revision was necessary. In addition, data were cleared of any non-conformed characters or values through visual checks and by running frequency tables and crosstabulations.

In the case of verbatim responses, i.e. open-ended questions, comments and suggestions, they were categorized by general thematic content and analyzed after the final questionnaire was received.

3.10.3 Data Analyses and Tests of Significance

This research survey was carefully designed to produce results that permit generalizations from the sample to the whole population of professional foresters, relatively free of personal biases. In other words, the main reason for the careful sampling randomization was to describe, with a certain degree of assurance, foresters and conditions beyond those studied in the sample. Tests of significance are the statistical tool used to be assured of the significance of the generalizations.

For the purposes of this study, the significance level chosen for all statistical tests was 0.05 (or a 95% confidence limit). In other words, it was accepted that there was a 5 percent chance that an association between two variables was simply due to chance. As a general rule, the tests of significance were interpreted as follows:

- probability more than 0.05 = "significant association between the sample and the population not proven" (or association not likely to hold in the population);
- probability less than or equal to 0.05 = "association probably significant" (or association likely to hold in the population);
- probability less than or equal to 0.01 = "association almost certainly significant" (or association very likely to hold in the population).

The hypotheses investigated in this study were statistically tested against the null hypothesis of non-association between the variables. Possible relationships between the variables or questions pertaining to each hypothesis were tested and showed to be probably

true or probably false. It is important to remember that tests of significance do not reveal anything as to the strength or direction of a relationship. They simply tell whether any relationship that does exist (weak or strong) is likely to hold in the population from which the sample was drawn[2].

3.10.3.1 Univariate Procedures

As a first step, basic descriptive statistics were used to analyze the questions relating to each hypothesis. In this study, the procedure followed was to collapse response categories and calculate percentage distributions[3]. Only percentages for collapsed categories were presented for the sake of clarity, brevity and for subsequent bivariate and multivariate analyses. For nominal variables, the categories with similar characteristics were combined in order to increase the number of respondents in each new category. For ordinal variables, which were measured on an increasing scale of 1 to 5, categories 1 and 2 were collapsed together as well as 4 and 5. Thus, three "new" categories were developed and used for the analysis for the same reason mentioned above. Collapsing categories in this manner permitted subsequent more elaborate analysis i.e. crosstabulations.

3.10.3.2 Bivariate Procedures

The next step in the data analysis was to use crosstabulations to determine whether two variables were related (associated). In this context, detecting relationships between two variables was useful for understanding attitude variations (Hypothesis VIII) towards different FLM issues.

Pearson chi-square was used to test the hypothesis that two variables of a crosstabulation were independent of each other by determining whether actual (observed) frequency distribution between independent sample groups was significantly different from that expected, given the total number in the studied categories and sample groups. For a confident

[2]All statistical analyses were done using the Statistical Package for the Social Sciences (SPSSx) available on the Michigan Terminal System (MTS) at the University of British Columbia.

[3]The guide used for interpreting percentages as group sizes is presented in Appendix VIII.

interpretation of chi-square, Norusis (1983) points out that certain conditions must be met. First, the data must be random samples from multinomial distributions. The sampling procedure assured that this condition was met. Secondly, the expected values of each of the crosstabulation cells must not be too small. This condition alone has necessitated the regrouping of the basic categories. Although there is a general acceptance that all expected frequencies be at least 5, some studies indicate that this minimum can be relaxed (Everitt, 1977; Norusis, 1983, 1986). For example, Norusis (1986) mentions that chi-square test should not be used if more than 20% of the cells have expected values less than 5, but that none of those values should be less than 1. This condition was adopted throughout the survey analysis. A significant chi-square value was designated in the tables by an asterisk "*" at the 0.05 level and by two asterisks "**" at the 0.01 level.

As a reminder, chi-square test is only a test of independence. It specifies whether two variables are associated in the population. By itself, chi-square provides little information about the character of the relationship (if any) i.e. its strength (importance), direction (positive or negative), and nature (linear or not). For a full investigation of a relationship, measures of association were used.

Many different statistical techniques or measures of association exist to study and quantify the relationships among variables, but no single measure adequately summarizes all possible types of association (Norusis, 1983). In other words, no single measure of association is best for all situations. The following presents the measures of association used for each level of measurement.

(A) Measures of Association used for Nominal Variables

Variables measured at the nominal level have inherent limitations as to their ability to explain the character of an association. Nothing can meaningfully be said about the direction or nature of a relationship. At this level of measurement, only the strength of an association can be measured.

There are basically two types of measures of association for nominal variables: measures based on chi-square and measures based on a logic known as proportional reduction

in error (PRE) introduced by Goodman and Krustall (1954). For many reasons, chi-square-based statistics do not represent good measures of association between two variables (Norusis, 1983, 1986 and Healey, 1984). In addition, they are very difficult to interpret compared to the measures obtained from Goodman and Krustall's statistics.

One of the best measures of association for nominal variables, and the one used in this study, is based on PRE and is called lambda. Lambda helps to explain the strength of a relationship and can also offer the possibility of predicting people's attitudes and perceptions on one variable given a knowledge of their characteristics on the other variable.

(B) Measures of Association used for Ordinal Variables

More powerful measures can be used when both variables are measured at the ordinal level. Those measures provide a summary index of the existence, strength, and direction of a relationship. Also based on PRE, the measure of association for ordinal variables used in this study is Goodman and Krustall's gamma (G). Gamma measures the proportional reduction in error possible in predicting rank order variation in response to the different questions (variables) over the potential errors that might derived if these were random predictions. It ranges in value from -1.0 to +1.0 (Goodman and Krustal, 1954).

Gamma, like all the other measures of association at the ordinal level, statistics only measure monotonic associations (Norusis, 1986). In the case where non-monotonic relationships are suspected, a nominal measure of association are used instead. Although a nominal measure of association is less stringent as to the nature of the relationship, it is also less sensitive and does not use the more advantageous ordering information provided by ordinal variables

(C) Measures of Association used for Mixed Levels of Measurement

In the case where two variables are measured at different levels, a conservative and safe approach is taken by choosing statistics according to the variable measured at the lower level. Thus, when one variable is nominal and the other ordinal, both variables are treated as they were measured at the same level, i.e. nominal.

CHAPTER IV

SURVEY ANALYSIS AND INTERPRETATION

4.1 Questionnaire Returns

All 300 questionnaires were mailed on June 20th, 1986. A progress report of the relationship between mailed contacts and response rates is presented in Table 4.1. The response rates were calculated as the percentage of contacts with eligible respondents who returned completed questionnaires. Thus, the undelivered questionnaires caused by unknown addresses were excluded from calculations.

At the last reception date, i.e. September 20th 1986, a response rate close to 90 percent (264 questionnaires) had been achieved, excluding an additional 4 percent (13 questionnaires) for refusals. No specific reasons were given for these refusals. Overall, only 6 percent (18 questionnaires) were not returned or "lost" for different reasons. The result of this survey can certainly be added to the long list of very successful mail surveys that have been implemented over the years using the Total Design Method (TDM) of Dillman (1978)[1].

Figure 4.1 displays the number of responses (in absolute values) over the course of the fieldwork[2]. The occurrence of peaks is partly explained by the sometimes hectic field-office summer work schedule of many foresters (e.g. periods between week 5-7 and 9-11) and partly by the effect of the follow-up letters (e.g. periods between week 2-5 and 12-16). Clearly, the intensive follow-up procedures had a significant impact on the final number of respondents. To counter-act the potential negative impact of the seasonal fieldwork on the final response rate,

[1]Up to the time of Dillman's book, nearly 50 individual mail surveys had been conducted that had relied on the TDM. The average response rates for those surveys were approximately 74 percent and no survey obtained less than a 50 percent response rate, "...a level once considered quite acceptable for mail surveys" (Dillman, 1978, p.21). Of all the surveys referred to by Dillman, response rates of nearly 90 percent were not unusual for some specialized groups. It was then not much of a surprise to reach that level with the present survey of professional foresters.

[2]All charts (figures) presented in this chapter were produced using the micro-computer software package: Harvard Presentation Graphics.

Table 4.1 - Progress report on the response rates over time.

June 20, 1986:	Sent out 300 questionnaires.
July 7, 1986:	Compilation before sending the first follow-up letters: 103 questionnaires received 10 refusals[1] 1 unknown address **Response Rate = 35%**
July 7, 1986:	Sent out the first follow-up letters.
September 10, 1986:	Cumulative compilation before sending the second follow-up letters: 258 questionnaires received 13 refusals 4 unknown addresses **Response Rate = 88%**
September 11, 1986:	Sent out the second follow-up letters.
November 20, 1986:	Final cumulative compilation: 264 questionnaires received 13 refusals 4 unknown addresses **Final Response Rate = 90%**

[1]Refusals are uncompleted returned questionnaires (not included in the calculations).

the second follow-up letter, including another copy of the questionnaire, was sent after the summer season, i.e. September 11th (after the 12th week). This resulted in a peak of return that spread over four weeks. Due to the low percentage of non-respondents and to time and budget constraints, no attempts were made to secure information about the non-respondents. The possible unknown bias caused by refusals is assumed to be minimal due to their low number.

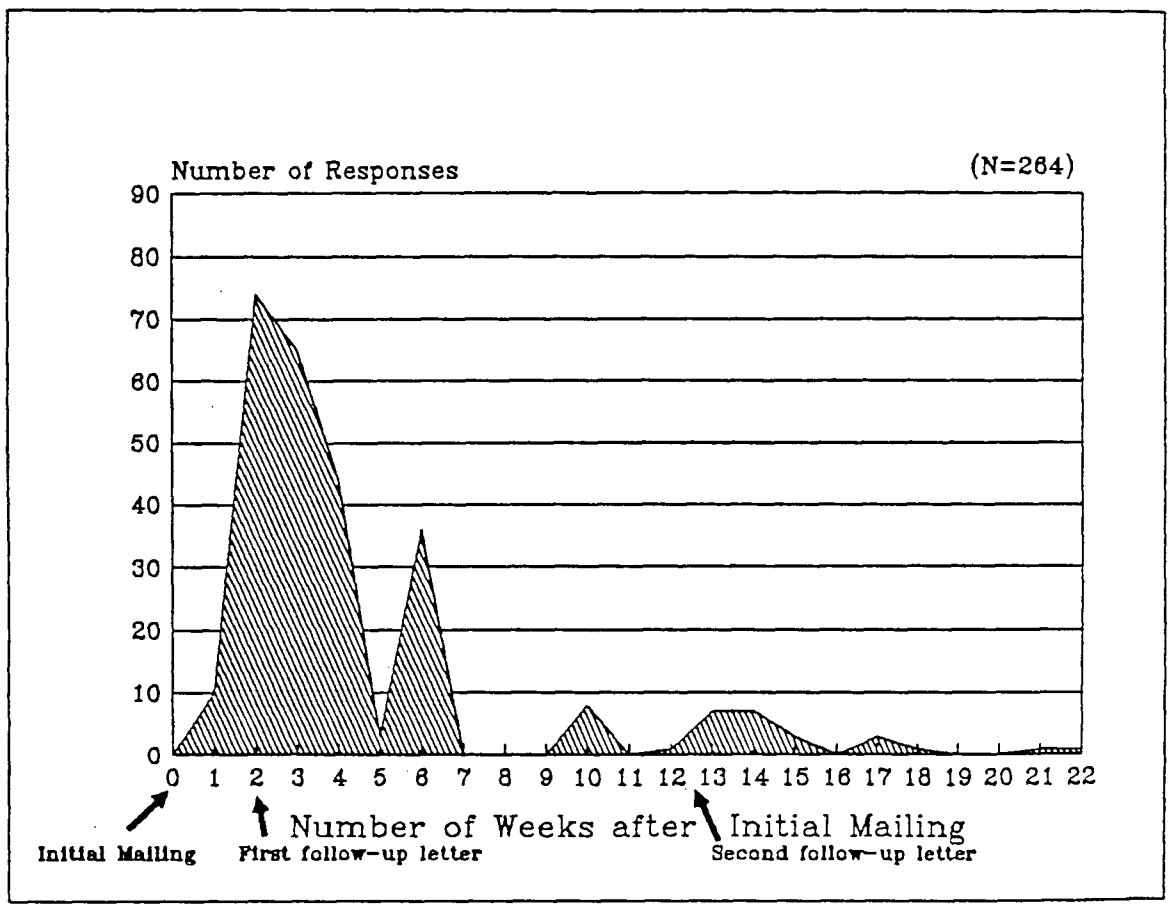

Figure 4.1 - Relationship between mailed contacts and number of questionnaires returned.

An initial expectation was that the response rate for each forest region of the province would be markedly different because of the various levels of landscape management issues present in each one of them. It was thought that the intensity of these issues resulting from social and physical factors, such as number of residents/tourists that raise concern, ruggedness of the topography, and intensity of forestry practices would influence foresters interest in answering a questionnaire on FLM. Judging by the regional high rates of response and by the relatively small variation between the lowest rate (85% for Kamloops region) and the highest (100% for Cariboo region), the above factors do not seem to influence foresters' interest in FLM (Figure 4.2). On the contrary, the excellent overall and regional response rates strongly suggest interest in or concern about FLM. As a matter of fact, many foresters expressed their appreciation of having the chance, "at last", to give their views on this topic.

4.2 Professional Profiles of Participants

This section describes the foresters sampled. Often called demographic or background characteristics, professional profiles present important facts about foresters that aid in the understanding and interpretation of the data. Four professional attributes were considered: primary forestry discipline, employer category, number of years of forestry practice, and the forest region of each respondent.

In addition to describing the population surveyed, the questions on professional profile constituted the independent variables that were used to breakdown the other questions (i.e. dependent variables) and test Hypothesis VIII on attitude variations. These breakdowns lead to an understanding of the relationships between variables that helped to explain variations in foresters' attitudes. Variations in opinions or attitudes among different groups of foresters were noted throughout the analysis.

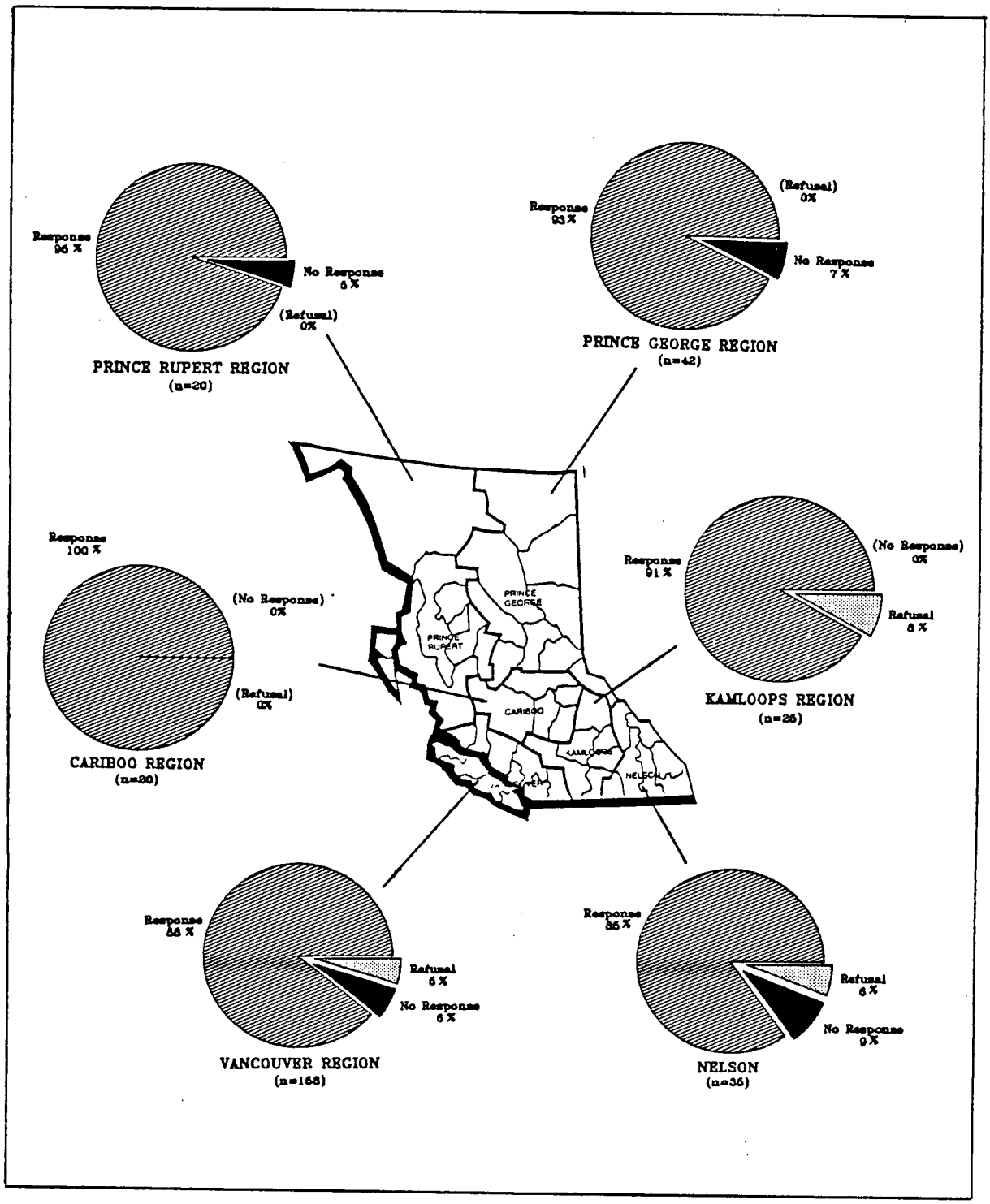

Figure 4.2 - Regional number of foresters contacted (n) and response rates.

4.2.1 Forestry Discipline

The best represented forestry aspect was "Silviculture/Ecology" with 25% of the respondents, closely followed by the "Harvesting/Engineering" group with 22% (Table 4.2). Around 10% were primarily involved in administrative duties and about the same percentage were in forest planning and inventory. More than 20% of the foresters could not specify one primary activity involved in so they were regrouped into the "Several Aspects" category. Very few (4%) were involved in protection-related activities, such as wildlife management, recreation, and hydrology. Finally, more than 8% were classified into the "Other" category. This category comprised foresters involved in teaching, research, remote sensing, computer, sale, manufacturing, valuation, and economics. Unemployed and retired foresters were also included in this category.

4.2.2 Employer Category

The employer category was originally recorded in seven categories, including an open one for "Other". The categories "Federal Government", "Academics", and "Trainee" represented only about 1%, 4%, and 2% of the respondents, respectively. Consequently, they were regrouped into the "Other" category. By far, the two largest employer categories were private industry and the provincial government, which both accounted for 37% of the foresters. The remaining 16% were consultants or contractors.

4.2.3 Years of Forestry Practice

Again, for practical reasons and further analysis, the eight categories specified on the questionnaire were reduced to five categories by regrouping the last four categories into "21 Years and Over". Thus, an overwhelming 81% of the foresters practiced forestry for 20 years or less.

Table 4.2 - Summary of foresters' professional profiles.

PROFESSIONAL PROFILES	NUMBER (N=264)	PERCENTAGE
PRIMARY ASPECT OF FORESTRY		
- Silviculture/Ecology	66	25
- Harvesting/Engineering	57	22
- Several Aspects (unspecified)	53	20
- Administration	26	10
- Planning/Inventory	27	10
- Protection Aspects	10	4
- Other	22	8
- No Answer	3	1
TOTAL	264	100%
EMPLOYER CATEGORY		
- Private Industry	98	37
- Provincial Government	97	37
- Consultant/Contractor	42	16
- Other	26	9
- No Answer	1	1
TOTAL	264	100%
YEARS OF PRACTICE		
- 0-5 years	40	15
- 6-10 years	80	30
- 11-15 years	59	22
- 16-20 years	36	14
- 21 years +	48	18
- No Answer	1	1
TOTAL	264	100%
FOREST REGION		
- Vancouver	135	51
- Prince George	39	15
- Nelson	30	11
- Kamloops	21	8
- Cariboo	19	7
- Prince Rupert	19	7
- No Answer	1	1
TOTAL	264	100%

4.2.4 Forest Region

The respondent's forest region in which (s)he practiced was recorded in one of six categories: Cariboo, Kamloops, Nelson, Prince George, Prince Rupert, and Vancouver (including Vancouver Island). More than half of the respondents were from the Vancouver forest region. The other half were distributed as follows: about 15% from the Prince George region, 11% from the Nelson region, 8% from the Kamloops region, and around 7% from both the Cariboo and the Prince Rupert forest regions.

4.2.5 Summary of Professional Foresters' Profiles

The foregoing information on professional profiles of the foresters indicated that foresters were involved in a fairly large array of forestry disciplines. However, protection-related disciplines were under-represented when compared to "Harvesting/Engineering" or "Silviculture/Ecology". Almost three foresters out of four were equally divided between private industry or the provincial government. In addition, 81% of the respondents had 20 years of practice or less, and more than half of them were located in the Vancouver forest region.

The overall distribution of forestry aspect, employer category, years of practice, and forest region indicated that the sample was not strongly skewed on any of these variables. Consequently, the results could be generalized meaningfully to the whole population of professional foresters working in British Columbia.

4.3 Analysis and Interpretation of Results

This section presents the results of the univariate and bivariate analyses of the questions related to each hypothesis. The univariate analysis investigates the percentage distributions of the respondents for the questions[3], while the bivariate analysis explores the influence of the different professional characteristics on foresters' attitudes (testing of Hypothesis VIII). The bivariate analyses, using crosstabulations, chi-square test of independence, and measures of association, seek significant[4] relationships between pairs of variables and answers three basic questions:

(1) Does an association exist?

(2) If an association does exist, how strong is it?

(3) What is the pattern and/or the direction of the association?

Finally, the results are analysed to determine if the data support the hypotheses, and more discussions are provided.

4.3.1 Levels of Knowledge

Hypothesis I: A majority of foresters have a relatively low level of knowledge of forest landscape management.

Univariate Analysis

Figure 4.3 indicates the comparative response distribution of the foresters' with respect to their self-assessment of knowledge regarding the three aspects of FLM: concepts, program, and policy. In relative terms, the findings indicate that FLM concepts were highly known by 26% of the foresters, followed by the program (20%) and the policy (13%).

Regarding the question on policy, several foresters expressed a certain level of confusion. For many, policy and program were the same thing, or at least closely related, and this could explain the slightly higher number of non-respondents for Question 4 (Figure 4.3).

[3]Appendix VIII presents the general guide adopted in this thesis for reporting percentages as group sizes.

[4]The significance of a relationship is denoted in tables as follows: "*" for $p < 0.05$ and "**" for $p \leq 0.01$.

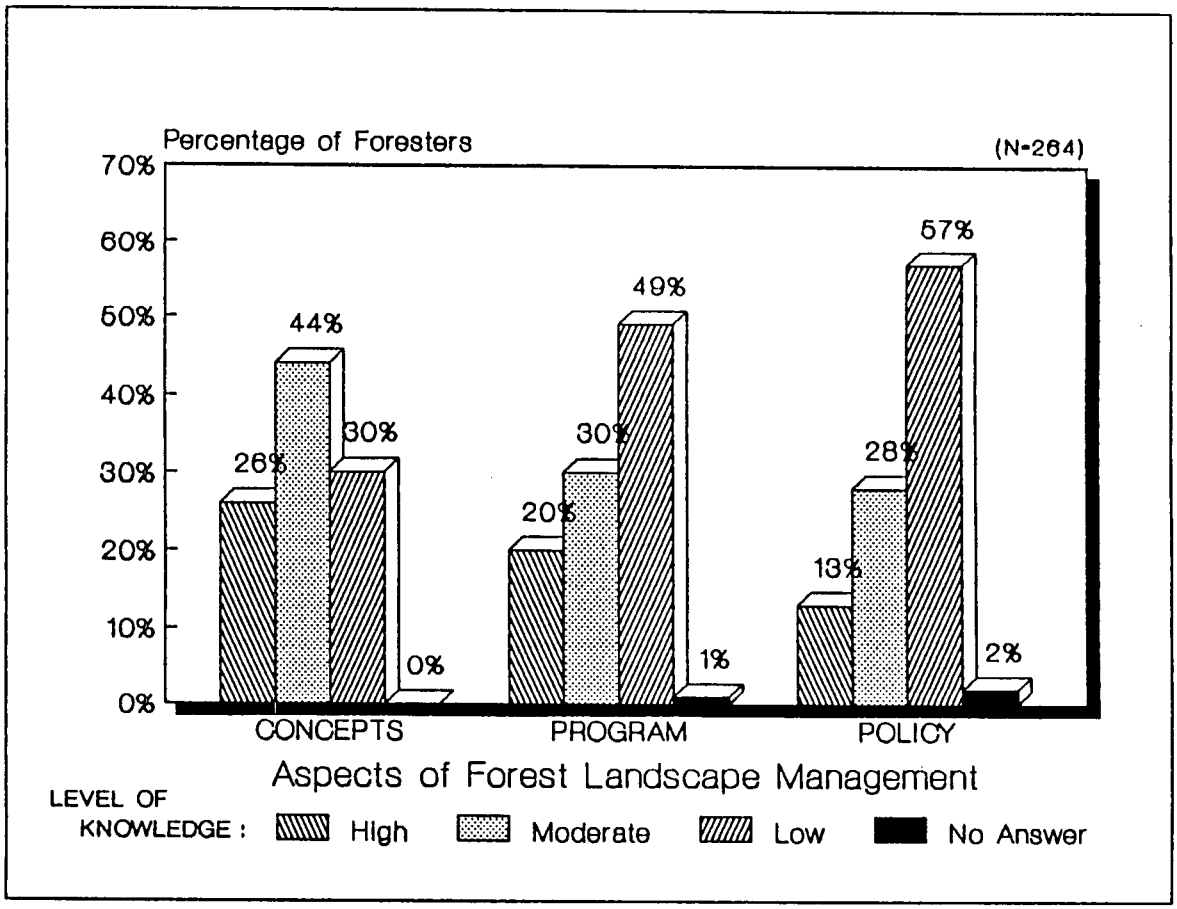

Figure 4.3 - **Comparative percentage distributions of foresters' levels of knowledge of three FLM aspects.**

In practice, it is true that program and policy are closely related but the rationale behind the question was that one might know a little about the existence of the program but not know about the specific policy on FLM serving to implement it and vice versa. In general, the individuals who perceived the program and the policy as being the same responded to Question 4 with the same response category used for Question 3, which related to level of knowledge about program.

As a possible way to improve the effectiveness of FLM in B.C., Question 19.1 asked for the importance of having a stronger policy. Figure 4.4 shows that foresters had mixed feelings concerning this issue: a large minority (37%) felt it was highly important to have a stronger policy. Close to 18% said it was moderately important whereas about 29% of the foresters felt that it was of little importance. An important point was that 14% of the foresters said they did not know enough about the issue to answer the question.

Bivariate Analysis

The bivariate analysis revealed that there were significant positive relationships between level of knowledge of the three aspects and years of practice (Table 4.3), meaning the higher the number of years, the higher the level of knowledge. However, the weakness of the relationships indicated that other variables may be more strongly associated with level of knowledge of concepts, program, and/or policy[5].

The analysis also revealed a very interesting and intriguing point: of all the foresters who declared having a high level of knowledge of FLM concepts, only 12% of them appear in the "0-5 Years" category as opposed to 22, 31, 36, and 31% respectively for the subsequent years of practice categories. This discrepancy appeared even stronger in the cases of the program and policy. For example, 70% of the foresters having between 0 and 5 years of practice had a low level of knowledge of the policy compared to 52% of the most experienced foresters. It was

[5]It is very important to note that due to the weakness of many of the significant relationships presented in this chapter, great care must be taken in their interpretations. A significant but weak relationship suggests there may be other, unmeasured, variables associated more strongly with the dependent variables considered in this study.

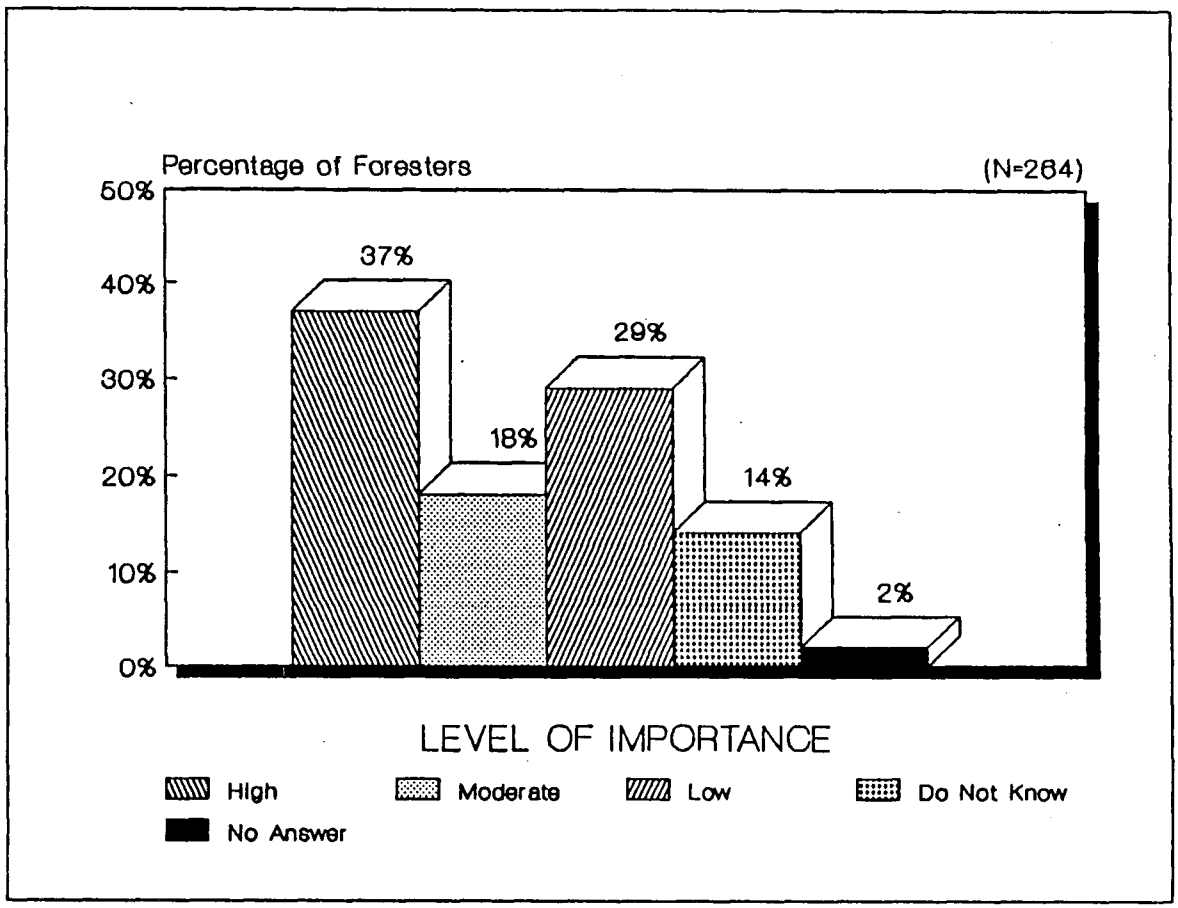

Figure 4.4 - **Response distribution to Question 19.1: "How important do you feel a stronger Ministry of Forests policy is to increasing the effectiveness of FLM in British Columbia?"**

Table 4.3 - Relationship between level of knowledge of the concepts, program, and policy and number of years of practice in forestry.

LEVEL OF KNOWLEDGE OF **CONCEPTS**	YEARS OF PRACTICE 0-5 (n=40)	6-10 (n=79)	11-15 (n=59)	16-20 (n=36)	21+ (n=48)
	%				
LOW	30	35	30	31	21
MODERATE	58	43	39	33	48
HIGH	12	22	31	36	31
Totals	100%	100%	100%	100%	100%

Notes: Missing data= 2 (N=262) Gamma = +0.16*

LEVEL OF KNOWLEDGE OF **PROGRAM**	(n=40)	(n=79)	(n=59)	(n=36)	(n=48)
	%				
LOW	68	51	44	39	44
MODERATE	22	29	34	28	37
HIGH	10	20	22	33	19
Totals	100%	100%	100%	100%	100%

Notes: Missing data= 2 (N=262) Gamma = +0.18**

LEVEL OF KNOWLEDGE OF **POLICY**	(n=40)	(n=79)	(n=57)	(n=35)	(n=48)
	%				
LOW	70	62	55	49	52
MODERATE	28	22	33	37	31
HIGH	2	16	12	14	17
Totals	100%	100%	100%	100%	100%

Notes: Missing data= 5 (N=259) Gamma = +0.17*

expected that "younger" foresters who recently graduated would have more knowledge about FLM concepts, program, and policy.

The bivariate analysis also revealed that level of knowledge of both program/policy and employer category were weakly but significantly related, i.e. working for a specific employer would significantly affect the number of foresters with a certain level of knowledge of the program and/or the policy. For instance, if only the three main categories of employer were considered i.e. consultants/contractors, private industry, and provincial government, about 56% of the foresters who worked as consultants/contractors had a low level of knowledge on the program compared to 54% of the private industry people and approximately 37% of the provincial government employees. The same pattern emerged for the policy: about 60% of the foresters who worked as consultants/contractors had a low level of knowledge compared to 66% of those working for the private industry, around 47% of those working for the provincial government, and 65% of those in the "Other" category. In sum, the provincial government employs the highest number of foresters who have the highest level of knowledge of all of the employer category.

It was expected that the forest region of the foresters would affect their level of knowledge simply because certain regions, for example the Vancouver region, encompasses a large number of people living in highly visible landscapes, which tend to create more public debates on landscape management issues. There existed, in fact, a weak but significant relationship between the forest region and level of knowledge of the program and policy. However, the level of foresters' knowledge within each region was quite unexpected (Table 4.4). For example, of these foresters working in the Vancouver forest region, the majority (58%) had a low level of knowledge of the program while only a few (15%) have a high level of knowledge. The trend was even stronger for the level of knowledge of policy: 65% of the Vancouver region foresters have a low level of knowledge. Furthermore, an overwhelming majority (83%) of the foresters practicing in the Nelson region had at least a moderate or higher level of knowledge of the Ministry's program.

Table 4.4 - Relationship between level of knowledge and forest region location of the foresters.

LEVEL OF KNOWLEDGE ON THE **PROGRAM**	FOREST REGION					
	Cariboo (n=19)	Kamloops (n=21)	Nelson (n=30)	Prince George (n=39)	Prince Rupert (n=19)	Vancouver (n=134)
	%					
LOW	37	52	17	59	32	58
MODERATE	42	29	43	21	37	27
HIGH	21	19	40	20	31	15
Totals	100%	100%	100%	100%	100%	100%

Missing data= 2 (N=262) Chi-square= 24.02** Lambda= 0.07

LEVEL OF KNOWLEDGE ON THE **POLICY**	(n=19)	(n=21)	(n=30)	(n=37)	(n=19)	(n=133)
	%					
LOW	42	71	37	62	37	65
MODERATE	47	19	47	19	53	23
HIGH	11	10	16	19	10	12
Totals	100%	100%	100%	100%	100%	100%

Missing data= 5 (N=259) Chi-square= 21.58* Lambda= 0.06

It seems that a better information system is in place in the Nelson region. This may be simply due to a better promotion of the FLM program by the Ministry's recreation staff. The Kamloops forest region had the highest proportion of foresters with a low level of knowledge of the policy (71%). Although it is reasonable to assume that level of knowledge of policy relates to the level of importance of a stronger policy, the crosstabulation analysis showed that there was no significant relationship between these two variables. This suggests that the level of knowledge foresters have of FLM has no effect on their attitude towards the importance of having (or not having) a stronger policy. Furthermore, the four professional profile variables did not have significant effects on the attitude towards a stronger policy.

When the relationships between the three variables on knowledge were tested, it was found that there were strong positive significant relationships between level of knowledge of concepts and level of knowledge of the program, and also between the former and level of knowledge of the policy. In other words, the higher the level of knowledge on program and policy, the higher the level of knowledge of FLM concepts. An even stronger positive relationship existed between the two variables level of knowledge of the program and of the policy. The strength of this last relationship reflects the comments expressed by several foresters that the policy and program are one and the same.

The strength of the above relationships confirms two important points: (1) the group of foresters with a high level of knowledge do not only know about the existence of the program or policy, but also about their content, and (2) program and policy represent important sources of information for the foresters but only a minority take advantage of them.

4.3.2 Summary and Discussion

The testing of Hypothesis I revealed that when taken as three individual entities, foresters' levels of knowledge of concepts, program, and policy support the hypothesis but in different degrees: (1) a minority of foresters (30%) had a low level of knowledge of concepts; (2) almost half of them (49%) had a low level of knowledge of the program; and (3) a majority (58%) possessed a low level of knowledge on the FLM policy. However, when pooled together, it was

found that close to half of the foresters (45%) had a low level of knowledge of FLM concepts, program, and policy, compared to 35% and 20% for the moderate and high level of knowledge categories, respectively.

In sum, the data supported Hypothesis I but to a lower degree than expected:

A very large minority of foresters felt they had a relatively low level of knowledge of FLM.

Several questions can be raised at this point: Is this relatively low level of knowledge of FLM concepts, program, and policy a consequence of a lack of interest on the part of the professionals? Or is it caused by an inadequate distribution of information? Or is it because of the inefficiency of the Ministry to achieve one of its mandates of training industrial and governmental foresters on FLM matters? With nearly half of the foresters having a relatively low level of knowledge of the program and policy, it can be assumed that one of the Ministry's objectives has not been successfully achieved. The analyses of the next hypotheses provide more information to answer the above questions.

The analyses also showed that the least experienced foresters, those having less than 5 years of practice in forestry, formed the largest sub-group of foresters having a low level of knowledge of the three aspects studied. The least experienced foresters were expected to form the largest group with a high level of knowledge because of the recent introduction of elective courses dealing with FLM concepts, program and policy at the university level. This did not appear to be the case, suggesting perhaps that forestry students are not interested in FLM or that they lack the time to take courses dealing with FLM due to an already over-loaded course schedule.

Foresters seemed to have a divided opinion about the importance of having a stronger policy. Although a large minority of them found this issue highly important, a minority also thought that a stronger policy was of low importance. This divided opinion and the relatively high rate of no answer for this question (14%) can be explained by two factors: (1) the confusion created by the possible double meanings of the word "stronger", and (2) the relatively high proportion of foresters (57%) who had a low level of knowledge of the present policy.

Several foresters raised the very pertinent point that "stronger policy" could mean "stronger wording" or "stronger enforcement". A small number of foresters commented explicitly on the need for a better enforcement of the existing policy. Unless such enforcement is done, "landscape management is just an academic daydream". One respondent pointed out that:

> "At the present time, forest industries are logging where and how they wish with little regard for actual management. A forester can not scream for proper landscape practices too many times when his paycheck and job are dependent on following the company' objectives. Stronger Ministry policy and enforcement are required throughout the forest industry to allow both industry and government foresters the chance to practice proper forestry".

On the other hand, others expressed the need for having a "clearer and more concise policy". One suggestion was to "get the policy straight" by specifying: (1) "who pays"; (2) "what professional advice is necessary"; and (3) "name responsibility: who is accountable, who makes the decisions". Consequently, a possible improvement would not necessarily be a "stronger" policy, but rather more a concerted effort to better know, understand, and enforce the present policy as well as applying the FLM program.

The existing significant relationships between level of knowledge and years of practice, employer category, and forest region respectively determine the most needed groups for education or training on FLM matters. The analysis of Hypothesis II "Sources of Knowledge" provides more information on this subject. It shows, among other things, the willingness of professional foresters to learn more about FLM.

4.3.3 Sources of Knowledge

Hypothesis II: Foresters' level of knowledge of forest landscape management is a function of limited information[6].

Univariate Analysis

Figure 4.5 summarizes the contribution of various sources to foresters' knowledge. In decreasing order of importance, the sources of information that moderately or highly contributed

[6]Although Hypothesis II assumes a lack of information on FLM as the main factor for the low level of knowledge, it is important to keep in mind that other factors such as poor accessibility or availability of existing information or a lack of interest on the part of the foresters could also contribute to poor knowledge. These factors are tackled in different parts of this chapter.

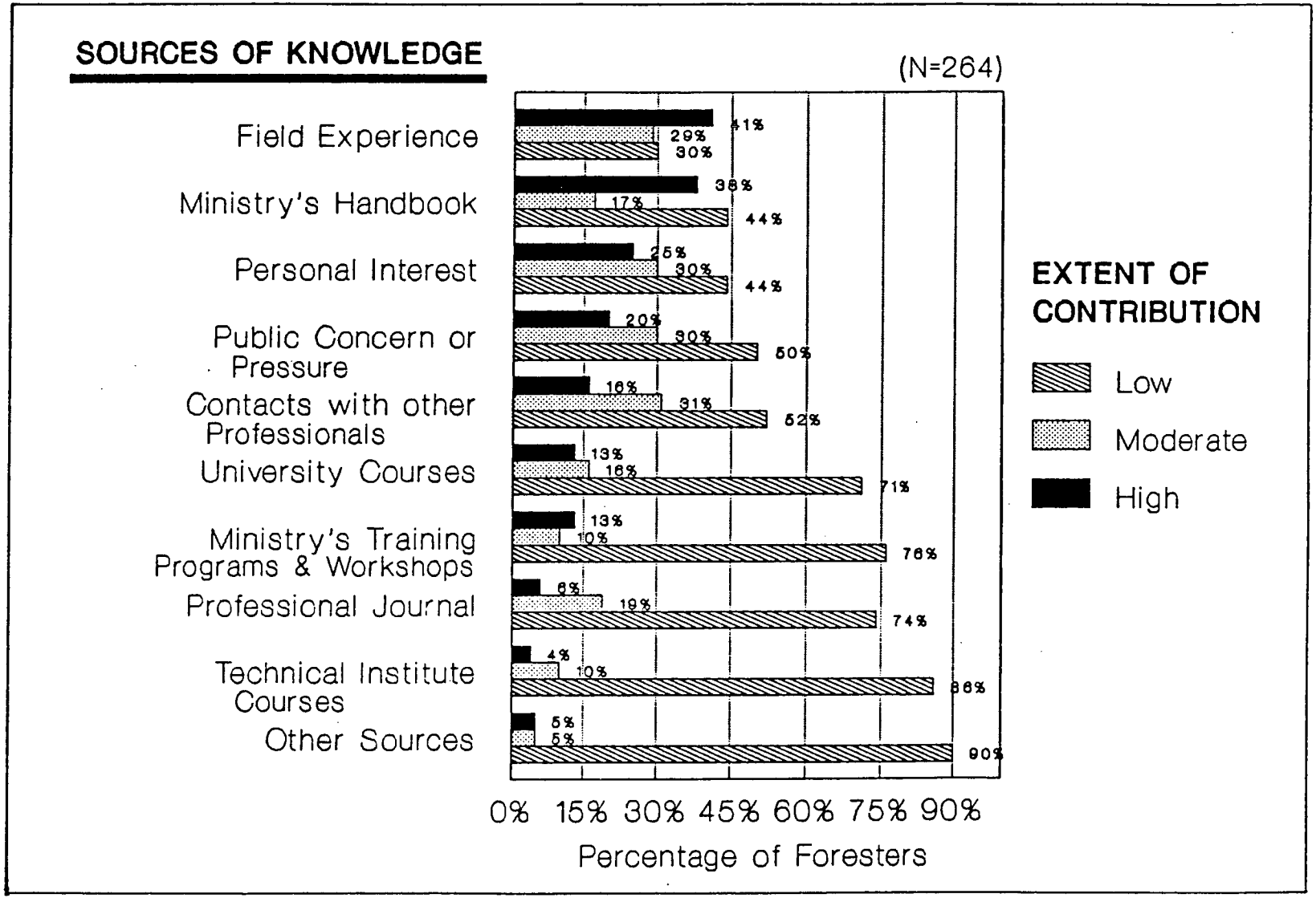

Figure 4.5 - **Response distribution to Question 5: "Please indicate to what extent each of the following (sources) have contributed to your level of knowledge about FLM?"**

to foresters' knowledge are: field experience (70%), the forest landscape handbook and personal interest in landscape management (56% each), public pressure or concerns (50%), contacts with other professionals (48%), courses at university (29%), professional journals (26%), Ministry's training programs and workshops (23%), and courses at technical institute (14%). Very few (10%) indicated that other sources contributed in a moderate or high manner.

Bivariate Analysis

Most of the paired variables showed a very significant, positive relationship; that is, the higher the extent of contribution of a source, the higher the level of knowledge on concepts, program, and/or policy (Table 4.5). These relationships are discussed in more detail in the following subsections, where each source is reviewed separately in decreasing order of

Table 4.5 - Summary of relationships between the sources of knowledge and the level of knowledge of FLM concepts, program, and policy.

SOURCES OF KNOWLEDGE	LEVEL OF KNOWLEDGE OF		
	CONCEPTS (Q-2) Gamma	PROGRAM (Q-3) Gamma	POLICY (Q-4) Gamma
Field Experience	+0.48**	+0.37**	+0.38**
Ministry's Handbook	+0.46**	+0.58**	+0.57**
Personal Interest	+0.49**	+0.35**	+0.43**
Public Concern or Pressure	+0.40**	+0.39**	+0.36**
Contacts with other Professionals	+0.40**	+0.37**	+0.37**
University Courses	+0.23**	+0.03	+0.10
Ministry's Training Programs & Workshops	+0.42**	+0.59**	+0.47**
Professional Journals	+0.30**	+0.32**	+0.39**
Technical Institute Courses	+0.09	-0.02	+0.06
Other Sources	+0.32*	+0.25*	+0.13

"*" $p \leqslant 0.05$
"**" $p \leqslant 0.01$

importance. Noteworthy exceptions were the small and insignificant relationships between the sources "University Courses" and levels of knowledge of the program and policy, and between "Technical Institute Courses" and levels of knowledge of the concepts, program, and policy.

4.3.4 Detailed Analysis and Discussions

Field Experience

Overall, "Field Experience" was the greatest source of knowledge for a very large minority of foresters (41%). This source had a moderate or low extent of contribution to knowledge for more than half the foresters (59%) (Figure 4.5).

When asked about the importance of having more field workshops (Q-19.12, Figure 4.6), nearly half of the foresters (46%) felt that it was highly important in order to improve the effectiveness of FLM in British Columbia. It is supposed that these foresters who felt "Field Experience" did not highly contribute to their knowledge corresponded to the group who felt it was highly important to have more field workshops. However, quite a few foresters (13%) either did not know enough about this issue to answer the question or simply omitted it. This uncertainty may have been caused by a lack of clarity in the question as to who, the public or the professional, would participate in the workshops.

Given the relative importance of "Field Experience" as a source of knowledge, one forester suggested that although "more education, seminars, and literature is helpful,..., if the planners and decision makers do not obtain experience in the field, then there may be a tendency to overlook pertinent points...". Table 4.5 also shows that indeed, foresters with more fieldwork experience had a higher level of knowledge of the FLM concepts, program, and policy.

The crosstabulations that paired the variable "Field Experience" with the four professional profile variables i.e. forestry discipline, employer category, years of forestry practice, and forest region did not show any significant relationships. This lack of significance also held for the variable "More Field Workshops" and each of the professional profile variables. In sum, the source "Field Experience" did not contribute differently to any particular groups of

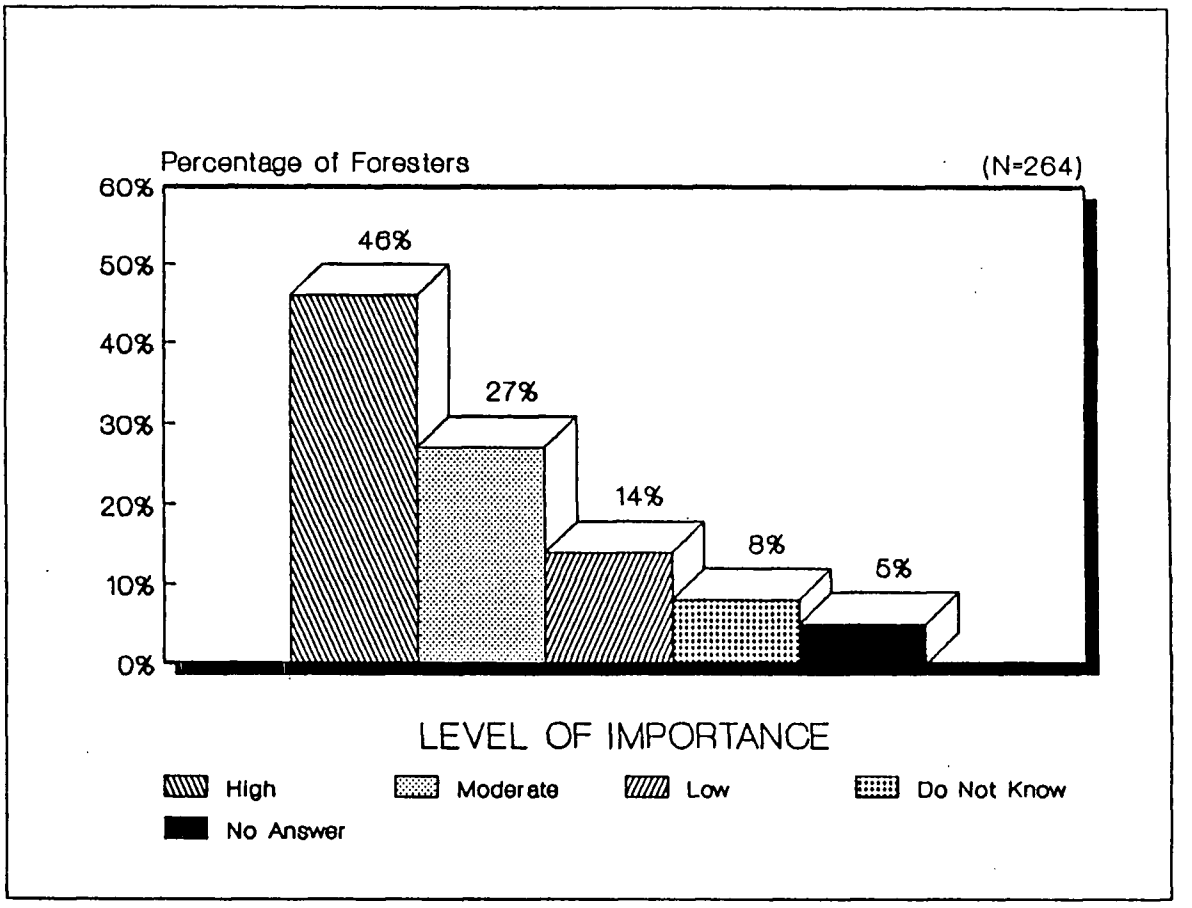

Figure 4.6 - **Response distribution to Question 19.12: "How important do you feel that more field workshops is to increasing the effectiveness of FLM in British Columbia?"**

foresters, and the latter groups did not present significant differences in attitude towards the question of more field workshops.

Ministry's Forest Landscape Handbook

The Ministry's forest landscape handbook, although contributing less than expected, was the second most important source of knowledge for the foresters.

It was expected that the Handbook would relate to employer category and this in fact happened (Table 4.6). However, because the Handbook originated from the Ministry of Forests and Lands, it was also expected that the largest sub-group of foresters reporting that the Handbook highly contributed to their knowledge would come from the provincial government. Table 4.6 indicates that this was not the case. The proportion of responses in the "High" category was almost identical for all four categories of employer. The main difference occurred in the "Moderate" category which included 31% of the provincial government foresters compared to only 10%, 10%, and 8% subsequently for the other categories. As expected, at the "Low" end of the scale, it was the government that employed the smallest number of foresters to whom the Handbook had contributed a little to their knowledge of FLM.

The only other significant relationship indicated, once again, that the higher the number of years of practice, the higher the extent of contribution of the Handbook to knowledge.

Table 4.6 - Extent of contribution to knowledge of the Ministry's Handbook by employer category.

EXTENT OF CONTRIBUTION OF HANDBOOK	EMPLOYER CATEGORY			
	Provincial Government (n=97)	Private Industry (n=98)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
HIGH	39	38	39	38
MODERATE	31	10	10	8
LOW	30	52	51	54
Totals	100%	100%	100%	100%

Missing Data= 2 (N=262) Chi-square= 22.68** Lambda= 0.06

Personal Interest

Although "Personal Interest" may not technically be considered a source of knowledge, it represents one incentive to search for, or at least, to be open to information on FLM activities. Personal interest may be seen as an intervening variable that can help to explain the state of certain relationships.

Taken as a contributor to knowledge, personal interest seemed to have contributed highly to a quarter of the foresters (Figure 4.5). At the other end of the scale, nearly half of the foresters (44%) said that personal interest had a low extent of contribution to what they know about FLM. This last percentage corresponds almost exactly to the proportion of foresters (46%) that had a general low level of knowledge (Hypothesis I), but no evidence supported this correspondence.

Up to this point, it appears that the low level of knowledge for half the foresters is partly due to a lack of interest. However, as the next findings show, other factors such as few or no opportunities for involvement in landscape management issues and a lack of awareness for FLM play a much greater role than originally expected.

Public Concern or Pressure

Through their concern or pressure, the public can play an important role as informers and sources of awareness for foresters. In the case of this study, only a few foresters (20%) felt this source contributed greatly to their present level of knowledge on FLM, and this situation could be explained by either a lack of public pressure or a lack of willingness on the part of the foresters to listen to the public, or both. The section on "Public Involvement" (Hypothesis VII) explores further this last possibility.

Table 4.7 shows that "Public Concern or Pressure " contributed significantly less to the knowledge of the "Consultant/Contractor" than it did for the other groups of foresters. In fact, only 2% of them declared that "Public Concern or Pressure" highly contributed to their knowledge of FLM. Comparatively, the largest proportion of foresters (27%) in the "High" category worked for the provincial government, 19% for the private industry and finally, 23% of

the foresters were in the "Other" category. At the "Low" end of the scale, the difference between "Consultant/Contractor" and the other groups was even more marked.

Table 4.7 - Extent of contribution of public concern or pressure to foresters' knowledge of FLM by employer category.

EXTENT OF OF CONTRIBUTION PUBLIC CONCERN OR PRESSURE	EMPLOYER CATEGORY			
	Provincial Government (n=97)	Private Industry (n=98)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
HIGH	27	19	2	23
MODERATE	30	33	27	27
LOW	43	48	71	50
Totals	100%	100%	100%	100%

Missing Data= 2 (N=262) Chi-square= 13.70* Lambda= 0.0

Contacts with Other Professionals

The inclusion of "Contacts with Other Professionals" as a source of knowledge was based on the premise that attitude and perception can be greatly influenced by others. In this case, however, more than half of the foresters (52%) said that professional colleagues contributed little to their level of knowledge. On the other hand, only about 16% said that they contributed highly to their knowledge of FLM.

Complementary to this source, Question 6 asked the foresters what they thought was the importance of FLM to other forestry professionals (Figure 4.7). This question was included to test the belief that most foresters find FLM relatively unimportant to a majority of colleagues. This was indeed the case as nearly half of the foresters (49%) believed that FLM was of little importance to other professionals while very few (6%) said it was highly important (Figure 4.7). However, it must be realized that individuals own beliefs concerning the importance of FLM can determine their views of how others see it.

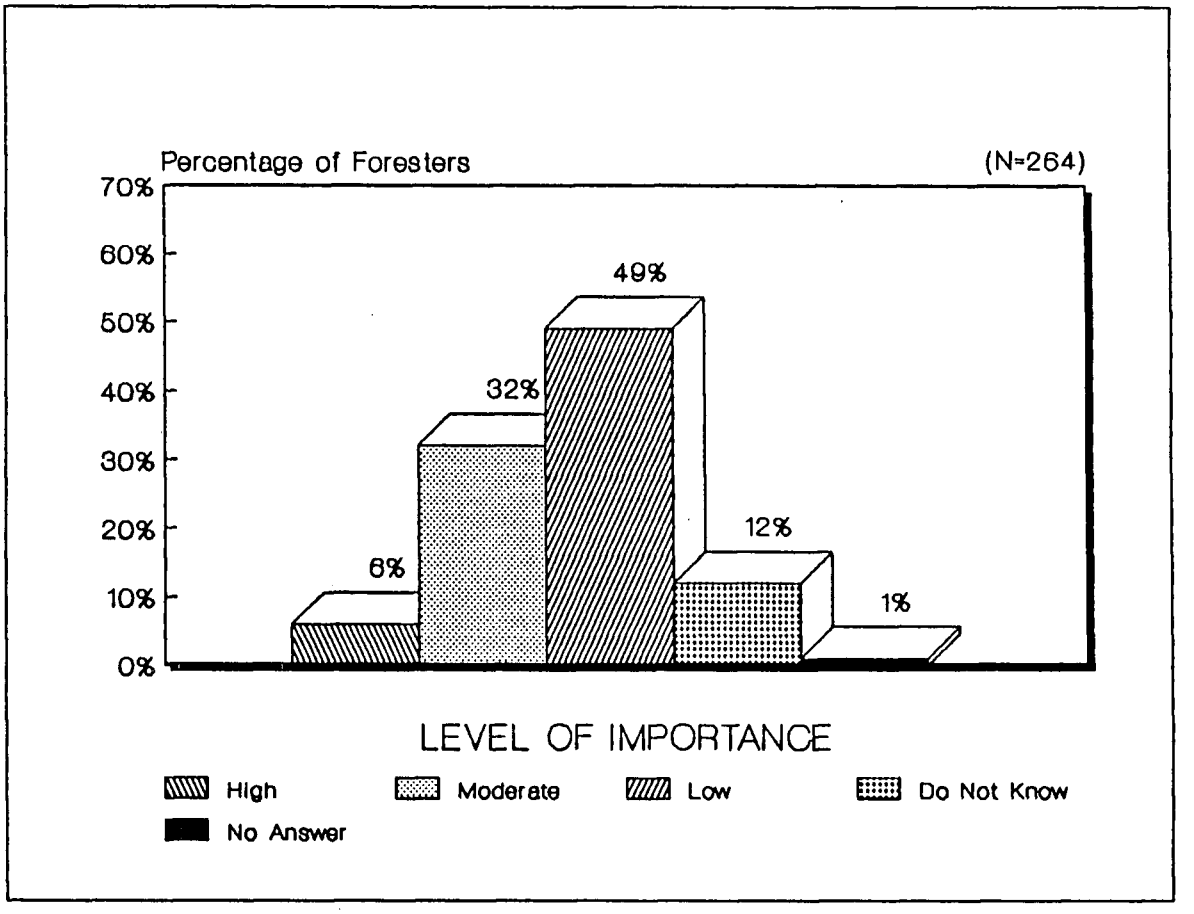

Figure 4.7 - **Response distribution to Question 6: "How important do you believe FLM is to other forestry professionals that you know?"**

Only a few foresters (3%) felt the need to comment on Question 6, but this produced noteworthy results. One forester explained that "most of us [foresters] in the field shake our heads at how far out of touch landscape management and the people who started it, are from reality." He added, "most foresters think it is a joke and may never be practiced properly without severe penalties." Consistent with this view, another forester stated that "the present B.C. program has no real commitment at the professional level." Another one talked about the reluctance of foresters to recognize landscape management because: (1) "may lock up additional timber ..."; (2) "logging delays or cut reductions increase cost per unit logged"; and (3) "forest industry has many agencies to deal with, each with its own self interest". Some other foresters, despite strongly approving FLM, were particularly concerned with its real chance of implementation because of the negative attitudes of "an unfortunately large number of foresters" concerning the role of non-timber values in forest management. Consequently, it is believed that foresters "mindset to timber harvesting" would have to be changed before being able to do anything good with landscape management.

University and Technical Institute Courses

Since the early 1980's, the visual dimension of forest land management has been studied in universities and technical schools[7].

A very large majority of foresters (71%) indicated a low extent of contribution of "University Courses" to their knowledge on FLM (Figure 4.5). The very significant negative relationship existing between level of contribution of "University Courses" and years of practice indicates that the more experienced the foresters, the less these courses contributed to their knowledge on FLM. For these foresters, "Field Experience" represented a more important source of knowledge (Figure 4.5). This last situation is explained by the fact that only the foresters who graduated in the past seven or eight years had the opportunity to take the courses, and those represented about 45% of the respondents. When the foresters with 0 to 5 years of

[7]For example, University of British Columbia, Faculty of Forestry, visual resource management and recreation electives; B.C. Institute of Technology, Recreation and Wildlife electives.

practice are isolated, i.e. those who are presumably recent graduates and could have taken FLM courses at university, the findings show that these courses may have contributed greatly to knowledge to about one third of them (Table 4.8).

Table 4.8 - Contribution of "University Courses" to foresters' knowledge of FLM, by years of practice.

LEVEL OF CONTRIBUTION	YEARS OF PRACTICE 0-5 (n=40)	6-10 (n=79)	11-15 (n=59)	16-20 (n=36)	21+ (n=48)
	%				
HIGH	30	12	10	11	6
MODERATE	32	18	12	14	4
LOW	38	70	78	75	90
Totals	100%	100%	100%	100%	100%

Missing Data= 2 (N=262) Gamma= -0.43**

With respect to the source "Technical Institute Courses", a very large proportion of foresters chose the low category (86%), indicating that courses at technical institutes contributed little to their knowledge on FLM (Figure 4.5). This is easily explained by the fact that very few foresters attended a technical institute.

When asked about their attitude towards an increased training in FLM, nearly half the foresters felt it was highly important to increase training at both the universities and technical institutes (Figure 4.8). The response distribution for the question relating to technical institutes is particularly interesting, despite the fact that few foresters had any association with them. Actually, many foresters felt that more forestry technicians with a working knowledge of FLM techniques are needed. As one forester suggested, "technicians can help with "how" but not with "what" is to be done in landscape management".

Since few foresters attended technical institutes, it is not surprising that there was no significant associations between the extent of contribution of technical institute courses and the level of knowledge of concepts, program, and policy (Table 4.5). An unexpected finding was that there was also no significant relationship between extent of contribution of university courses

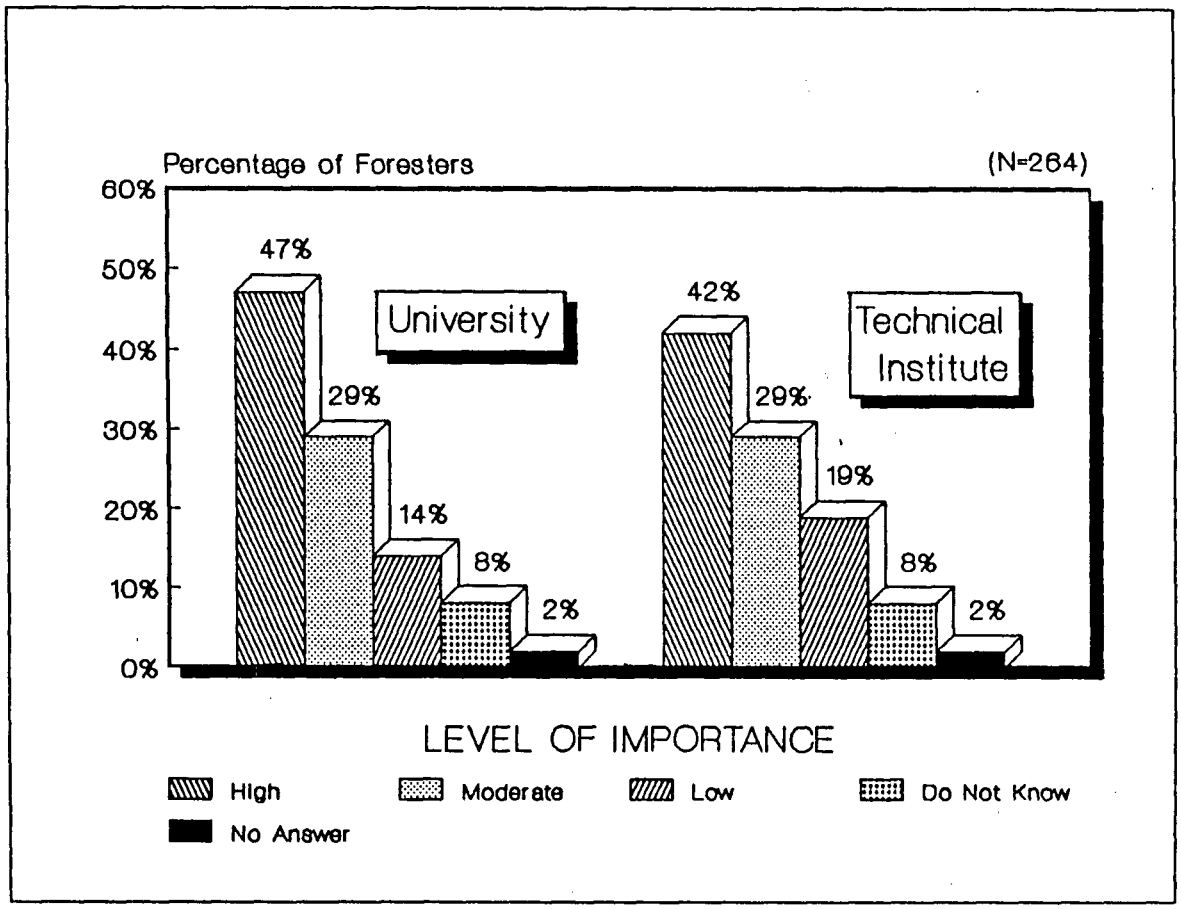

Figure 4.8 - **Response distribution to Questions 19.5 and 19.6: "How important do you feel an increased training in FLM at university (and at technical institutes) is to increasing the effectiveness of FLM in British Columbia?"**

and either the program or policy. However, foresters' level of knowledge of concepts was positively and very significantly related to knowledge obtained from university courses, although this relationship was weak (Table 4.5). Generally, this suggests that university courses contributed little to foresters knowledge of FLM concepts, program, and policy.

Ministry's Training Programs and Workshops

One of the objectives of the Ministry's FLM program is "to conduct and encourage training programs for Ministry and forest industry personnel which raise awareness, develop expertise and promote consistent application of landscape management principles and practices." (B.C. Ministry of Forests, 1981, p.8). Findings indicated that the Ministry has not been very successful in achieving this objective. For example, a very large majority of foresters (76%) mentioned the small contribution of the Ministry's training programs and workshops to their level of knowledge, while only a few (10%) declared that these sources contributed highly (Figure 4.5). Note that when considering the response distribution for the uncollapsed categories, a striking number of foresters (65%) took a radical position in stating that programs and workshops did not contribute at all to their knowledge.

In this it resembles very much the American situation as reported by Fullerton (1976). She shows strong concern about the "adequacy of the communication programs to explain the principles of landscape management" of the U.S. Visual Management System (p.36). She even doubts if "...foresters outside the Forest Service are very much aware of the program..." (Fullerton, 1976, p.36).

The survey shows that most foresters were interested in obtaining more training and having more trained personnel. More than three foresters out of four felt that it was either moderately (25%) or highly (53%) important to have increased training in FLM through continuing education (Figure 4.9). One respondent's comment appropriately explains this attitude: "... the ordinary forester can't do anything about landscape management because they don't understand how to use it." Some of these foresters even suggested that education and training efforts be directed to specific professional groups such as industry foresters, and

particularly those working in the engineering department and in the field (4 cases), to Ministry District staff (1 case), to small logging operators (1 case), or simply "where the need exists" (1 case).

Figure 4.9 also illustrates that over 50% of the foresters were interested for more trained personnel in FLM. When this was broken down by employer category, it was found that the attitude towards more trained personnel varied significantly. For instance, foresters working for the provincial government form the largest group (79%) that highly favoured more trained personnel in landscape management (Table 4.9). Only 4% of the members of this group said that it was of low importance. Surprisingly, almost one forester out of two working for the private industry thought it was highly important too, but 30% of them said that it was of low importance.

Professional Journals

There has been very little information published in Canadian forestry journals dealing with FLM issues. It was not surprising, therefore, that nearly all foresters were in the low (74%) or moderate (19%) categories (Figure 4.5); that is, professional journals did not contribute very much to their knowledge about FLM.

In terms of the importance of having more publications on FLM, there were mixed feelings (Figure 4.10). Foresters were almost equally distributed among the three levels of importance. This suggests that more publications may not be an appropriate way to reach the foresters and that efforts should be concentrated on other ways to inform them.

Other Sources of Information

Finally, an open category gave the respondents the opportunity to state other sources that contributed to their knowledge of FLM. Very few foresters, however, indicated any other sources (about 5%). Examples of other sources that contributed highly to knowledge included: literature from other countries (the United States and Great Britain), professional involvement with landscape issues, travel in Europe, and contacts with landscape architects.

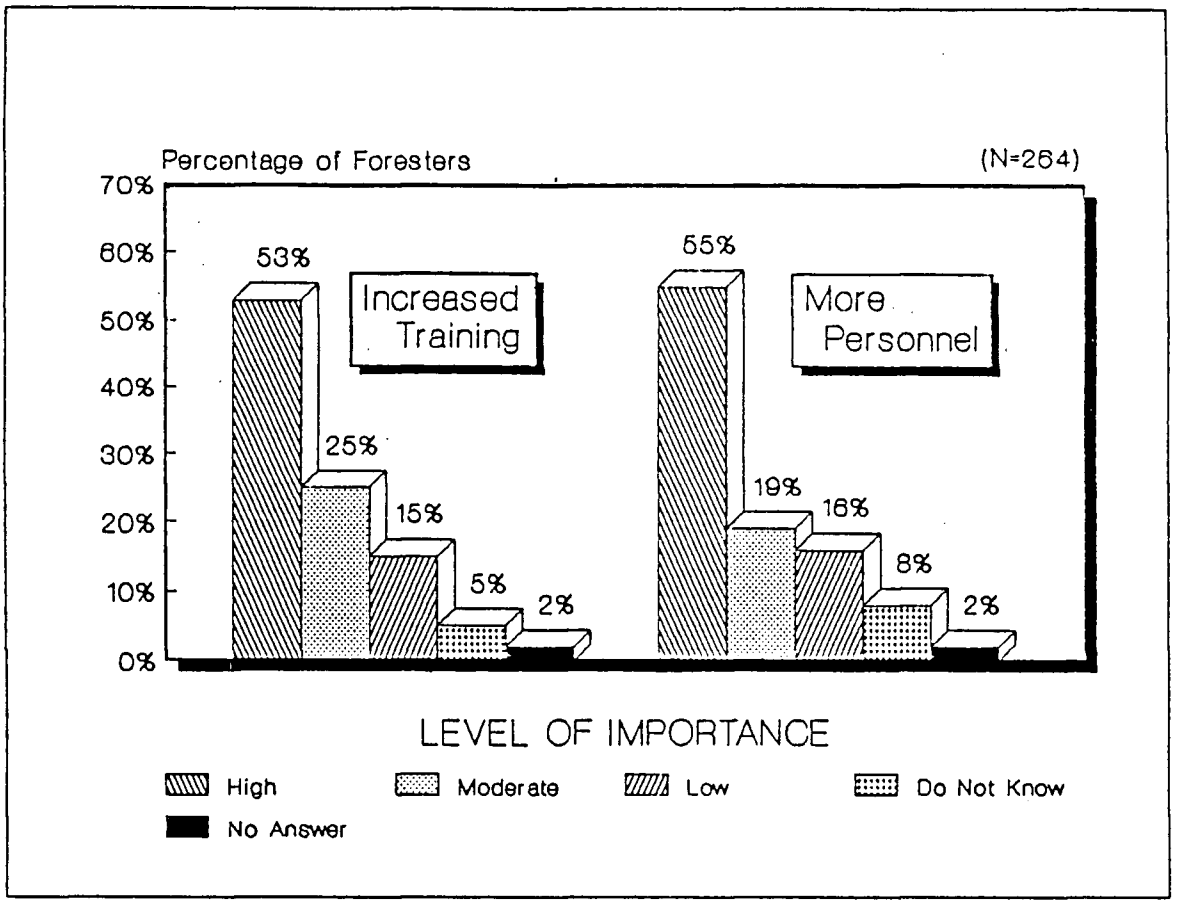

Figure 4.9 - **Response distribution to Questions 19.7 and 19.2: "How important do you feel increased opportunities for FLM training through continuing education (and more trained personnel) is to increasing the effectiveness of FLM in British Columbia?"**

Table 4.9 - **Importance of more trained personnel in FLM by employer category.**

LEVEL OF IMPORTANCE OF MORE TRAINED PERSONNEL	EMPLOYER CATEGORY			
	Provincial Government (n=92)	Private Industry (n=88)	Consultant/ Contractor (n=36)	Other (n=23)
	%			
HIGH	80	47	56	52
MODERATE	16	23	19	30
LOW	4	30	25	18
Totals	100%	100%	100%	100%

Missing Data= 25 (N=239) Chi-square= 28.60** Lambda= 0.0

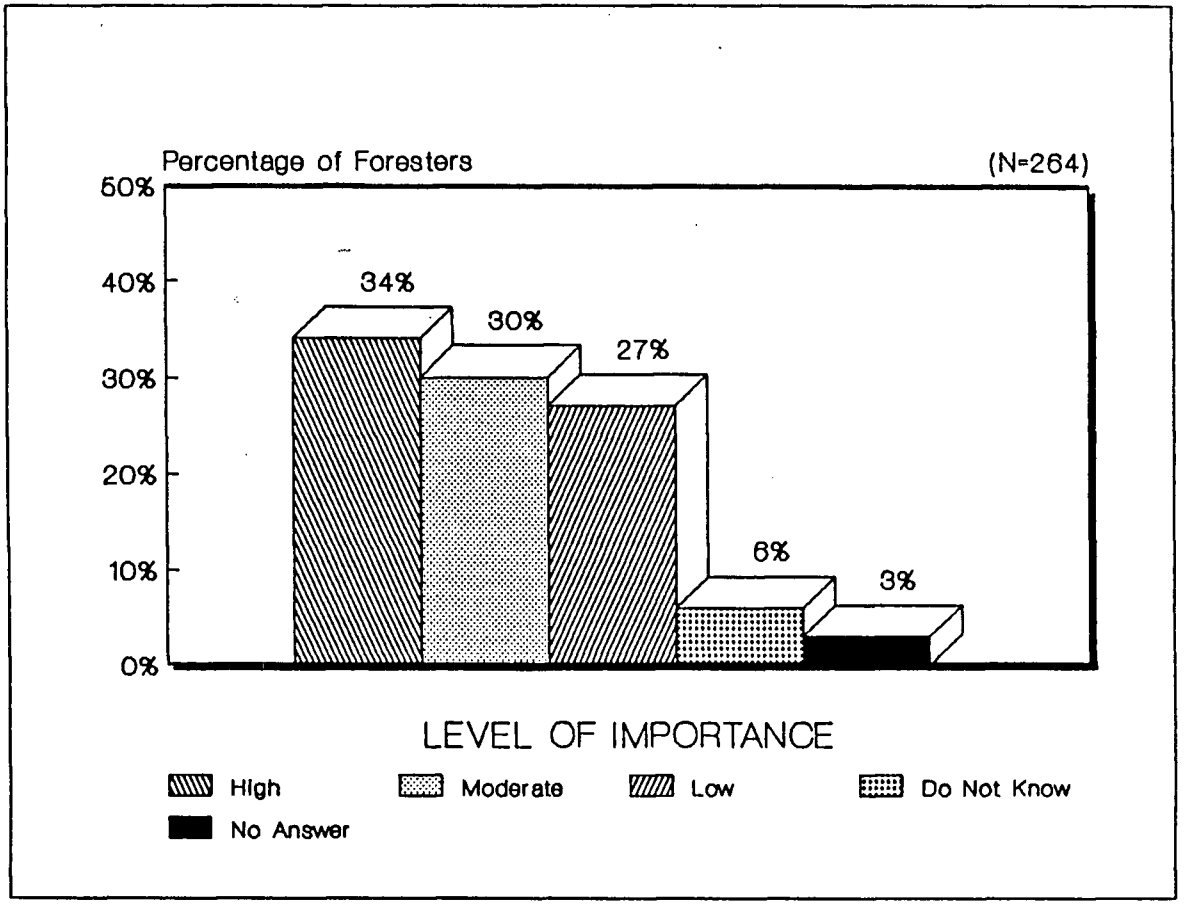

Figure 4.10 - **Response distribution to Question 19.11: "How important do you feel that more publications (journals, brochures, reports) on FLM is to increasing the effectiveness of FLM in British Columbia?"**

4.3.5 Summary and Discussion

Overall, the data related to Hypothesis II have shown that there is a lack of information about FLM pertinent to the British Columbia context. This finding helps explain the low level of knowledge of a majority of foresters concerning FLM (see Hypothesis I).

Foresters' attitudes towards the proposed means of increasing the effectiveness of FLM have revealed that approximately one forester out of two in British Columbia felt it was highly important to have more training, programs, trained personnel, and courses at university and technical institute levels for the purpose of improving FLM (Figures 4.6, 4.8, and 4.9). However, mixed feelings existed concerning the importance of having more publications on FLM (Figure 4.10). Most foresters also felt that FLM was of little importance to their colleagues (Figure 4.7). It appears that incentives such as education at university level or training through continuing education were perceived by foresters as more effective at reaching their colleagues than just "free" reading through more publications.

Certainly the most surprising findings were that the source "University Courses" did not significantly relate to foresters' self-assessment of knowledge of either the program or the policy, and that the least experienced foresters, i.e. those who are presumbly recent graduates, knew the least about FLM topics. Of these recent graduates, only 30% said that "University Courses" had highly contributed to their knowledge of FLM. Considering foresters' interest in learning more about FLM, professional forestry schools should put much more emphasis on non-timber values and landscape management. It seems imperative that basic landscape management concepts and techniques be well understood by all forestry professionals, because most of them, directly or indirectly, affect the landscape in the course of their work.

Another key player in the field of FLM is the Ministry of Forests and Lands, which has the mandate to implement FLM concepts and techniques through a forest policy. The data have shown that the Ministry's training programs and workshops do not represent important sources of information for a very large majority of foresters. Again, a majority of them expressed their interest in more training programs and workshops so serious considerations should be given to this facet of landscape management.

4.3.6 Costs

Hypothesis III: A very large majority of foresters perceive forest landscape management practices as imposing undue additional costs on the forest industry.

Univariate Analysis

To test the above hypothesis, foresters were asked to express their views on whether or not FLM practices as applied now in British Columbia impose additional costs on forest industry (Question 7, Appendix III). In this case, it was necessary to use a different approach for grouping the categories than was used for the other hypotheses. Category 1 "Not at All" was kept as a sole entity to see what proportion of foresters felt that FLM did not impose any undue additional cost on the forest industry. The categories 2 and 3 were grouped and labelled as "Low-Moderate" and 4-5 as "High".

Figure 4.11 shows that almost one quarter (21%) of the foresters felt that FLM did not impose any undue additional costs on the forest industry. In addition, a majority (58%) felt that FLM imposed low to moderate undue costs whereas only a few (18%) said that it imposed large undue additional costs. The main reasons foresters gave for explaining their attitudes towards this cost issue are presented in Table 4.10. There were basically two major reasons why foresters believed that FLM produced undue additional costs on the forest industry: (1) sub-optimal cut block design from an engineering perspective, and (2) loss of timber volume (either definitive or short-term deferral). On the other hand, the two major reasons given for not imposing any undue additional costs were: (1) FLM guidelines not really applied or policy not enforced, and (2) costs present but not undue, simply the costs of "doing business".

Bivariate Analysis

A very interesting point to examine was the industry foresters' attitudes towards the imposition of undue additional costs of FLM. The expectation was that these foresters' views would significantly differ from those of the other employer categories and that they would constitute a large majority in the "High" category. This was not the case. Their views did not

significantly differ from their colleagues, although they formed the largest group, in relative terms, in the "High" category (Table 4.11).

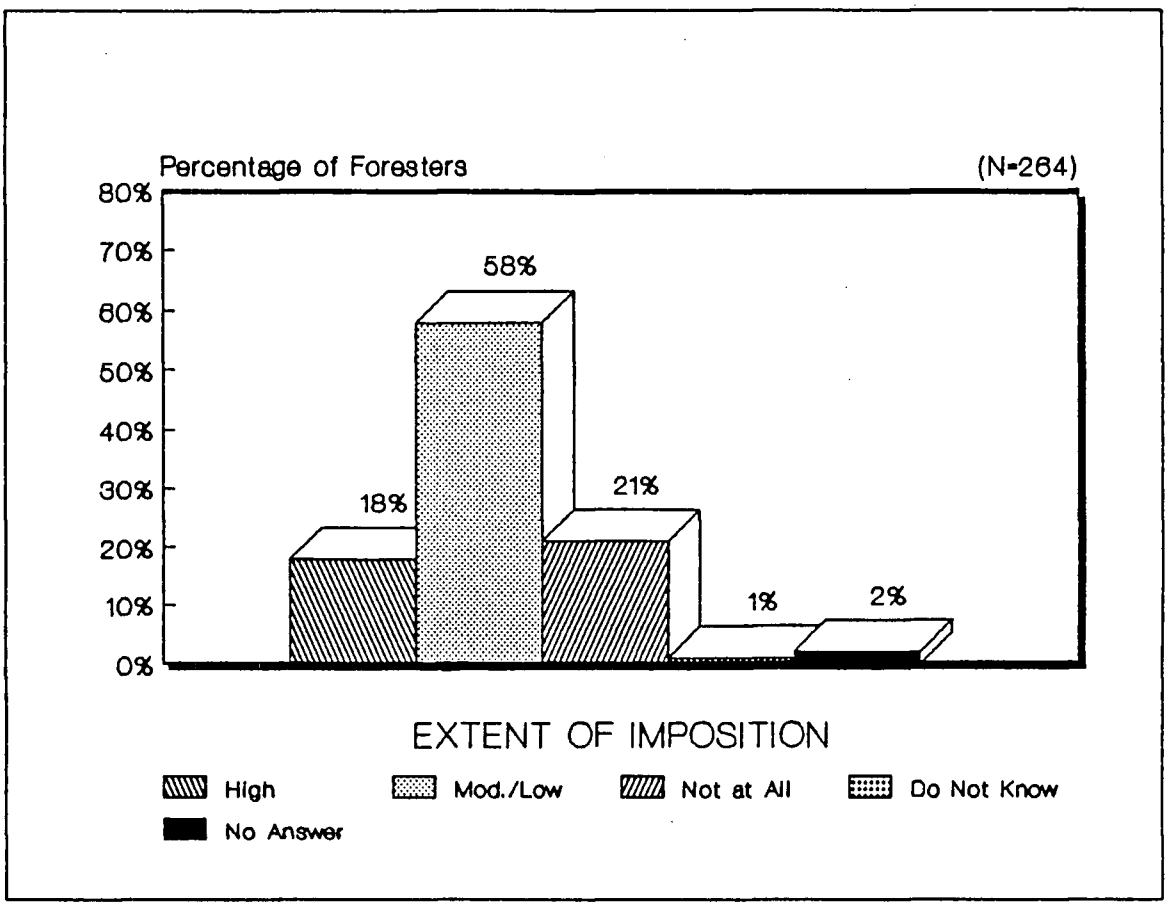

Figure 4.11 - **Response distribution to Question 7 : "Please indicate to what extent you feel that FLM as applied now imposes undue additional costs on the forest industry in British Columbia? Why?"**

Table 4.10 - Summary of the main reasons why FLM, as applied now, imposes (or does not) undue additional costs on the forest industry.

A. Reasons for not imposing undue additional costs at all

1. Guidelines not applied or policy not enforced: (5%)[1]

2. Costs present but not undue, costs of doing business: (5%)

3. FLM takes only some foresight and planning: (3%)

4. Not an undue cost, a benefit: (2%)

5. If properly planned and integrated into management practices, overall costs should not be unduly affected: (2%)

6. FLM not an important issue in certain regions: (2%)

7. Lack of interest and involvement from industry: (1%)

B. Reasons for imposing little/moderate undue additional costs

1. Cut block boundary locations and sizes less than optimal from an engineering perspective (higher road construction, falling, yarding, skidding costs): (8%)

2. Cut blocks size reduction (loss of timber volume): (6%)

3. Guidelines not closely applied or policy weakly enforced: (6%)

4. More planning and administration: (3%)

5. FLM not of great concern (issue) in certain regions: (3%)

C. Reasons for imposing high undue additional costs

1. Cut block boundary locations and sizes less than optimal from an engineering perspective (higher road construction, falling, yarding, skidding costs): (4%)

2. The above reason plus timber deferrals: (4%)

3. Definitive loss of timber volume for scenic reserves: (2%)[2]

[1]Based on total number of respondents (N = 264).
[2]Percentages do not add to 100% because not all foresters responded.

Table 4.11 - Foresters' attitudes towards the extent of imposition of undue additional costs of FLM on the forest industry by employer category.

EXTENT OF IMPOSITION OF UNDUE COSTS	EMPLOYER CATEGORY			
	Provincial Government (n=96)	Private Industry (n=95)	Consultant/ Contractor (n=41)	Other (n=25)
	%			
NOT AT ALL	28	17	15	28
LOW-MOD.	59	57	66	60
HIGH	13	26	19	12
Totals	100%	100%	100%	100%

Missing Data= 7 (N=257) Chi-square= 10.17 Lambda= 0.0

4.3.7 Summary and Discussion

Overall, the data fully support Hypothesis III:

A very large majority of foresters perceive FLM practices as imposing undue additional costs on the forest industry.

The wide array of reasons given by foresters (Table 4.10) clearly demonstrated an obvious lack of information regarding the real economic and ecological impacts of FLM on forestry practices. As one forester suggested, there is a need for "a proper cost/benefit analysis" of landscape management along with a "policy analysis to determine its (FLM) impact on the AAC (Annual Allowable Cut) and on logging costs."

Another cost-related issue which did not appear in the questionnaire was who should pay for FLM, the forest industry or the provincial government, assuming these are additional costs. In spite of the fact that there was no specific question that related to who should pay for FLM, the foresters presented many views on the issue. A few government foresters said that FLM "has become a cost of doing business which the forest industry must recognize and bear." In turn, two industry foresters mentioned that "the industry has to be provided with incentives to do FLM", while a consultant/contractor took a middle position on the issue by saying that landscape management benefit both the industry and the province but that the former can not bear the whole cost.

4.3.8 Potential Contributions

Hypothesis IV: A majority of foresters perceive forest landscape management as being a much greater contributor to social than to forestry issues.

Univariate Analysis

To test the above hypothesis, foresters were asked about their attitudes towards the potential contributions of FLM to a variety of different social and forestry issues (Figure 4.12). In relative terms, a higher proportion of foresters felt that FLM could contribute to social issues. For example, they mentioned that FLM could highly contribute to social issues such as public scenic and recreation enjoyment (72% and 48% respectively), public support for forestry (59%), protection of cultural/social values (37%), and tourism (37%). On the other hand, smaller proportions of foresters felt that FLM could highly contribute to certain forestry issues. For example, only 26% said that FLM could highly contribute to better timber management practices, while others felt that it could highly contribute to increase harvesting expenses (47%) or decrease timber availability (47%) (Figure 4.12).

To complement the above question on potential contributions of FLM, Question 18 tackled one of the basic assumptions of this study, that FLM practices promote better forest management practices and result in a reduction of public criticism. Foresters had a divided opinion on this social issue: 41% of them mentioned that FLM could greatly help resolve public concerns over forest management decisions (Figure 4.13). Some foresters, however, pointed out that FLM was only one aspect of forest management, and that it should be complemented with public education.

Bivariate Analysis

The only independent variables related to potential contributions were years of practice and employer category. An intriguing and not yet explained point is that all the significant or very significant relationships which existed between potential contributions of social-related issues and years of practice were negative, indicating that the more experienced foresters were, the less they felt FLM could contribute to those social issues (Table 4.12). The table also

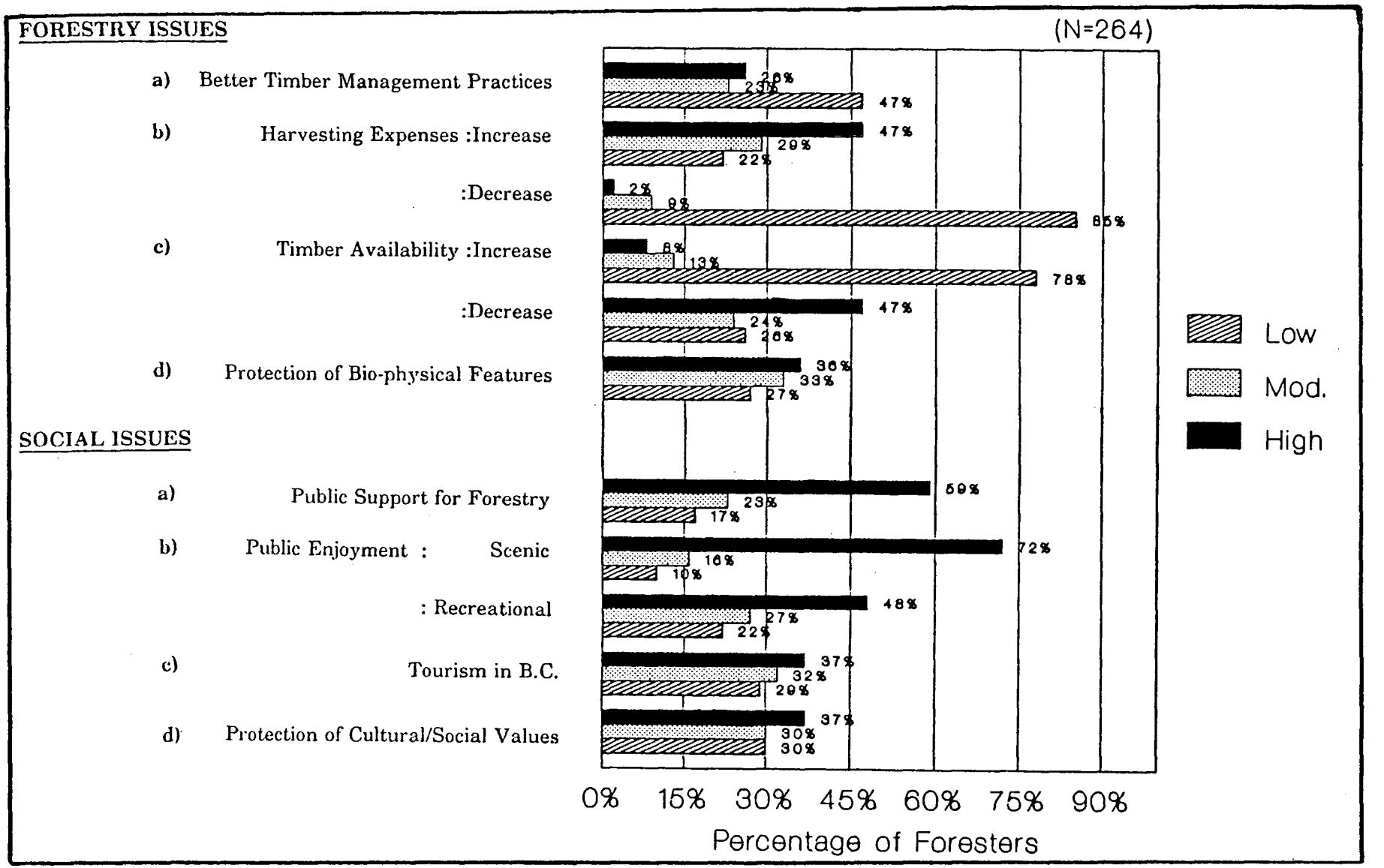

Figure 4.12 - Response distribution to Question 8: "To what extent do you feel that forest landscape management can contribute to each of the following?"

shows that most of the potential contributions to forestry and social issues related very significantly with employer category.

The next section discusses in more detail the potential contributions, which were grouped under "forestry issues" and "social issues".

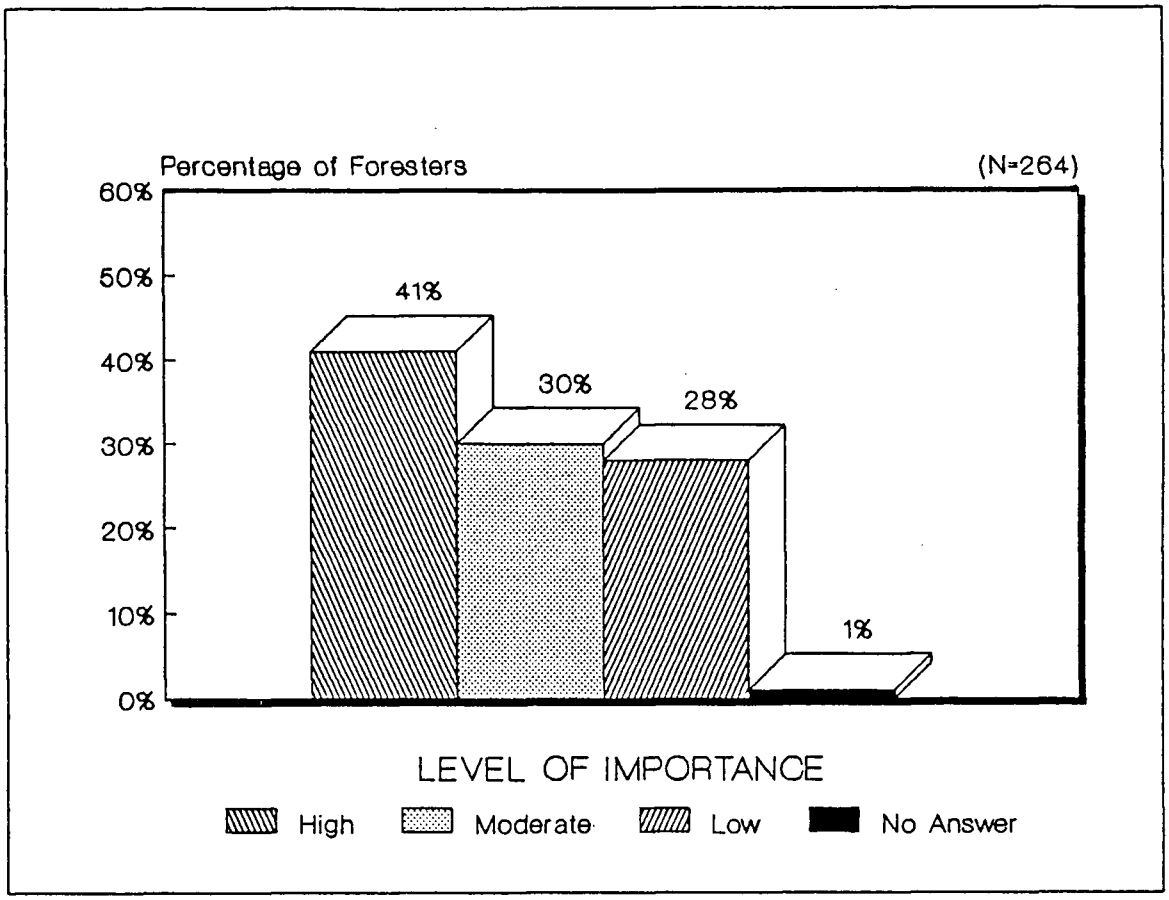

Figure 4.13 - Response distribution to Question 18: "To what extent do you feel good FLM can help resolve public concerns over forest management decisions?"

Table 4.12 - Summary of relationships between potential contributions of FLM and both years of practice and employer category.

POTENTIAL CONTRIBUTIONS OF FLM	YEARS OF PRACTICE Gamma	EMPLOYER CATEGORY Chi-square Lambda
FORESTRY ISSUES		
- Question 8 -		
Protection of Important Bio-Physical Features	-0.16**	9.26 0.06
Better Timber Management Practices	-0.10	24.65** 0.03
Increase Harvesting Expenses	-0.04	22.56** 0.04
Decrease Harvesting Expenses	+0.05	25.38** 0.0
Increase Timber Availability	+0.03	11.62 0.0
Decrease Timber Availability	+0.06	42.83** 0.09
SOCIAL ISSUES		
- Question 8 -		
Public Support for Forestry	-0.15*	21.92** 0.0
Public Scenic Enjoyment	-0.12*	20.10** 0.0
Public Recreation Enjoyment	-0.20**	20.46** 0.0
Tourism in B.C.	-0.15*	17.30** 0.10
Protection of Cultural and Social Values	-0.18**	19.09** 0.11
- Question 18 -		
Resolving Public Concern over Forest Management Decisions	-0.12*	30.06** 0.12

"*" $p \leq 0.05$
"**" $p \leq 0.01$

4.3.8.1 Forestry Issues

a) Better Timber Management Practices

The appendix on "Conceptual Notions and Key Definitions" has already introduced the notion of quality forest management versus good or quality landscapes (see Appendix I, p.156). At that point, two questions were raised: "Does "good quality" of visual landscape automatically result from "good" management practices? Or conversely, does "good" management practices automatically result in "good scenery"? According to the response for Question 8 (Figure 4.12), almost half the foresters (47%) felt that FLM had a low potential for contributing to "better timber management practices". This suggests that for them, "good" timber management practices lead to "good" landscapes. As three foresters pointed out: "The emphasis must always remain on sound silvicultural, ecological and economic forest management techniques; when these are followed, then landscape management will follow naturally". Another forester wrote, "it's tragic that we have to move into areas called landscape management, which is a "new" name and direction for what we were all taught about forest management... Places (in Europe) where "good" forest management is practiced do not need "landscape" management policies!" However, a forester noted that landscape management would be taken care of if "we, foresters, would apply what we preach".

Conversely, one forester out of four believed that FLM could highly contribute to better management practices, perhaps indicating that they believe a "good-looking" forest does not end simply with sound timber management. Sampson (1973) specifies that what is needed is landscape forestry, which involves the management of the "quality of human experience" (p.47).

The bivariate analysis has shown a weak but significant positive relationship between "better timber management practices" and each of the knowledge variables (i.e. concepts, program, and policy). These relationships indicate that the higher foresters' level of knowledge, the higher the contribution that FLM could have to better timber management practices. In addition, employer category played a significant role in the foresters attitudes towards the contribution of FLM to better management practices. Table 4.13 shows that the foresters

working for the private industry formed the largest group (64%) in the "Low" category. In other words, 64% of private industry foresters felt that the potential contribution of FLM to better timber practices was low.

b) Harvesting Expenses

The testing of Hypothesis III on costs has shown that FLM is perceived, by many, as "another constraint" in timber harvesting, in addition to costing extra money for the forest companies. In terms of increase, it appears that this perception is widespread, because nearly half of the foresters (47%) felt that FLM could highly contribute to increase harvesting expenses (Figure 4.12). At the opposite end of the scale, 22% of them said that it could contribute to a low extent.

In terms of contribution to decreasing harvesting expenses, as expected, a large majority (67%) of foresters felt that FLM could not contribute at all. When this category is combined with "2", more than 85% of the foresters felt that FLM could contribute only a little to decrease harvesting expenses. Two foresters commented that "greater attention paid to better harvesting techniques" can be one reason for a decrease. Note that nobody answered with the "Very Much" category.

Also foresters' attitudes significantly differ depending on their employer (Table 4.14). For instance, it is still the private industry foresters who form the largest group in the "High" potential contribution of FLM to increase harvesting expenses.

c) Change in Timber Availability

A change in timber availability may be either an increase or a decrease, and in this study both issues were examined separately. As expected, a very large majority of foresters (78%) felt that FLM could contribute only a little to increase timber availability. As for a decrease in timber availability, the foresters took a much less radical position (Figure 4.12) but still, nearly half (47%) of them said that FLM could highly contribute to decrease timber availability.

The bivariate analysis shows only one significant relationship, which is between the extent of FLM to decrease timber availability and employer category (Table 4.15). The largest

Table 4.13 - Foresters' views on the potential contribution of FLM to better timber management practices, by employer category.

EXTENT OF CONTRIBUTION	EMPLOYER CATEGORY			
	Provincial Government (n=93)	Private Industry (n=97)	Consultant/ Contractor (n=39)	Other (n=25)
	%			
HIGH	40	14	18	44
MODERATE	22	22	33	20
LOW	38	64	49	36
Totals	100%	100%	100%	100%

Missing Data= 10 (N=254) Chi-square= 24.65** Lambda= 0.03

Table 4.14 - Contribution of FLM to increase harvesting expenses by employer category.

EXTENT OF CONTRIBUTION	EMPLOYER CATEGORY			
	Provincial Government (n=95)	Private Industry (n=97)	Consultant/ Contractor (n=40)	Other (n=26)
	%			
HIGH	32	64	53	38
MODERATE	37	24	27	35
LOW	31	12	20	27
Totals	100%	100%	100%	100%

Missing Data= 6 (N=258) Chi-square= 22.56** Lambda= 0.04

Table 4.15 - Contribution of FLM to decrease timber availability by employer category.

EXTENT OF CONTRIBUTION	EMPLOYER CATEGORY			
	Provincial Government (n=95)	Private Industry (n=97)	Consultant/ Contractor (n=39)	Other (n=25)
	%			
HIGH	26	71	56	36
MODERATE	36	17	18	24
LOW	38	12	26	40
Totals	100%	100%	100%	100%

Missing Data= 8 (N=256) Chi-square= 42.83** Lambda= 0.09

group of foresters taking an extremist position on "decrease of timber availability" was the private industry foresters: the very large majority (71%) felt that FLM could highly decrease timber supply. Several foresters expressed strong concern about the negative impact of FLM practices on the annual allowable cut (AAC). Others could not really tell about this issue because FLM effects on the AAC were greatly influenced by geographic locations, social context, and the level to which guidelines were applied in specific situations.

In summary, several beliefs exist as to the effects of FLM on timber availability. It is clear that this issue has to be validated through research in British Columbia and more specifically, in the six forest regions of the province.

d) Protection of Bio-physical Features

As seen in Figure 4.12, the extent of contribution of FLM to protect bio-physical features did not raise strong opposite views on the part of the foresters. There seems to be mixed feelings on the issue.

4.3.8.2 Social Issues

a) Public Support for Forestry

For almost 60% of the foresters, FLM could highly contribute to obtain more public support for forestry (Figure 4.12). Although industrial foresters formed the smallest group of that category, almost 50% of them believed in the possible high contribution of FLM to improve public support for forestry. The foresters in the "Other" category formed the largest group (Table 4.16).

Table 4.16 - Contribution of FLM to public support for forestry by employer category.

EXTENT OF CONTRIBUTION	EMPLOYER CATEGORY			
	Provincial Government (n=96)	Private Industry (n=97)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
HIGH	69	47	56	81
MODERATE	24	25	22	15
LOW	7	28	22	4
Totals	100%	100%	100%	100%

Missing Data= 4 (N=260) Chi-square= 21.92** Lambda= 0.07

b) Public Enjoyment: Scenic and Recreational

The very large majority of foresters (72%) mentioned that FLM can highly contribute to public scenic enjoyment. Only 10% said that it could contribute only a little to the issue (Figure 4.12). In fact, this issue is the one that presents the greatest difference (82%) between the number of foresters in the "High" and "Low" category.

This widespread belief on the contribution of FLM to public scenic enjoyment seems supported by one of the few studies done on the subject in British Columbia. Commendeur (1982) came to the conclusion that indeed, landscape logging does make a difference in people perception (visual) of forest landscapes.

On the other hand, Figure 4.12 shows a smaller proportion of foresters (48%) that felt that FLM could highly contribute to public recreational enjoyment. This seeming discrepancy between the two types of enjoyment may be explained by the fact that "scenic" is often taken as an activity occurring at a certain distance from the landscape while outdoor recreation mainly involves people in close contact with it. This suggest that for many foresters, FLM may have more potential for generating public support if this public does not interact at close range with logged forest landscapes.

The bivariate analysis revealed that both public scenic and recreational enjoyment were weakly but significantly related to employer category (Table 4.17-A-B). In short, it seems that the private industry foresters were the ones who differed the most markedly from the others by ranking lower the extent of contribution of FLM. The public enjoyment issues were also significantly but weakly related to years of practice. The more experienced foresters were the lower they ranked the extent of contribution of FLM to scenic and recreational enjoyment by the public.

c) Tourism

Although tourism in British Columbia is based largely upon the scenic attractions and outdoor recreation opportunities provided by the diverse biophysical background (Brook, 1979), a smaller number of foresters (37%) felt FLM highly contributed to this issue compared to the above two types of public enjoyment (Figure 4.12).

The bivariate analysis showed that tourism, like public scenic and recreational enjoyment, was negatively related to years of practice. Tourism had also a very weak but significant relationship with employer category (Table 4.17-C). Again, it was the industrial foresters group that markedly differed from the other groups in scoring lower in the "High" category.

Table 4.17 - Contribution of FLM to public enjoyment (scenic and recreational) and to tourism by employer category.

A) EXTENT OF CONTRIBUTION OF FLM TO SCENIC ENJOYMENT	EMPLOYER CATEGORY			
	Provincial Government (94)	Private Industry (n=98)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
HIGH	86	59	78	77
MODERATE	9	24	17	15
LOW	5	17	5	8
Totals	100%	100%	100%	100%
Missing Data= 5 (N=259)	Chi-square= 20.10**		Lambda= 0.0	

B) EXTENT OF CONTRIBUTION OF FLM TO RECRE-ATION ENJOYMENT	(95)	(n=97)	(n=37)	(n=26)
	%			
HIGH	60	37	54	54
MODERATE	28	27	24	35
LOW	12	36	22	11
Totals	100%	100%	100%	100%
Missing Data= 9 (N=255)	Chi-square= 20.46**		Lambda= 0.0	

C) EXTENT OF CONTRIBUTION OF FLM TO TOURISM	(94)	(n=97)	(n=41)	(n=26)
	%			
HIGH	47	26	41	42
MODERATE	29	32	44	31
LOW	24	42	15	27
Totals	100%	100%	100%	100%
Missing Data= 6 (N=258)	Chi-square= 17.30**		Lambda= 0.1	

d) Protection of Important Cultural or Social Values

Serious social conflicts are currently occurring in British Columbia concerning the impacts of timber harvesting on cultural and/or social values. Foresters' attitudes towards the potential role of FLM to protect these values were almost equally divided among the three categories of responses (Figure 4.12).

4.3.9 Summary and Discussion

The manner in which the forestry issues were formulated in Question 8 did not allow them to be classified into one group as was the case with the social issues. Consequently, for the testing of Hypothesis IV, only the forestry issue "better timber management practices" was used. This issue was then compared with the pooled social issues (Table 4.18). The findings tend to support Hypothesis IV:

> **Half of the foresters feel that FLM can contribute greatly to issues benefiting society, while only about a quarter believe that it can highly contribute to better timber management practices.**

In terms of attitude variations between sub-groups of foresters (Hypothesis VIII), two particular points stood out: (1) the sub-group "private industry foresters" ranks significantly lower than all the other groups on the extent they feel FLM can benefit different forestry and social issues, and (2) the more experienced foresters are, the less they feel FLM can contribute to social benefits.

Table 4.18 - Comparison of the extent of contribution of FLM to better management practices and to social issues.

EXTENT OF CONTRIBUTION	CONTRIBUTION OF FLM TO: Better Timber Management Practices	Social Issues
	-- % --	-- % --
HIGH	26	50
MODERATE	23	27
LOW	47	23
Totals	96%[1]	100%

[1]"No Answer" = 4%

4.3.10 Integrated Resources Management

Hypothesis V: A majority of foresters feel that it is moderately possible to retain or enhance landscape values and manage the forest according to the integrated resources management concept.

The 1978 forest legislation revision revolved around the fundamental concept of integrated resources management (IRM). At the outset, however, it should be recognized that its implementation in the field has been very difficult, since foresters have to consider not only timber values but non-timber values such as visual resources as well.

To test Hypothesis V, foresters were asked whether they felt enough consideration is being given to non-timber values (FLM) in harvesting decisions (Question 9). Foresters were then asked about their attitudes towards the possibilities of merging both timber and non-timber values in forest management (Question 10).

Univariate analysis

Figure 4.14-A indicates that a surprising number of foresters (64%) felt that barely enough consideration was given to FLM in harvesting decisions. However, a slightly smaller proportion of foresters (54%) felt that it was highly possible to retain or enhance forest landscape values through the concept of integrated resources management (Figure 4.14-B); thus indicating that they believed timber and non-timber values can be merged successfully with managing the forest resources.

Bivariate Analysis

The results of the analysis revealed that no provincial government foresters felt that there was too much FLM consideration in forest harvesting decisions, while 83% of them said that it was barely enough. On the other hand, the private industry foresters formed, as expected, the largest group (25%) that felt that there was too much FLM consideration in harvesting decisions (Table 4.19-A). The foresters from the private industry also appeared to be the most skeptical regarding the possibility of maintaining or enhancing landscape values and managing the forest according to IRM (Table 4.19-B).

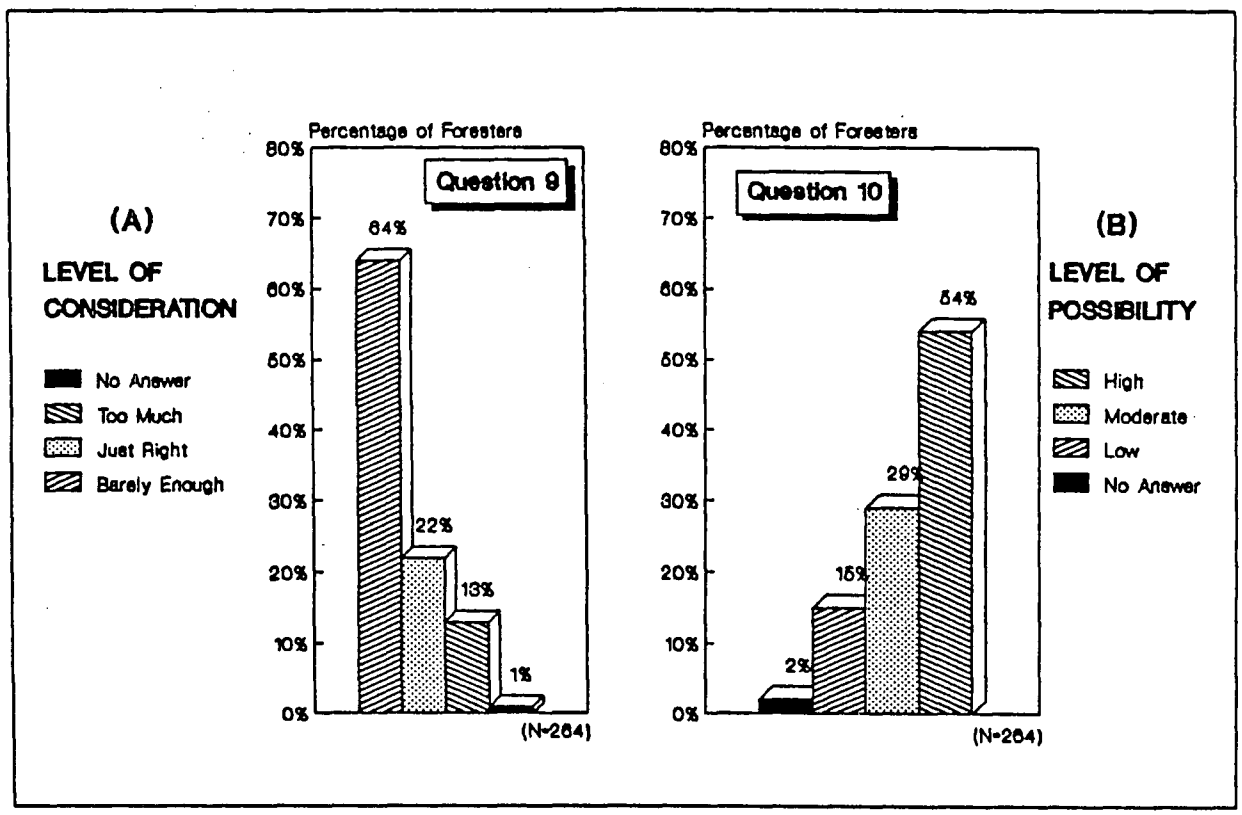

Figure 4.14 - Response distribution to Question 9 : "At the present time, do you feel enough consideration is given to FLM in forest harvesting decisions?" and, Response distribution to Question 10: "To what extent do you feel it is possible to retain or enhance visual values or forest landscape values and manage the forest according to integrated resource management concepts?"

Table 4.19 - Foresters' attitudes towards: A) the level of consideration of FLM in forest harvesting decisions (Q-9), and B) the possibility of retaining or enhancing forest visual values and manage the forest according to IRM (Q-10), respectively by employer category.

A) (Q-9) LEVEL OF CONSIDERATION	EMPLOYER CATEGORY			
	Provincial Government (n=96)	Private Industry (n=98)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
TOO MUCH	0	25	20	8
JUST RIGHT	17	34	12	11
BARELY ENOUGH	83	41	68	81
Totals	100%	100%	100%	100%
Missing Data= 3 (N=261)	Chi-square= 50.72**		Lambda= 0.0	

B) (Q-10) LEVEL OF POSSIBILITY				
	(n=97)	(n=97)	(n=40)	(n=26)
	%			
HIGH	69	40	50	69
MODERATE	21	38	32	27
LOW	10	22	18	4
Totals	100%	100%	100%	100%
Missing Data= 4 (N=260)	Chi-square=20.24**		Lambda= 0.0	

The other significant relationship revealed that an overwhelming majority of the least experienced foresters, i.e. with 0-5 years of practice, felt that barely enough consideration was given to FLM in harvesting decisions (Table 4.20-A). It was also this group of foresters that formed the largest group (73%) thinking that it is highly possible to retain or enhance forest visual values and manage the forest according to IRM (Table 4.20-B). In other words, the more years of practice foresters had, the less possible they felt it was to retain or enhance landscape values and manage the forest according to the IRM concept. Noteworthy is that no forester in the "0-5" years category is present in the "low possibility" category.

Table 4.20 - Foresters' attitudes towards: A) the level of consideration of FLM in forest harvesting decisions (Q-9), and B) the possibility of retaining or enhancing forest visual values and manage the forest according to IRM (Q-10), respectively by years of practice.

A) (Q-9) LEVEL OF CONSIDERATION	YEARS OF PRACTICE				
	0-5 (n=40)	6-10 (n=79)	11-15 (n=59)	16-20 (n=35)	21+ (n=48)
	%				
TOO MUCH	5	10	15	20	19
JUST RIGHT	13	19	29	26	23
BARELY ENOUGH	82	71	56	54	58
Totals	100%	100%	100%	100%	100%
Missing Data= 3 (N=261)	Gamma= +0.28**				

B) (Q-10) LEVEL OF POSSIBILITY					
	(n=40)	(n=79)	(n=59)	(n=36)	(n=46)
	%				
HIGH	73	54	58	55	39
MODERATE	27	32	25	31	33
LOW	0	14	17	14	28
Totals	100%	100%	100%	100%	100%
Missing Data= 4 (N=260)	Gamma= -0.13*				

4.3.11 Summary and Discussion

The data have shown that Hypothesis V is not supported. The statement should read as follows:

> **A majority of foresters feel that it is highly possible to retain or enhance forest landscape values and manage the forest according to the integrated resources management concept.**

In addition, a large majority of foresters, particularly those with the least experience and those working for the provincial government, felt that not enough consideration is given to FLM in forest harvesting decisions. Nearly half of the private industry foresters also fell into this category. This may indicate that a large majority of foresters agree with a stronger application of FLM guidelines, which in turn would require a stronger enforcement of the Ministry's policy.

On the other hand, written comments supply a few clues as to why some foresters are concerned about integrating FLM at a higher level into forest planning and management. There seems to be a "fear" of the consequences that such integration would have on the overall management scheme. For example, one forester wrote, "it is dangerous to concentrate on one aspect of forest management, i.e. landscape management, and overlook pertinent issues." Another specified that "one has to look at the (forestry) issues from all points of view: logging, economics, timber supply both short and long term, silvicultural objectives, etc. Being oriented in a conservative fashion is too easy a pitfall for persons to end up in".

These comments on integration or lack of integration relate back to the comments noted earlier in the "Costs" section. They seem to indicate uncertainties and confusion as to the real impacts that FLM has on the above issues. The overall comments point to a need for evaluating these impacts in economic, social, ecological, and technical terms and at both, the provincial and regional scale.

4.3.12 Personal Involvement

Hypothesis VI: An overwhelming majority of foresters have a low level of personal involvement with forest landscape management techniques.

To permit the testing of this hypothesis, questions asked for the present frequency of use of FLM techniques (Q-11), if not used at all, the opportunity for using those techniques (Q-12), and if used to a certain extent, the level of support received from superiors (Q-13). In addition, foresters were asked about the importance of having more administrative direction to increase the effectiveness of FLM in British Columbia.

The results have been analyzed and interpreted despite many problems inherent in the questions. First, concerning Question 11, those foresters who have never had any responsibility for forest management have almost certainly answered "Not at All", thus introducing a bias. Second, Question 12 created confusion because of the explicit restriction included in it. Several individuals did not like the limitation of the question as to who could answer it. Some of those people raised a valid point: "You may have used FLM techniques only a few times but still, more opportunities may exist." So several respondents who had used FLM techniques did answer Question 12, although they were not supposed to. Another source of confusion relating to this question was the omission of a "Not Applicable" category. This design flaw mislead some individuals to provide a response. At this point, it is impossible to make any adjustment to this problem. Nevertheless, by analyzing the results some tentative conclusions have been drawn.

Univariate Analysis

As expected, only a few foresters (11%) often used FLM techniques while a large minority (36%) of foresters said they had very little if any experience of FLM techniques in their work (Figure 4.15-A). In the case where FLM techniques had not been used at all, about 38% of the foresters said that there existed a low level of opportunity, and 7% felt there were a moderate level of opportunity. Only 2% mentioned that there were a high level of opportunity to use FLM techniques in their work. More than half of the foresters (53%) either gave no answer at all or wrote "Not Applicable" (Figure 4.15-B).

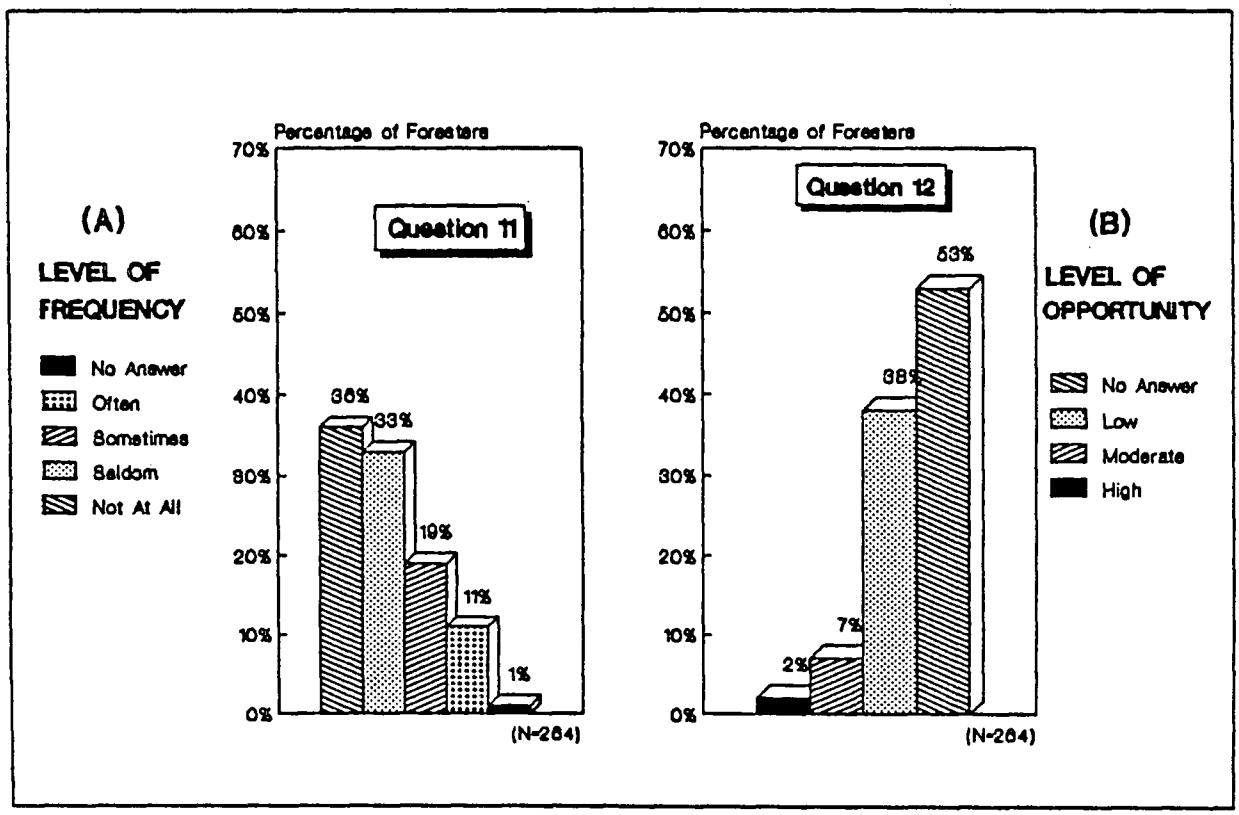

Figure 4.15 - Response distribution to Question 11: "How frequently have you used FLM techniques in your work?" and to Question 12: "If you circled "1" in Question 11, how much opportunity is there for using these techniques in your work?"

The level of support from superiors to those who had used FLM techniques and the level of importance of having more support (i.e. administrative direction) from these superiors are shown in Figure 4.16-A and 4.16-B, respectively. About 20% revealed that their superiors showed a low level of support for their efforts, around 25% said that they were moderately supportive, and 19% mentioned that they highly supported their efforts. Finally, around 36% of the foresters either did not answer the question or comply to the restriction involved in it. Once more, the question did not include an explicit "Not Applicable" category.

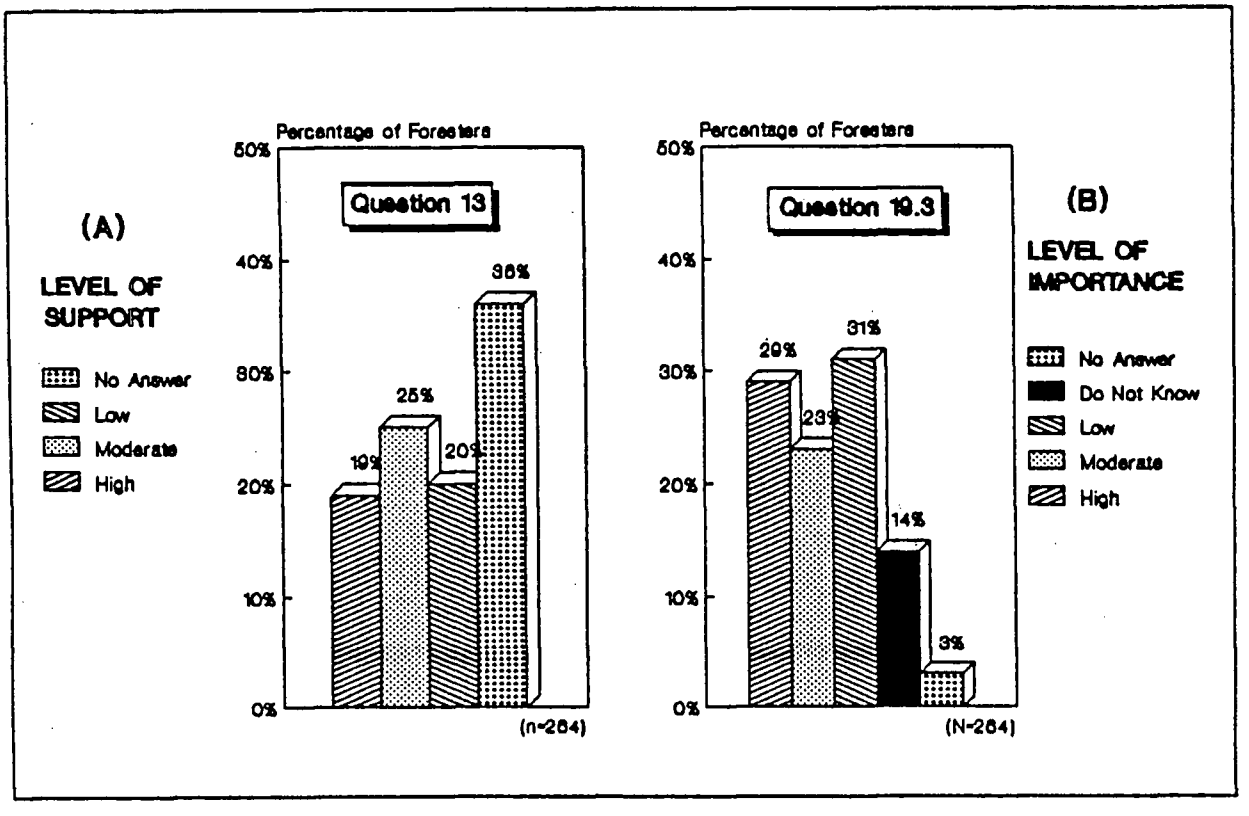

Figure 4.16 - Response distributions to Question 13: "If you have used FLM techniques, how supportive have your superiors been of your efforts?" and to Question 19.3: "How important do you feel that more administrative direction is to increasing the effectiveness of FLM in British Columbia?"

Regarding the level of importance of having more support from their superiors, a minority of foresters (29%) felt that it was highly important to have more administrative direction, about 23% said it was moderately important and finally, 31% felt that more administrative direction was of low importance for increasing the effectiveness of FLM in British Columbia. A relatively important number of foresters (14%) mentioned that they did not know enough about the issue to answer the question.

Bivariate Analysis

This analysis found three significant relationships. First, the support foresters received from their superiors varied significantly between employer categories. The consultants/contractors received the lowest level of support from their superiors (61%). As expected, the largest group receiving high support were the provincial government foresters (45%) (Table 4.21-A). Second, there was a very significant relationship between foresters' attitude towards more administrative direction and employer category (Table 4.21-B). Both the private industry and consultant/contractor (approximately 50%) were the largest groups who felt that more administrative direction was of low importance for increasing the effectiveness of FLM in B.C., while the largest group who felt that it was of high importance was once again the provincial government foresters. The final significant relationship indicated that the more years of practice foresters had, the higher the level of frequency to which they had used FLM techniques (as expected).

4.3.13 Summary and Discussion

Despite the inherent limitations involved with the questions, the results tend to support Hypothesis VI, but involve a smaller proportion of foresters than expected:

A large majority of foresters have a low level of personal involvement with FLM techniques.

One additional reason for this widespread lack of involvement may be that FLM is a program specifically implemented by one organization i.e. the Recreation Division of the Ministry of Forests and Lands, and that as seen previously, this organization does not enforce

Table 4.21 - A) Level of support received from superiors for applying FLM techniques (Q-13), and B) importance of more administrative direction (Q-19.3), respectively by employer category.

A) (Q-13) LEVEL OF SUPPORT FROM SUPERIORS	EMPLOYER CATEGORY Provincial Government (n=65)	Private Industry (n=71)	Consultant/ Contractors (n=23)	Other (n=10)
	%			
HIGH	45	24	9	30
MODERATE	31	46	30	60
LOW	24	30	61	10
Totals	100%	100%	100%	100%
Missing Data= 95 (N=169)	Chi-square= 21.63**		Lambda= 0.15	

B) (Q-19.3) LEVEL OF IMPORTANCE OF MORE DIRECTION	(n=81)	(n=82)	(n=34)	(n=21)
	%			
HIGH	45	22	38	43
MODERATE	33	27	12	33
LOW	22	51	50	24
Totals	100%	100%	100%	100%
Missing Data= 46 (N=218)	Chi-square= 22.47**		Lambda= 0.16	

strongly their present policy and training programs. Consequently, a large majority of foresters do not have to get directly involved with FLM.

In terms of support from superiors, the data indicated that government foresters are the largest group receiving a high level of support for their involvement with FLM techniques. On the other hand, it is the superiors of the consultants/contractors group who provide the least support. Some foresters commented that few workers in the field do more than give "lip service to good environmental planning and management if they know their superiors give it low priority". To rectify the situation, one forester said that "top managers should hire specialized people in landscape management". Another one wrote that "what is needed is more management direction and closer scrutiny of local operations to ensure practice lives up to the billing". These comments for more administrative directions seem to reflect the fact that it is a moderately or highly important issue to more than half of the B.C. foresters (Figure 4.16-B).

4.3.14 Public Involvement

Hypothesis VII: A majority of foresters do not desire more public involvement in forest planning and decision-making processes.

To test this hypothesis, foresters were asked about their satisfaction of the present level of public input in forest management decisions; the importance of more public participation in the planning process; the public's level of understanding of forest management issues; the importance of public education; the level of public concern for visual forest landscape; the importance of better public education of FLM concepts; and the importance of having more research into public landscape perception. To end this section on involvement, foresters were also asked about the importance of more industry involvement with FLM.

Univariate Analysis

Regarding the first question on level of public input, nearly half of the foresters (45%) felt that the present level of public input was not very satisfactory, while a minority (23%) felt that it was highly satisfactory. About the same proportion (27%) chose a middle position on the issue which can be interpreted as an "adequate" level of public input (Figure 4.17-A).

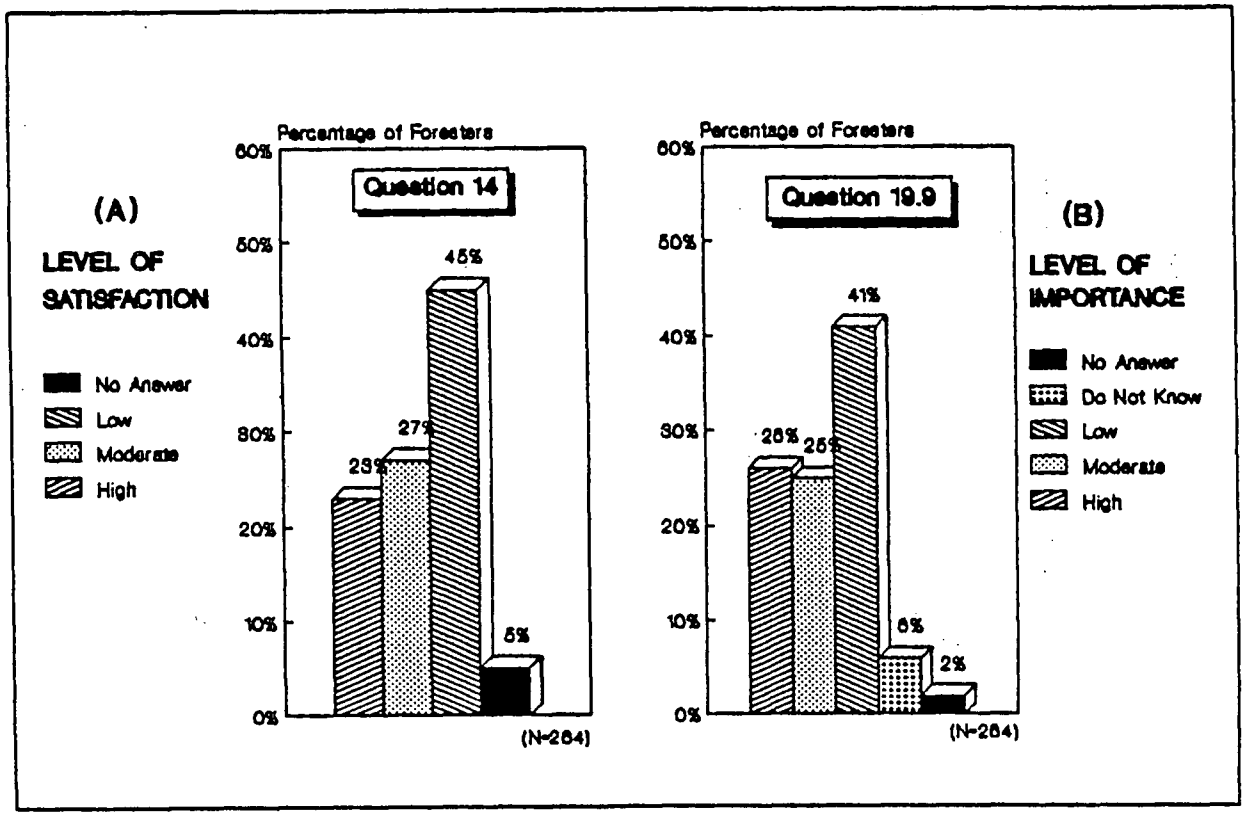

Figure 4.17 - Response distribution to Question 14: "To what extent do you feel the present level of public input into forest management decisions is satisfactory? Why?" and to Question 19.9: "How important do you feel that more public participation in the planning process is to increasing the effectiveness of FLM in British Columbia?"

In general, for those who indicated that the present level of public input was adequate or highly satisfactory, there did not exist a strong will for greater input unless major changes occur. For instance, foresters provided comments of the following nature: "Greater input by the public would make the decision tasks even more difficult" (approximately 20 cases); "Current MOF policies on public participation adequately reflect public wishes and provide lots of forums for involvement" (approximately 16 cases); "Excessive public involvement unduly slows down the decision-making process" (approximately 6 cases). Other foresters qualified their positions with comments such as the following: "Little public interest in forestry issues anyway", and that "the present level of public input comes from small interest groups only" (approximately 27 cases); "Majority of the public is not informed (educated) or does not understand forest management practices" (approximately 8 cases).

The main reasons foresters felt the present level of public input into management decisions is not very satisfactory are that: "the public is generally apathetic or not interested" (19 cases); and "the present level is not very satisfactory but specified that the public should not be involved anyway because it causes delays and upsets long term planning" (14 cases). Thirteen foresters said that the public should participate but that there are: "no avenues for public input; or "lack of support from the government for public involvement". Finally, 24 foresters indicated that the present level of public input is not very satisfactory because this public involvement is represented by specific groups which do not represent the whole population opinion.

Concerning the importance of more public participation in the planning process, only a minority of foresters (26%) felt it was highly important (Figure 4.17-B). On the other hand, more than 41% felt that this issue was of little importance. Approximately 40 foresters (15%) went into more detailed explanations concerning the issue of public participation. The overall consensus was that the public as a whole does not understand the actual concept of forest management. Therefore, foresters felt that the public either don't care or are too radical. They recognized the need to better educate and inform the public on forest management theories and techniques if the public is to become more involved in the forest planning process.

These comments on the need for public education reflect the fact that almost all foresters (92%) believed that the general public had a low level of understanding of forest management issues (Figure 4.18-A). Note that no one mentioned that the public had a "Very Satisfactory" level of understanding. Furthermore, a very large majority of foresters (75%) felt it was highly important that the public be educated on forestry issues (Figure 4.18-B). Some foresters even specified who should be educated. For example, four of them said that the best possibility for education was of children at the primary school level. Two others mentioned that it was not just necessary to educate the public, but also foresters, forest technicians, and loggers on the interactions between the forest resource and all of its users. Another forester even suggested that regional tourism groups should be educated so they can lobby for better landscape management.

There were many other suggestions regarding public education. One forester made the excellent suggestion of establishing a "good sample program on FLM" which should include selected forest zones in the urban and rural areas of the Coast, the Interior, and the Rockies. He added that once FLM techniques would have been successfully practiced and their costs analyzed, the "demonstration forests should be promoted to government, industry, and unions" along with the distribution of hard data on costs. Another specified that demonstration forests should also be used to educate the public and local people. Finally, it was suggested that "public information signs should be put up at strategic viewpoints explaining the logged area, the stand history and methods of treatments". This forester (and a few others) specified that the public must be informed that forest harvesting and management is the number one industry in British Columbia and being a renewable resource, it always will be.

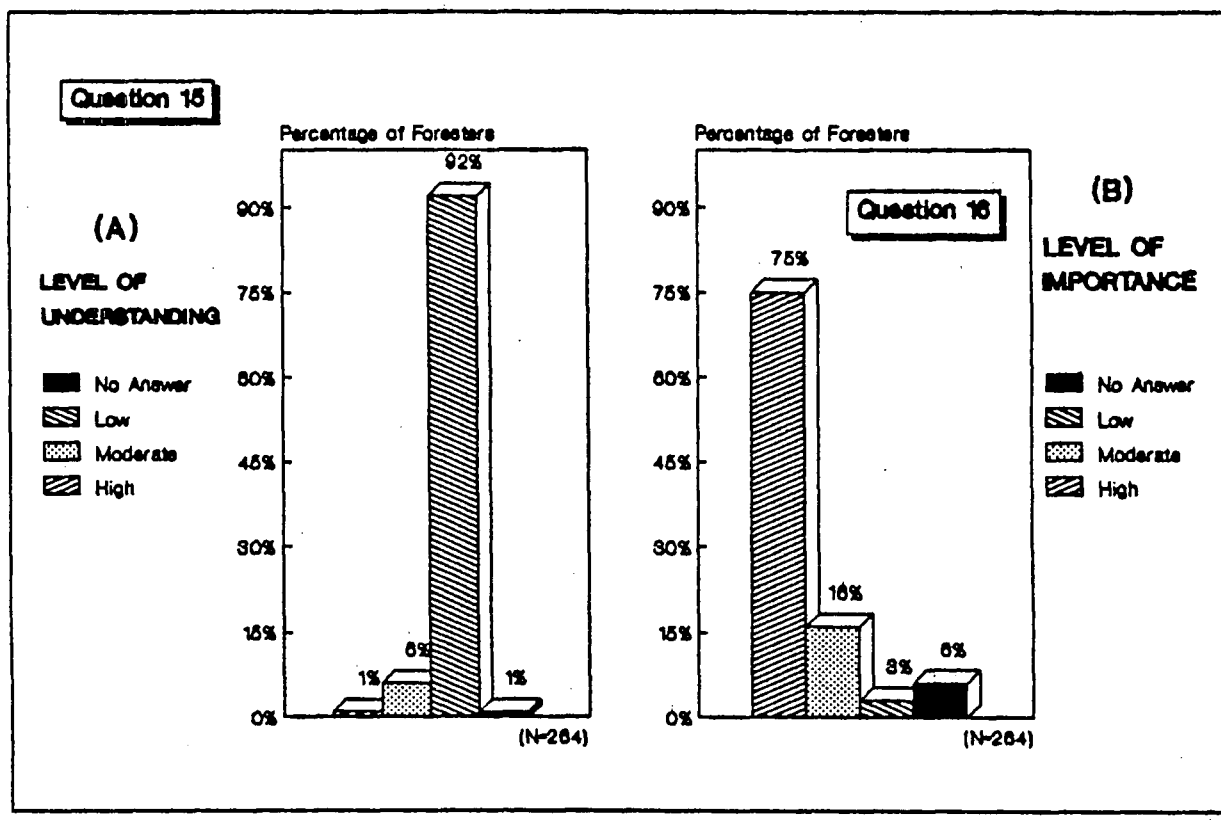

Figure 4.18 - **Response distribution to Question 15: "In your opinion, to what extent does the general public have a satisfactory understanding of forest management issues?" and to Question 16: "If you circled "1" or "2" above, how important do you think it is that more energy (time and money) be put into public education?"**

When asked for their opinions about the public's concern for visual landscape management, a very large minority of foresters (41%) thought that the public in their respective region was highly concerned but at the same time, a large minority of them (32%) thought that the public was not very concerned (Figure 4.19-A). With regards to their views about the importance of educating the public on FLM concepts, more than half of the foresters (55%) felt that it was highly important and a few (15%) said it was of little importance (Figure 4.19-B). Overall, about 77% of the foresters saw public education on landscape management concepts as a relatively useful way to improve FLM in British Columbia. One forester's comment was that "managing aesthetics is a very tangible way of showing concern for the forest resource". Another forester added: "to promote FLM among foresters and the public,

the most effective way might be to run one or two articles per year in the press describing the FLM "successes" on the local scene". Finally, the following comments seem to suggest that FLM can be a good vehicle for public education: "landscape management alone will not accomplish any "public goodwill" for the forest industry but it is essential support for better public education" and "FLM and public education regarding logging practices to help resolve the negative image many of the publics have of forestry."

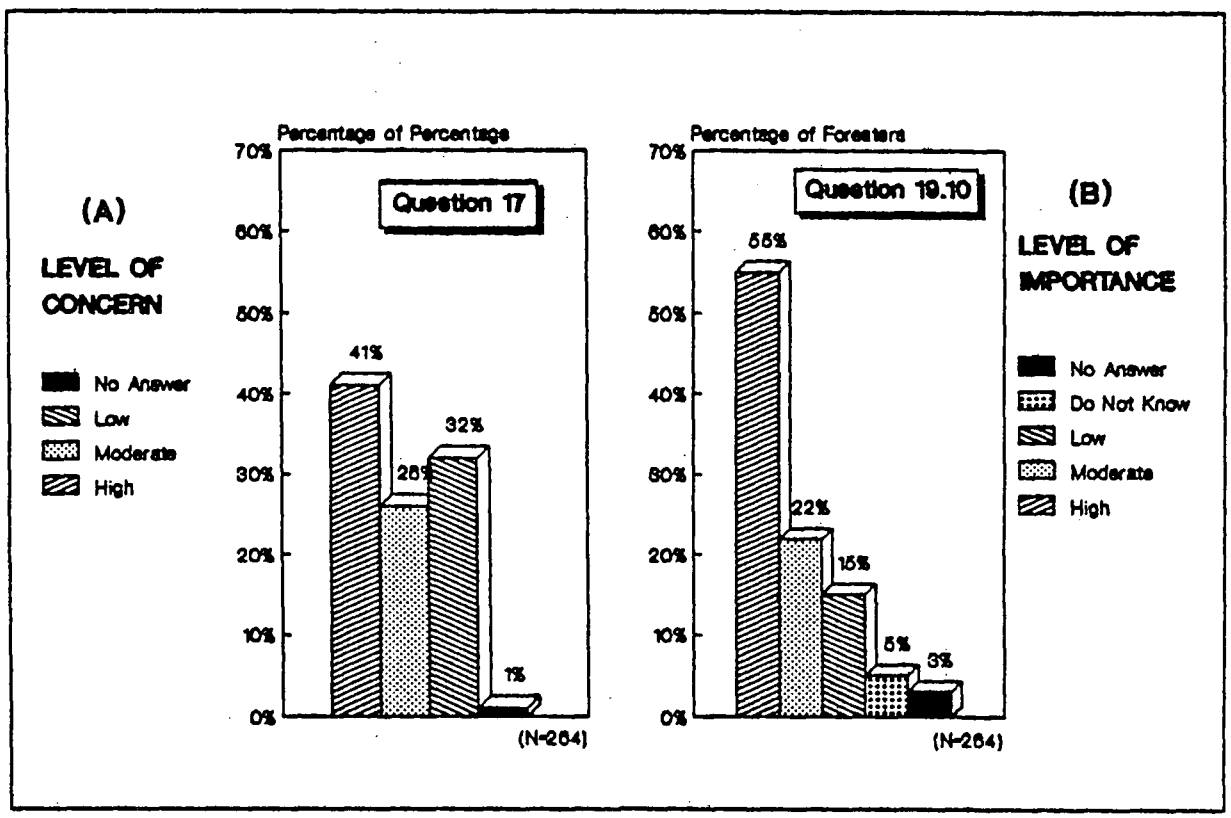

Figure 4.19 - Response distribution to Question 17: "To what extent do you think the public in your region is concerned about visual or aesthetic values in the forest landscape?" and to Question 19.10: "How important do you feel that better public education regarding FLM concepts is to increasing the effectiveness of FLM in British Columbia?"

Finally, foresters were asked about the importance of more research into public landscape perception (Figure 4.20). A large minority of foresters (41%) felt that it was highly important whereas a quarter of them (23%) found the issue moderately important. Another quarter (24%) felt that more research in public landscape perception was of little importance.

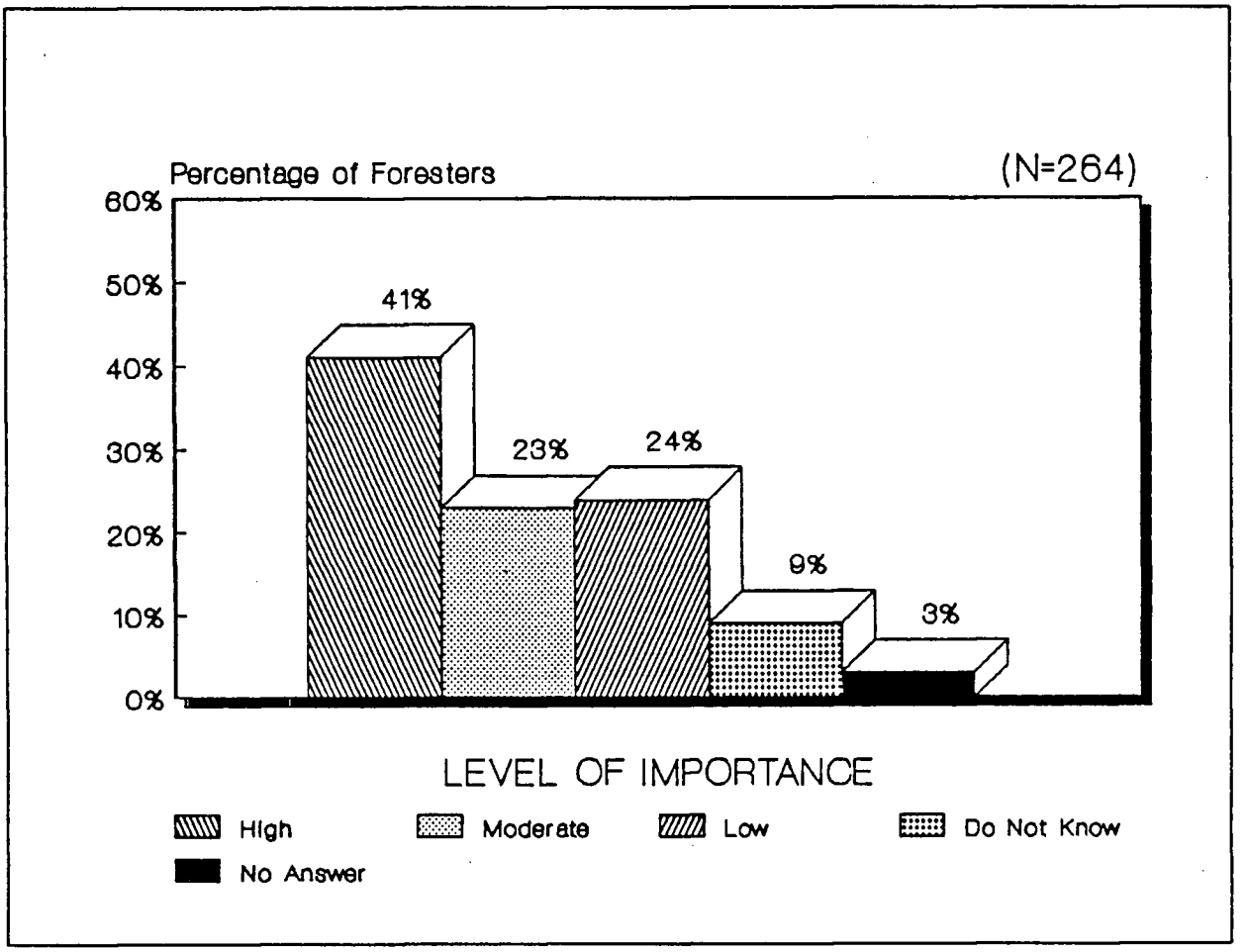

Figure 4.20 - **Response distribution to Question 19.4: "How important do you feel that more research into public landscape perception is to increasing the effectiveness of FLM in British Columbia?"**

Another question related to involvement asked foresters about how important they felt it was that the forest industry be more involved with FLM. A large majority of foresters (67%) answered that it was highly important while very few of them (8%) felt that more involvement was not very important (Figure 4.21). As the bivariate analysis will show, a surprisingly high number of industrial foresters were in favour of more forest industry involvement in FLM.

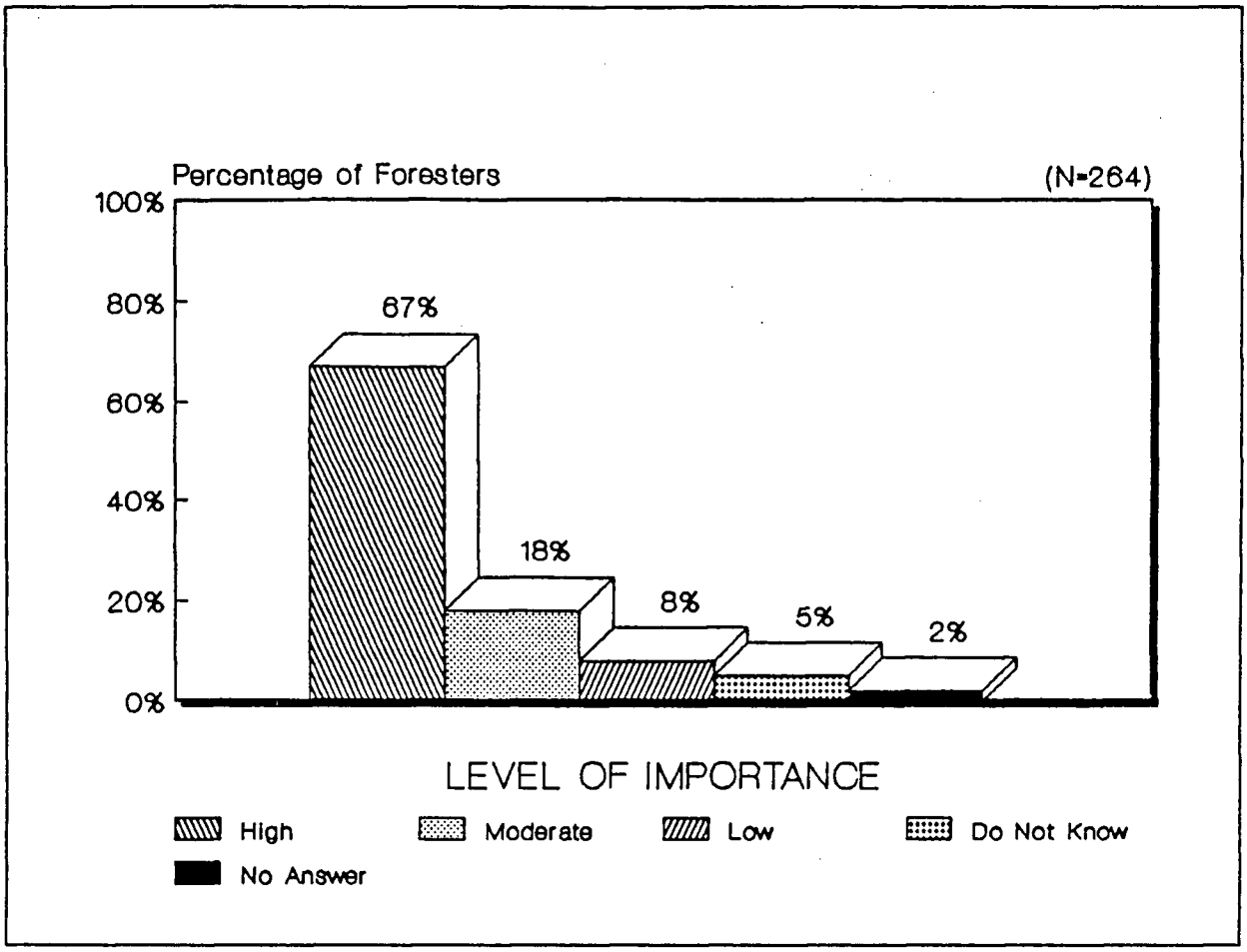

Figure 4.21 - **Response distribution to Question 19.8: "How important do you feel that more involvement from forest industries is to increasing the effectiveness of FLM in British Columbia?"**

Bivariate Analysis

Bivariate analyses of the responses showed the foresters' attitudes towards the level of input into forest management decisions, the extent of satisfaction regarding the general public understanding of forestry issues, the importance of more energy into public education, the importance of better public education of FLM concepts, and the importance of more research into public landscape perception were similar among foresters practicing in all aspects of forestry and in all forest regions. The employer category and the years of practice also did not influence foresters' attitude towards these issues.

The analyses revealed however that six pairs of variables were significantly related. First, it was found that attitudes towards the level of public concern for forest visual values, the importance of more public participation, and the importance of more involvement from forest industries varied among foresters working for different employers. Fifty-one percent of the foresters from the provincial government (as opposed to only 31% and 34% of the foresters in private industry and working as consultants/contractors, respectively) thought that the public was highly concerned about forest visual values (Table 4.22). Likewise, more foresters from the provincial government felt that it was highly important that the public participate more in the planning process (Table 4.23), and that forest industries get more involved in FLM (Table 4.24). On the other hand, it was generally the industrial foresters who represented the largest group, in relative terms, feeling that the public was not very concerned about forest visual values, and that it was of low importance for the public and the forest industry to become more involved in the planning process and in FLM, respectively. Nevertheless, an unexpected 60% of the private industry foresters still felt that it was highly important for them to get more involved in FLM, compared to 82%, 73%, and 79% for the provincial government foresters, consultants/contractors, and foresters in the "Other" category, respectively (Table 4.24).

Table 4.22 - Foresters' opinions variations among employer category concerning the level of public concern about visual values in the forest landscape (Q-17).

LEVEL OF CONCERN	EMPLOYER CATEGORY			
	Provincial Government (n=97)	Private Industry (n=98)	Consultant/ Contractor (n=41)	Other (n=26)
	%			
HIGH	51	31	34	58
MODERATE	25	24	42	11
LOW	24	45	24	31
Totals	100%	100%	100%	100%

Missing Data= 2 (N=262) Chi-square= 21.14** Lambda= 0.11

Table 4.23 - Foresters' opinions variations among employer category concerning the importance of more public participation in the planning process (Q-19.9).

LEVEL OF IMPORTANCE	EMPLOYER CATEGORY			
	Provincial Government (n=94)	Private Industry (n=90)	Consultant/ Contractor (n=36)	Other (n=22)
	%			
HIGH	37	18	25	36
MODERATE	36	24	17	23
LOW	27	58	58	41
Totals	100%	100%	100%	100%

Missing Data= 22 (N=242) Chi-square= 23.44** Lambda= 0.07

Table 4.24 - Foresters' opinion variations among employer category concerning the importance of more involvement in FLM from the forest industry (Q-19.8).

LEVEL OF IMPORTANCE	EMPLOYER CATEGORY			
	Provincial Government (n=93)	Private Industry (n=92)	Consultant/ Contractor (n=37)	Other (n=24)
	%			
HIGH	82	60	73	79
MODERATE	14	24	22	21
LOW	4	16	5	0
Totals	100%	100%	100%	100%

Missing Data= 18 (N=246) Chi-square= 16.72* Lambda= 0.00

Second, attitudes varied significantly between foresters of the six forest regions and two variables: level of public concern for forest visual values and the importance of more public participation. For instance, 80% of the foresters working in the Prince George region thought that the public in their region was little concerned with visual values in the forest landscape as compared to only 13% of foresters in the Nelson region who thought the same. Conversely, 5% of the foresters in the Prince George George region thought the public was highly concerned, as opposed to 74% in the Nelson region (Table 4.25). Concerning the relationship between the importance of more public participation in forest planning and forest region, it was found that more than half of the foresters from the Cariboo, Kamloops, and Vancouver regions were in the low category; that is, they felt more public participation was of little importance in forest planning (Table 4.26).

Finally, the last significant relationship occurred between level of public concern for forest visual values and years of practice in forestry (Table 4.27). The negative association indicates that the more years of practice foresters have the less they think the public is concerned with visual values in the forest landscape.

4.3.15 Summary and Discussion

The testing of Hypothesis VII showed that nearly half of the foresters (45%) felt that the present level of public input into forest management decisions is not very satisfactory. However, about the same proportion (41%) felt that it was not very important to have more public input. Thus, the data support Hypothesis VII but at a slightly lower degree than expected:

A very large minority of foresters do not desire more public involvement in forest planning and decision-making processes.

To complement this issue on public involvement, foresters were asked about their attitudes towards public education. It was found nearly every forester (92%) believed that the general public has a poor understanding of forest management issues and of these foresters, the very large majority (75%) feel that it is highly important to educate the public. Moreover,

Table 4.25 - Relationship between level of public concern for visual values in forest landscape (Q-17) and forest region.

LEVEL OF CONCERN	FOREST REGION Cariboo (n=19)	Kamloops (n=21)	Nelson (n=30)	Prince George (n=39)	Prince Rupert (n=19)	Vancouver (n=133)
	%					
HIGH	26	24	74	5	53	49
MODERATE	37	47	13	15	21	28
LOW	37	29	13	80	26	23
Totals	100%	100%	100%	100%	100%	100%

Missing Data= 3 (N=261) Chi-square= 67.15** Lambda= 0.24

Table 4.26 - Relationship between the importance of more public participation in forest planning (Q-19.9) and forest region.

LEVEL OF IMPORTANCE	FOREST REGION Cariboo (n=19)	Kamloops (n=20)	Nelson (n=30)	Prince George (n=35)	Prince Rupert (n=19)	Vancouver (n=118)
	%					
HIGH	16	15	37	34	32	28
MODERATE	31	25	33	40	42	19
LOW	53	60	30	26	26	53
Totals	100%	100%	100%	100%	100%	100%

Missing Data= 23 (N=241) Chi-square= 19.05* Lambda= 0.07

Table 4.27 - Relationship between foresters' opinions of the level of public concern for visual values (Q-17) and years of practice in forestry.

LEVEL OF CONCERN	YEARS OF PRACTICE 0-5 (n=40)	6-10 (n=79)	11-15 (n=59)	16-20 (n=36)	21+ (n=48)
	%				
HIGH	58	45	44	19	38
MODERATE	22	25	20	31	33
LOW	20	30	36	50	29
Totals	100%	100%	100%	100%	100%

Missing data= 2 (N=262) Gamma = -0.18**

many foresters believed that more public education is necessary if the public is to become more involved in the forest planning process.

The results also suggest that FLM can be a good vehicle to public education. For instance, the analysis has showed that a very large majority of foresters (72%) felt that FLM can highly contribute to public scenic enjoyment (see section on "Potential Contributions"). However, at the same time, a majority of foresters (55%) also felt that it would be highly important to have better public education regarding FLM concepts. This reflects the belief among a majority of foresters (58%) that the public is not very or moderately concerned about visual values in forest landscape, and that for FLM to highly contribute to the public scenic enjoyment, the public has to be educated first.

Another point of interest in the testing of this hypothesis is the level of involvement that foresters thought the forest industry should have with FLM. Overall, a large majority (67%) felt it is highly important to have more industry involvement. Interestingly enough, a majority of the foresters from the private industry (60%) felt the same way. This tends to suggest that the forest industry at large would be interested in becoming more involved with FLM, but according to comments, too many uncertainties still exist surrounding the real impact of landscape management on the industry. Some examples of those uncertainties include: lack of facts regarding changes in timber availability (AAC), lack of data on costs related to FLM practices and who would pay, and lack of cooperation from the Ministry of Forests and Lands.

4.3.16 General Support for Forest Landscape Management

The purpose of this final section is to provide answers to two specific questions: (1) How supportive are B.C. foresters to FLM? and (2) Who are these foresters? To answer these questions, the survey responses and comments were reviewed. Based on this information three general categories of support were developed: "Supportive" - "Not Supportive" - and "Undecided" (for those foresters who presented mixed feelings on FLM).

As Figure 4.22 shows, a very large majority of foresters (71%) in British Columbia did support FLM. The largest group of foresters who supported FLM were the provincial government foresters, while industrial foresters made up the smallest group who supported FLM. For instance, 91% of provincial foresters were found to accept FLM while the remainder were undecided. On the other hand, approximately half of the industrial foresters seemed to be for FLM (Table 4.28). The regions were FLM was most supported were Cariboo, Nelson, and Prince George, where 79, 80, and 82% of the foresters in each of these regions respectively were found to support FLM. However, this last relationship was not found to be significant (Table 4.29). Finally, the more experienced foresters were the less prone they were to support FLM. Eighty-five percent of foresters who practiced for 5 or less years supported FLM, compared to 49% who practiced for more than 20 years (Table 4.30).

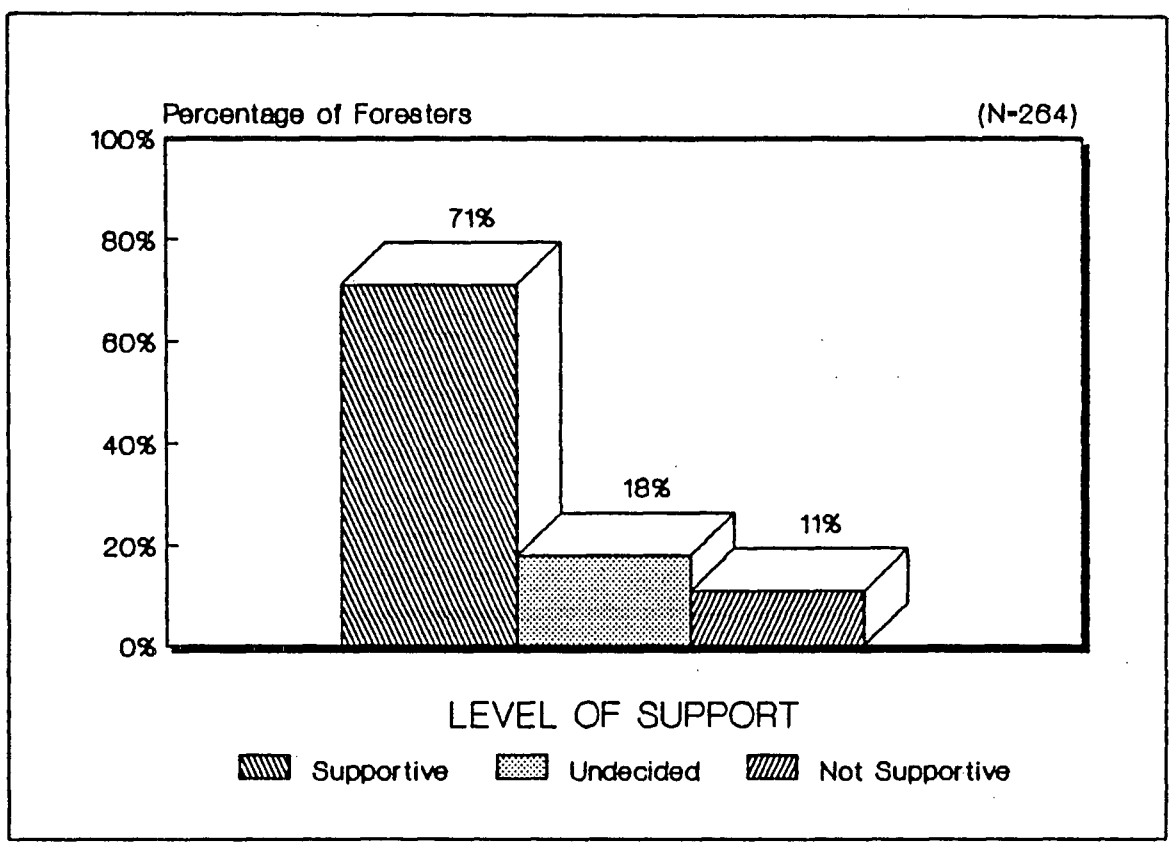

Figure 4.22 - Foresters' general support for forest landscape management.

Table 4.28 - Foresters' support for forest landscape management by employer category.

LEVEL OF SUPPORT	EMPLOYER CATEGORY			
	Provincial Government (n=96)	Private Industry (n=97)	Consultant/ Contractor (n=42)	Other (n=23)
	%			
SUPPORTIVE	91	49	67	83
UNDECIDED	9	30	19	13
NOT SUPPORTIVE	0	21	14	4
Totals	100%	100%	100%	100%

Missing Data= 6 (N=258) Chi-square= 44.12** Lambda= 0.56

Table 4.29 - Foresters' support for forest landscape management by forest region.

LEVEL OF ACCEPTANCE	FOREST REGION					
	Cariboo (n=19)	Kamloops (n=21)	Nelson (n=30)	Prince George (n=39)	Prince Rupert (n=19)	Vancouver (n=133)
	%					
SUPPORTIVE	79	57	80	82	68	67
UNDECIDED	16	33	7	13	32	19
NOT SUPPORTIVE	5	10	13	5	0	14
Totals	100%	100%	100%	100%	100%	100%

Missing Data= 3 (N=261) Chi-square= 16.00 Lambda= 0.39

Table 4.30 - Foresters' support for forest landscape management by years of practice in forestry.

LEVEL OF SUPPORT	YEARS OF PRACTICE				
	0-5 (n=40)	6-10 (n=79)	11-15 (n=59)	16-20 (n=36)	21+ (n=47)
	%				
SUPPORTIVE	85	77	68	72	49
UNDECIDED	7	14	19	17	36
NOT SUPPORTIVE	8	9	13	11	15
Totals	100%	100%	100%	100%	100%

Missing data= 3 (N=261) Chi-square= 18.20* Lambda= 0.58

CHAPTER V

SUMMARY, IMPLICATIONS AND CONCLUSIONS

5.1 Summary of Major Findings

This research has involved surveying professional foresters' attitudes towards issues related to the practice of forest landscape management in British Columbia. The major research objectives were to:

(1) Develop a reliable tool for surveying foresters' attitudes;

(2) Determine if attitudes varied between groups of foresters;

(3) Provide guidance for improvements in FLM based on foresters' attitudes; and,

(4) Propose research needs and priorities in FLM.

The review of the literature showed that virtually no major work specific to professionals attitudes towards landscape management had been done in any Canadian province. While many professional attitude studies have been completed in the area of visual resource management in the United States, many critical questions related to foresters' views and opinions still remain unanswered in British Columbia and Canada.

The 1986 Professional Foresters Survey on forest landscape management was based on a self-administered questionnaire implemented in British Columbia over a period of three months. A systematic random sample of 300 foresters was drawn from the current list of the Association of B.C. Professional Foresters. Ninety percent of these responded to the questionnaire.

Contrary to initial expectations, the excellent response rate, overall and in each forest region, showed that foresters were concerned about FLM. However, a very large majority of them admitted they had a relatively low level of knowledge of FLM concepts, program, and policy. While it was expected that foresters who recently graduated from universities, where FLM-related courses are available, would represent the largest group with a relatively high

level of knowledge, they in fact formed the largest group with a low self-assessment of knowledge.

Foresters also showed a divided opinion about the importance of "having a stronger policy" on FLM. However, it was noted that this might be due partly to the low level of knowledge of the policy by the majority of foresters, and partly to the confusion created by the double meaning of the word "stronger". Foresters expressed real concerns about the consequences of a "stronger policy formulation" or of a "stronger enforcement" of the present policy on various sectors of forestry.

Overall, the study showed that there was a lack of information regarding FLM pertinent to British Columbia. This finding explained to a certain degree the low level of knowledge of a very large majority of foresters. Regarding the importance of specific sources of knowldege of FLM, "Field Experience" was found to be the greatest source for a very large majority of foresters. Certainly, the most unexpected findings were that the source "University Courses" did not significantly relate to foresters' self-assessment of knowledge of either the program and policy, and that a large majority of foresters indicated that the Ministry's workshops did not contribute at all to what they knew about FLM. In addition, there was evidence to suggest that certain goals and objectives of the Ministry's program on FLM were misunderstood or misinterpreted. For example, many foresters believed that its prime objective was to hide forest management practices from view. These findings strongly suggested that the Faculty of Forestry at U.B.C. and the Ministry of Forests and Lands were not very successful in promoting FLM among the members of the profession.

Foresters' attitudes towards the proposed means of increasing professionals' knowledge revealed that approximately half of them felt that it was highly important to have more training through continuing education, more courses at university and technical institute levels, more field workshops, and more trained personnel for the purpose of improving FLM in British Columbia. However, mixed feelings existed concerning the importance of having more FLM-related publications. This suggested that the means discussed above were perceived by foresters as being more effective at reaching them than just "free" reading in publications.

A very large majority of foresters perceived FLM practices as imposing undue additional costs on the forest industry, while 21% said it did not at all. The industry foresters took a much less radical position on the issue: only 26% of them said that FLM as applied now was highly imposing undue additional costs on the forest industry.

Half of the foresters felt that FLM could contribute greatly to issues benefitting society, while only 26 percent believed that it could contribute greatly to better timber management practices. Private industry foresters ranked significantly lower than all other groups in the extent that they felt FLM could benefit forestry and social issues.

A majority of foresters felt that it is highly possible to retain or enhance forest landscape values while managing the forest according to the integrated resources management concept. In addition, a large majority of foresters, particularly those with the least experience and those working for the provincial government, felt that not enough consideration was given to FLM in forest harvesting decisions. Nearly half of the industry foresters also fell into this category. Finally, almost half of the foresters stressed the importance of more support or direction from superiors if FLM is to achieve better success in the field.

Approximately 45% of the foresters felt that the present level of public input into forest management decisions was not satisfactory. In addition, about the same proportion felt that it was not very important to have more public participation in the planning process. This can be easily explained by the fact that almost all foresters in B.C. felt that the general public has a poor understanding of forest management issues. A very large majority saw public education on forest and landscape management matters as very important, especially if the public was to become more involved in the process.

A large majority of foresters, including a majority of those employed in the forest industry, felt that it was very important that the industry be more involved with FLM. It appeared, however, that more incentives were necessary to expect a reasonable level of involvement.

Responses and comments suggested that a very large majority of foresters in British Columbia supported forest landscape management. As expected, this support was

overwhelming among the provincial government foresters. Furthermore, approximately half of the industry foresters supported FLM. However, the widespread support was tempered with repeated concerns about the potential and real impacts of FLM on various forestry and social aspects, including impacts on operation costs, efficiency of logging practices, timber availability, and public perception of both the landscape and forestry in general. In summary, the overall comments pointed to a need for evaluating these impacts in economic, social, ecological, and technical terms and at both the provincial and regional scale.

5.2 Implications

Two objectives of this study are to provide guidance for improvements in FLM based on foresters' attitudes and opinions, and to propose research needs and priorities. The implications discussed next are cast in terms of these objectives.

1. Implications for Professional Involvement

- The B.C. Ministry of Forests and Lands should provide more opportunities to professional foresters to participate in forestry program development and improvement.

As demonstrated by this study and by the long series of Members Opinions Surveys implemented by the Society of American Foresters, foresters appreciate opportunities for sharing their views on professional issues. Consequently, mail surveys can be considered a reliable and relatively cheap tool for surveying attitudes towards forestry and social issues. They may be implemented on a continual basis, and results can be used to develop priorities for policy formulation, program development and improvement.

Another level of professional involvement is expressed by a large majority of foresters to whom it is greatly important that the forest industry be more involved with FLM. A majority of the industry foresters were also in this category.

2. Implications for Professional Education

- Foresters awareness and knowledge of FLM should be increased through courses at university level and continuing education.

The findings have shown that there is a lack of information about FLM pertinent to the B.C. context. As a consequence, this research, as well as that of others (Fullerton, 1976;

Laughlin and Garcia, 1986), has found that there is a lack of awareness and understanding by a majority of foresters on the role of FLM and what it tries to accomplish in forestry. It is evident from this study that many foresters still hold misconceptions regarding the management of visual resources. For example, many stated that it is extremely difficult to manage something as fortuitous as landscape quality because there are as many perceptions of the landscape as there are viewers, or that "beauty is in the eye of the beholder". Other studies have found no empirical evidence to support these beliefs (Kaplan, 1979; Williamson and Chalmers, 1982; Miller, 1984). Education and information are imperative to modify such misconceptions, and approximately half of the foresters see this education as highly important for increasing the effectiveness of FLM in British Columbia.

The low self-assessment of knowledge of FLM topics on the part of the recent graduates also indicates that forestry students should be given more opportunities to expand their knowledge of the relationships among non-timber values (landscape management), social values, and timber values in the management of B.C. forests.

- The Ministry of Forests and Lands should be more effective in promoting its FLM program and policy with an improved communication scheme to reach foresters at different levels.

One mandate of the Ministry is "to conduct and encourage training programs for Ministry and forest industry personnel" (Ministry of Forests, 1981, p.8). While meeting this objective appears essential to the success of the FLM program, the study shows that it is not very successfully achieved. Fullerton (1976) has clearly pointed out the need to educate foresters on landscape management issues to avoid confusion in the field. This study has shown that a majority of foresters find that more training programs and field workshops are needed to increase the effectiveness of FLM in British Columbia.

3. Implications for Public Education

- The Ministry of Forests and Lands should establish a scheme or program specifically to communicate the details of landscape and forest management practices to interested public.

Nearly every forester (92%) in the survey believed that the general public has a poor understanding of forest management issues and of these foresters, a very large majority felt that it is very important to educate the public. For many foresters involved in this study, FLM seemed to be a common-sense approach for gaining public support for timber harvesting practices. They specified that unless the public is properly informed and aware of the environmental and visual considerations that FLM entails, the Ministry can not expect to achieve the level of understanding it desires for this land management practice. Moreover, many foresters felt that more public education is necessary if the public is to become more involved in the planning process.

4. Implications for Public Involvement

- Public input in forest landscape design and forest planning is necessary to make decisions consistent with societal values.

Despite the fact that nearly half of the foresters felt that the present level of public input into forest management decisions is not satisfactory, about the same proportion felt that it was not very important to have more public input. Many recognized, however, that the public does not know enough about forestry to be involved. The implementation of a systematic communications program to obtain public understanding of forest and landscape management could result in a more efficient and valuable public involvement process, and in planning decisions which are more consistent with societal values.

5. Implications for Program and Policy Implementation

- The Ministry should put more emphasis on enforcing the present policy on FLM.

At the present time, major change in FLM policy formulation does not appear to be a priority for foresters. A large majority of them, particularly those with the least experience and those working for the provincial government, felt that not enough consideration is given to FLM in forest harvesting decisions. Nearly half of the industry foresters also fell into this category. This position, and many implicit comments, suggest that they would like to see a better enforcement of the FLM guidelines, which in turn would require an enforcement of the policy. This enforcement would most certainly impact on forest practices and the industry.

These impacts should be monitored to determine if future changes in the program and policy are warranted.

6. Implications for Research Priorities

- More financial and personnel resources should be put into applied research related to FLM in British Columbia.

The wide array of reasons given by foresters on the extent of imposition of undue additional costs of FLM on the forest industry clearly reflect the lack of factual information on the economics of FLM. Research should concentrate on the development and implementation of methods that seek to assess the costs and benefits of FLM for the various sectors of society and forestry. Particularly, foresters suggested that these methods focus on assessing the following: (1) short and long-term impacts of FLM practices on annual allowable cut (AAC) at regional and provincial levels; (2) costs of implementing FLM practices and who should bear these costs; and (3) public's perceptions and preferences of managed and unmanaged forest landscapes and various forest management practices. The rationale behind this last point is that often private benefits and opportunity costs of resources differ from costs and benefits to society. Conducting perceptual studies could help ensure that forest planning and management are based on actual social values.

The effectiveness of the FLM program and policy should also be evaluated to determine if stated goals and objectives are being met. For example, suggested possible modifications could take the form of a better formulation of the policy, or the development of incentives to forest industries to comply with FLM guidelines.

5.3 Conclusions

The management of forest landscapes is an important consideration for professional foresters. Current social and political awareness of environmental quality issues require that forest planners and managers be more sensitive and responsive to the visual impacts of certain forestry practices. It is with the intent of responding to societal concerns that a FLM program has been developed and implemented by the B.C. Ministry of Forests and Lands.

This study has shown that a great number of foresters support FLM but at the same time, wide applications of its techniques and policy are hindered by the many uncertainties surrounding implementation costs and impact on timber availability. To a lesser extent, foresters also expressed concerns on issues such as the ecological and social consequences of implementing FLM.

The results of this survey represents a preliminary assessment of potential improvements of FLM. The different issues raised by the members of the forestry profession should set the foundations for further empirical and applied research in the field of FLM. With the correct blend of ecological, social and design considerations in forest planning and management, landscape forestry has an important contribution to make by helping to ensure that further visual quality degradation of forest landscapes does not occur in the future.

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- - APPENDICES - -

- - APPENDIX I - -

CONCEPTUAL NOTIONS AND KEY DEFINITIONS

The general increased interest in environmental quality and landscape management has brought with it a flood of studies focusing on perceptions of and attitudes towards visual environments. This proliferation of work has come from numerous disciplines including geography, forestry, landscape architecture, sociology, psychology, and many others. Consequently, a myriad of definitions, implied or explicit, of various terms has emerged along with the confusion that inevitably results from a multiplicity of meanings. The following establishes a conceptual context by defining key terms and briefly discussing theoretical notions relating to the purposes of this thesis.

a) Environmental Quality

No single definition can adequately depict the breadth and implications of "environmental quality". Instead, different perspectives are presented which are most related to this work.

When related to evaluating management practices on public lands, Heyman and Twiss (1971) speak of "environmental quality" as referring "primarily to the continuance, to the extent feasible, of the natural ecosystems existing on public lands especially as that ecosystem is important to human health and safety, the provision of direct sensory experiences, and the continued viability of life forms and biotic communities that exist naturally on, and surrounding, the public lands".

In a more general context, however, the above definition must be expanded to include all environments experienced by humans and include aspects of environmental psychology. A very important point made by Schwarz *et al.* (1976) is that "quality" is a judgment made by a a human, and it can relate to both an individual or to a group of individuals. The "group" may attach some value or measure of quality to some environment, and each individual may give a somewhat different value to the same environment. Thus an environment may be natural or urban, managed or unmanaged, with each person having his or her own value judgment as to the quality of the environment, but together they may reach a consensus which forms an "environmental quality" basis for planning and management.

b) Visual Quality

Many researchers, studies, and definitions view "visual quality" as an integral and necessary component of environmental quality (e.g. Litton, 1978).

"Visual quality" is also often used interchangeably with landscape aesthetic, scenic quality, and landscape quality. Unfortunately, this can create misunderstanding because for many, "aesthetic" for example, is perceived as a whole sensory experience involving not only the visual, but also sound, smell, taste, and touch (Shafer, 1969; Schwartz *et al.*, 1976; U.S. Bureau of Land Management, 1977; Brown and Daniel, 1984).

The term "scenic", on the other hand, is often referred to and limited to large panoramic landscapes viewed from a distance. In addition, "aesthetic" or "scenic" values (or resources) are often associated with outdoor recreation or wilderness, "... frequently in a way that implies they are interchangeable" (Brown and Daniel, 1984, p.1).

In the context of this study, "visual quality" is the term preferred and implies the visual attributes or significance given to a landscape determined by cultural values and the landscape's intrinsic physical properties (Wilson-Hodges, 1978; Army Corps of Engineers, 1984). Such "visual quality" of a landscape is a property often labeled with terms like "high" versus "low" or "acceptable" versus "unacceptable" visual quality.

Equally important to consider is the double meaning of "visual quality" in forest land management. First, it can mean satisfying the public's expectations of the forest environment. Second, it can refer to the appropriateness of functions, beginning with adequate decisions on management techniques to satisfy ecological, economic, and visual requirements and ending with proper implementation of these techniques in the field.

c) Land and Landscape

"Land" and "landscape" are best understood when taken as two different entities.

"Land" can be defined as earth, the solid portion of the surface of the globe (Oxford, 1980; Hunter, 1985). It is a record of biophysical components such as landforms, vegetation types, and land uses.

"Landscape", on the other hand, can be defined as the appearance of that portion of land which the eye can view (Webster, 1963, p.311; Hunter, 1985).

In other words, land becomes a landscape when seen by a person, revealing a record of biophysical components and of his/her behaviour, values and activities on the surface of the earth, and his/her relationship with the environment.

d) Visual Resource(s)

As defined earlier, landscapes are a "seen" phenomenon. The land components, "...all of which have the potential of being seen as part of any given landscapes, and the landscapes they do form in combination are called the visual resource" (U.S. Forest Service, 1972).

The components of the visual resource, also seen as all of the light-reflective surfaces of the biophysical environment, has been grouped into six major categories (U.S. Forest Service, 1972): flora, fauna, land, water, air, and artificial (or man-made) objects.

Stated simply, visual resource are "those natural and cultural features of the environment which can potentially be viewed" (Army Corps of Engineers, 1984, p.314).

e) Visual Resource Management

Perhaps the most comprehensive definition of "visual resource management" has been given by the American Society of Landscape Architects (Stone, 1978, p.3):

> "...the management of the "seen" aspects of both the land and the activities which occur upon it - the administration of the land's scenic or aesthetic attributes. It [visual resource management] deals with those aspects of the environment which are evaluated by the sense of sight, as opposed to touch, hearing, smell, and taste."

The Society also states that activities such as visual resource inventory, analysis, and determination of objectives or standards should be integrated into the land use planning process along with all the other resource information.

The foregoing definition, although inclusive, fails to recognize explicitly the legitimate and necessary role of the human element, be it the lay public or the professional managers, in the landscape experience. Therefore, a complete definition of visual resource management must refer not only to the biophysical characteristics of the land, but also to the human

perceptual values that give a sense to a landscape. In one of his books, Lynch (1980) discusses the necessity of "managing the sense of a region" by surveying people and assessing their perceptual and preference values related to the landscapes (unmanaged and managed), and to projects that could modify them.

f) Landscape Management

The U.S.D.A. Forest Service (1972a, p.5) defines "landscape management" as follows:

> "The art and science of planning and administering the utilization of the natural resources in such ways that the resulting effects on the visual resource either maintain or upgrade man's psychological welfare. It is the purposeful planning and design of the visual aspects of ... forest multiple use land management."

In its subsequent development of the Visual Management System, the Forest Service adds that landscape management deals with the visual harmony or disharmony among all of its parts: landforms, vegetation, structures, air, and water (U.S.D.A. Forest Service, 1973).

The B.C. Ministry of Environment takes another approach in defining "landscape management" as "the assessment, evaluation, design and manipulation of a landscape" (1983, p.81).

With the constant human pressure on the natural environment, landscape management has become an environmental necessity (Zube, 1980). One primary role of landscape management is to maintain the integrity of the visual resource, and its ultimate goal is quality in land management.

g) Forest Landscape

A landscape in which the forest is the most dominant physical component.

h) Forest Landscape Management (FLM)

"Forest landscape management" is a specific branch of visual resource management. The term "forest landscape management", however, has more specific meanings depending on the group managing the forests for visual quality purposes.

The working definition of the U.S. National Forest visual management system is as follows:

> "Forest landscape management is the art and science of planning and administering the use of forest lands in such ways that the visual effects maintain or upgrade man's psychological welfare. It is the planning and design of the visual aspects of multiple-use land management." (U.S.D.A. Forest Service, 1973, p.4).

However in its policy, the B.C. Ministry of Forests and Lands defines "forest landscape management" as:

> "...the activity by which visual and aesthetic landscape values are identified, inventoried and analyzed, and are protected or enhanced, according to their relative importance, within integrated resource use management plans, and during resource development." (B.C. Ministry of Forests, 1982).

In other words, the Ministry declares that forest landscape management is concerned with maintaining the overall integrity of the landscape by blending the harvesting-related management activities with naturally occurring form, color, and texture as much as possible.

Although the above two agencies and two definitions include, in theory, all forest management activities, in practice most of the effort is directed towards timber harvesting activities. In essence, it can be said that forest landscape management has evolved as a new discipline in American and British Columbian forestry following persistent public controversies concerning timber harvesting, especially clearcutting. It is not surprising then to see definitions such as Burke's interpreting forest visual management as a blend of timber management and landscape management (1975).

i) Quality Forest Management

Within and outside the forestry profession, the visual quality of forest landscapes is often associated with "quality", "good", or "sound" forest management practices. The converse is also true: for many, "good management practices" lead to "good landscapes".

For example, the B.C. Ministry of Forests states "...forest landscape management concepts, principles and techniques shall be applied in conjunction with sound forest management practices..." (1982, Chapter Recreation, Section 003, p.2). Also, the Ministry's Handbook on forest landscape management clearly demonstrates that the choice is not between economic and aesthetic values but between good forestry practices and poor forestry practices.

This raises some valid questions: Does "good" scenery or quality of visual landscape automatically result from such "good" management practices? Or conversely, does "good" management practices automatically result in "good" scenery? Sampson (1973), for example, says that the management of forests exclusively for timber production raises the question of whether or not "good" landscape, in the sense of good scenery, automatically results from good timber production practices. He adds that "forestry is a land use which can be managed with a good set of logging tools but landscape may require a more subtle management..." (p.55). An additional question is: What are "sound (or good or quality) forest management practices?" Sound economically? Ecologically? Visually? Culturally? Historically? Sound for what or for whom? Before any attempt is made to answer these questions, definitions of key terms are necessary.

It is clear that every individual, professional, interest group, agency, and organization involved in the forest environment tends to define "good", "sound", or "quality" forest management according to a somewhat biased value system, be it economic, social, ecological, visual, cultural, historical, or a combination of these. In this context, an appropriate definition of "good", "sound", or "quality" is like the management of the multiple values or resources existing in the forest environment -- it must be integrated.

Bogdanovich, chairperson of the New York State Forest Practice Board, reported at a Forestry Congress on efforts of the Board and other groups to improve forest management and to define "good management" (1984). She quickly admitted that attempts at defining "good management" created conflicts. The Forest Practice Board has addressed this problem differently in revising the Forest Practice Standards, which are used throughout New York State as indicators of good management practices. The Board was faced with whether to develop strict standards, in order to improve forest management, or to keep them flexible. The question was: Do stiff rules or guidelines result in better management practices? In the end, the Board preferred flexibility to stiffness by including the best management practices in the standards and in the timber harvesting guidelines based on what it felt was good forest

management. Once more, the same problem of definitions persists: What is "best", "good", and for whom?

For some years now, Baskerville has been promoting "good management practices" throughout Canada and on many occasions, he has referred to the urgency for foresters to acknowledge the non-timber values in forest management (Baskerville, 1986b). He defines "good forest management" as "...control of the temporal and spatial development in a forest so that it is consistently possible to achieve the desired quantity and quality flow of benefits for that particular forest". He then continues, "...goodness of management can only be determined in a specific case, and that goodness of management is likely always to be a matter of degree" (1986a, p.346). In his approach to forest management, "desired... quality flow of benefits" certainly represents a key concept that does not only refer to timber quality.

The foregoing notions and definitions related to good forest management clearly show the difficulty of defining quality forest management. Therefore, it seems necessary to define "quality" in the context where it is applied. In this study, "quality forest management" is defined using the following steps:

Step 1: Quality in forest management implies an initial desire from the foresters to achieve not only quantity, but also quality in the flow of benefits they want to derive from a particular forest. These benefits vary in magnitude depending upon the given physical, technical, economical, social, and environmental conditions of the particular forest.

Step 2: Once these benefits have been acknowledged and agreed upon by the foresters and the public, there is the fundamental professional requirement to choose and implement the proper forest management practices best suited to achieve the desired benefits. With regard to this, Nelson (1974) points out that many foresters' or resource specialists' management decisions mistakes have been a matter of poor judgment rather than technical know-how, which he claims, reflects a lack of awareness, sensitivity, and consideration for other values. He also specifies that the decision-makers must specifically improve the quality of performance and let the public know what they are doing. Timber and non-timber considerations must be fully

taken into account whatever the forest management practice or the primary object of management.

Step 3: When the visual quality of the forest has been identified as a specific non-timber value to consider in the management scheme, forest landscape management concepts, principles and techniques must be used to modify practices according to the special landscape considerations required.

In summary, "quality forest management" is simply the consideration and integration of non-timber values (which include human values) with timber values in the planning and management processes of the forest environment. Sampson (1973) points out, quite lucidly, "...that we (professional foresters) may be wrong if we believe that a good-looking forest ends simply with forestry under sound management for timber production... What is needed is landscape forestry and landscape forestry is the management of the quality of human experience." (p.57).

j) Perception

The Oxford dictionary defines "perception" as "the process by which an individual becomes aware of changes through the senses." This definition introduces two important points which should be made explicit: (1) in order to perceive something, one must first be aware of it or simply see it, and (2) perception relies on stimuli, and more specifically, visual perception relies on visual stimulation. The following elaborates on these two points.

A large number of perception studies have been concerned with environmental quality and especially with the aesthetics and visual quality of the environment (Unesco, 1973). The focus here is on visual perception which includes discussions of the physical aspects of perception i.e. seeing the land and its visual resources as physical properties such as colors, surfaces, textures, edges, slopes, shapes, and patterns; discussions of the receptor organs, the eye, and its neurological function; and discussions of the transmission of impulses from the receptor to the brain i.e. perceiving the visual resource, interpreting and reacting to what is seen and experienced. In addition, the interpretation and reaction processes of the visual perception are not only influenced by the states of physical environment, but also by human

factors such as observer's past experience, physical and mental states at the moment of viewing, expectations about the landscape, and so on.

As a whole, the landscape experience or perception of the visual environment is a very complex and interrelated process: seeing and perceiving are simultaneous and different, rather than independent and similar processes.

In the context of the above definitions, Schiff (1971) concludes that "perception" should be limited only to those situations in which there is or was a physical stimulus or set of stimuli present i.e the physical landscape. Consequently, since this thesis is not involved with such stimuli (visual perception), the word "perception" is purposely avoided.

The literature review, however, does refer to "perception studies" and "public perceptions" simply because these terms are widely used in the context of public surveys. In this case, perception of the environment is not taken in the physical, neurological, or visual sense, but relates to what is called social perception.

Schiff (1971) refers to social perception as "...the impression one (or a group of individuals) has of a social stimulus or set of stimuli." In this context, social perception can be seen as the mental impression resulting from specific environmental stimuli and expressed by different groups of the society.

k) Attitude

The definition of attitude is perhaps even more difficult than the definition of perception. In general usage, Oxford (1974) defines "attitude" as a way of feeling, thinking or behaving. Schiff (1971) points out that "attitude" has come "... to mean an individual's feelings towards and beliefs about the object of the attitude..." (p.8). Despite the multiplicity of definitions of "attitude", there seems to exist an agreement among many psychologists that an attitude has an affective, cognitive and behavioural component (Krech *et al.*, 1962; Brown, 1965). As a result, Schiff comes out with the following: "An attitude,..., is the collection of feelings (affects) and beliefs (cognitions) which predispose an individual to react in a certain way to the object of these affects and cognitions" (p.8).

Thus in the context of this study, "attitude" is defined as the collection of feelings and beliefs on forest landscape management related-issues which predispose professional foresters to react and take positions on these issues.

- - APPENDIX II - -

MINISTRY POLICY ON FOREST LANDSCAPE MANAGEMENT

Province of British Columbia
Ministry of Forests

MINISTRY POLICY

SUBJECT: FOREST LANDSCAPE MANAGEMENT		
CHAPTER: REC	SECTION: 003	PAGE: 1

PURPOSE:

The Ministry recognizes that scenic quality is a major factor in the public recreational use and enjoyment of Crown lands and that, in British Columbia, the forest landscape is the key component in such scenic quality. Logging, as the major operating phase in forest management, causes considerable visible changes in the forest landscape.

The increasing public awareness of the importance of forest landscapes is often the reason for potential conflicts when logging occurs in visibly sensitive areas in the Province. In areas where the forest landscape is visually important (such as along highways and shorelines and near communities), landscape values need to be recognized in the Ministry's integrated planning process. One of the major goals of the Recreation Management program is to protect and maintain recreation values.

The purpose of this Policy Statement is to recognize that forest landscape management is an important factor in accomplishing this goal, and also to provide guidance to Ministry staff in administering the forest landscape program.

SCOPE OF APPLICATION:

This Policy is applicable throughout the Ministry.

DEFINITIONS:

Forest Landscape Management: the activity by which visual and aesthetic landscape values are identified, inventoried and analyzed, and are protected or enhanced, according to their relative importance, within integrated resource use management plans, and during resource development.

Recreation Values: the qualities of the natural environment, and recreation developments thereon, which contribute to active or passive enjoyment of the outdoor recreation experience.

Landscape Inventory: application of a formalized system for identifying, priorizing, recording and displaying forest landscape values on Crown lands which are subject to Forest Service management.

AMENDMENT NO:	DATE:	POLICY O.P.R.	VOL. - CHAP. - SEC. - PAGE
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Province of British Columbia
Ministry of Forests

MINISTRY POLICY

SUBJECT: FOREST LANDSCAPE MANAGEMENT		
CHAPTER: REC	SECTION: 003	PAGE: 2

POLICY STATEMENT:

It is the Policy of this Ministry that:

- forest landscapes shall be recognized as a major component of the public recreational use and enjoyment of Crown lands in British Columbia;
- forest landscape management concepts, principles and techniques, shall be applied in conjunction with sound forest management practices, as follows:
  - Landscape inventories shall be established to consistently record and classify landscape visibility and sensitivity;
  - Ministry Integrated Resource Plans shall include forest landscape management prescriptions based on data from the landscape inventory;
  - The Forest Landscape Handbook shall be the primary reference for implementation of this Policy;
  - Training and Education Programs shall be developed to inform and maintain an awareness of forest landscape management among Ministry staff, members of the forest industry and the public sector;
  - Participation by the Forest Industry in forest landscape management shall be required to incorporate concepts, principles, and techniques as a component of its resource management and operational plans proportionate to identified landscape significance in each situation; and
  - Public Involvement shall be solicited and encouraged, as necessary, to address forest landscape issues.

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FS 204

Province of British Columbia
Ministry of Forests

MINISTRY POLICY

SUBJECT: FOREST LANDSCAPE MANAGEMENT		
CHAPTER: REC	SECTION: 003	PAGE: 3

RESPONSIBILITIES:

Director, Recreation Management Branch:
through the specific involvement of the Landscape Manager, shall:

- provincially monitor and advise on standards, methods and procedures, generally based on principles described in the Forest Landscape Handbook which are accepted as the norm for the Ministry;
- provide guidance to Regions on major projects and those of Provincial importance;
- maintain contacts with other Ministries, the forest industry and the public, as required;
- coordinate an introductory training program in all Regions and Forest Districts, followed by ongoing training for Ministry and Industry staff, the public and technical and academic institutions, as required;
- coordinate measures required to implement industry's participation with forest landscape management in areas of aesthetic importance; and
- solicit public involvement as necessary, in accordance with the Ministry's Public Involvement Policy.

Regional Manager:
through the Regional Recreation Officer and the specific involvement of the Landscape Coordinator, shall:

- monitor and advise on standards, Regional coordination and setting of priorities in consultation with Districts;
- provide technical assistance and advice as required;
- require that landscape management principles be examined and incorporated where necessary before development plans are approved; this applies in particular to Regional plans or where more than one Forest District is involved;
- provide guidance in the application of the principles described in the Forest Landscape Handbook which are accepted as the norm for the Ministry;

Province of British Columbia
Ministry of Forests

MINISTRY POLICY

SUBJECT: FOREST LANDSCAPE MANAGEMENT		
CHAPTER: REC	SECTION: 003	PAGE: 4

RESPONSIBILITIES (cont'd.):

Regional Manager: cont'd.

- review the need for training in the field of forest landscape management and may initiate suitable training programs;
- coordinate measures necessary to require industry's participation with the application of forest landscape management principles in development plans and cutting permit applications; and
- solicit public involvement as necessary, in accordance with the Ministry's Public Involvement Policy.

District Managers:
through the Operational Superintendent and specific involvement of the Resource Officer, Recreation, shall:

- set District priorities, collect Landscape Inventory data, provide mapping and storage, and supply consolidated Inventory to the Region;
- examine all development plans and cutting permit applications to ensure that forest landscape management principles have been incorporated in areas where sensitive landscapes occur;
- provide guidance in the application of the principles described in the Forest Landscape Handbook;
- request training programs as required;
- solicit public involvement as necessary, in accordance with the Ministry's Public Involvement Policy.

REFERENCES:

MINISTRY OF FORESTS ACT, RSBC 1979, Section 4.

FOREST ACT, RSBC 1979, Section 2, 3(1), 4 and 5(4).

Ministry of Forests "FOREST LANDSCAPE HANDBOOK", 1981, ISBN 0-7718-8245-9.

Ministry of Forests "RECREATION MANUAL", 1979, Chapter 2, Chapter 3.1.

Ministry of Forests "PUBLIC INVOLVEMENT HANDBOOK", 1981, ISBN 0-7719-8788-9.

Ministry of Forests "PLANNING HANDBOOK".

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Province of British Columbia
Ministry of Forests

MINISTRY PROCEDURES

SUBJECT: FOREST LANDSCAPE MANAGEMENT		
CHAPTER: REC	SECTION: 003	PAGE: 5

PROCEDURES:

1. Long range management plans, integrated resource plans and operational plans, wherever initiated shall include forest landscape management considerations; the required intensity of application shall be determined on the basis of information obtained from available landscape inventories, or, lacking this, from area specific preliminary inventory initiated for the plan area if warranted.

2. The techniques and standards used in forest landscape management shall be based on those given and referenced in the Forest Landscape Handbook; technical assistance shall be provided through the Recreation Sections and Recreation Management Branch; and specific expertise from the Resource Officer Recreation at the District, the Landscape Coordinator at the Regional, and the Landscape Manager at the Branch level.

3. Landscape management training of Ministry and Industry personnel shall be ongoing. Specialist staff of the Ministry shall be available to explain the forest landscape management program to the public and educational institutions; and shall actively participate with integrated resource management planning when requested.

AMENDMENT NO.	DATE: 82-11-08	POLICY O.P.R. Director, Recreation Management Branch	VOL.-CHAP.-SEC.-PAGE II- REC - 003 - 5

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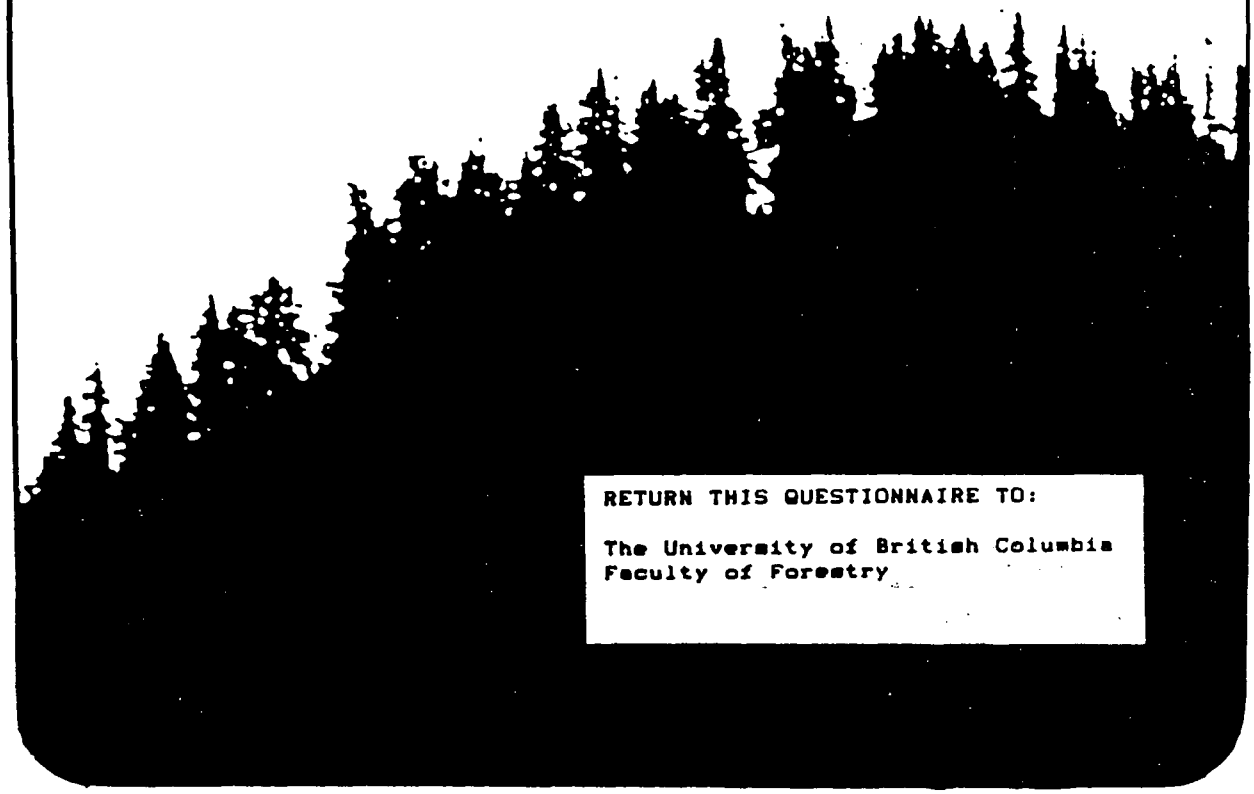
- - APPENDIX III - -

FOREST LANDSCAPE MANAGEMENT SURVEY

FOREST LANDSCAPE MANAGEMENT:
A SURVEY OF PROFESSIONAL FORESTERS

A 1986 STUDY TO BETTER
UNDERSTAND THE RELATIONSHIP
BETWEEN THE FORESTRY PROFESSION
AND FOREST LANDSCAPE MANAGEMENT

PLEASE ANSWER ALL OF THE QUESTIONS.
IF YOU WISH TO COMMENT OR QUALIFY
YOUR ANSWERS, PLEASE FEEL FREE
TO USE THE SPACE IN THE MARGINS.



RETURN THIS QUESTIONNAIRE TO:

The University of British Columbia
Faculty of Forestry

One purpose of this survey is to identify how much is known about forest landscape management by professional foresters.

Q-1 The Province of British Columbia encompasses a wide variety of natural landscapes. Using the map below, circle the one region in the list you believe to have the highest visual quality. (Please circle only ONE)

1 THE COAST MOUNTAINS AND ISLANDS
2 THE INTERIOR PLATEAU
3 THE COLUMBIA MOUNTAINS
4 THE NORTHERN AND CENTRAL PLATEAUS AND MOUNTAINS
5 THE GREAT PLAINS
6 THE ROCKY MOUNTAIN AREA

Q-2 How knowledgeable do you consider yourself to be about visual management or forest landscape management concepts? (Please circle only ONE)

(NOT AT ALL) 1 2 3 4 5 (VERY MUCH)

Q-3 How knowledgeable do you consider yourself to be about the existing B.C. Ministry of Forests' program on forest landscape management?

(NOT AT ALL) 1 2 3 4 5 (VERY MUCH)

Q-4 How knowledgeable do you consider yourself to be about the existing B.C. Ministry of Forests' policy on forest landscape management? (Please circle only ONE)

(NOT AT ALL) 1 2 3 4 5 (VERY MUCH)

Q-5 Please indicate to what extent each of the following have contributed to your level of knowledge about forest landscape management? (Circle only ONE number per category)

	EXTENT OF CONTRIBUTION (NOT AT ALL)				(VERY MUCH)
1. MINISTRY OF FORESTS TRAINING PROGRAMS AND WORKSHOPS	1	2	3	4	5
2. COURSES AT TECHNICAL INSTITUTE	1	2	3	4	5
3. PERSONAL INTEREST IN LANDSCAPE	1	2	3	4	5
4. PROFESSIONAL JOURNALS	1	2	3	4	5
5. B.C. FOREST LANDSCAPE HANDBOOK	1	2	3	4	5
6. COURSES AT UNIVERSITY	1	2	3	4	5
7. PUBLIC PRESSURE OR CONCERNS	1	2	3	4	5
8. FIELD EXPERIENCE	1	2	3	4	5
9. CONTACTS WITH OTHER PROFESSIONALS ...	1	2	3	4	5
10. OTHER:_____ ...	1	2	3	4	5

Q-6 How important do you believe forest landscape management is to other forestry professionals that you know?

(NOT IMPORTANT) 1 2 3 4 5 (VERY IMPORTANT) (DON'T KNOW) 9

Depending upon the situation, forest landscape management practices may or may not impose additional costs on forest industry.

Q-7 Please indicate to what extent you feel that forest landscape management as applied now imposes undue additional costs on the forest industry in British Columbia? (Circle only ONE)

(NOT AT ALL) 1 2 3 4 5 (VERY MUCH)

WHY? _____

_____

One of the purposes of this study is to learn more about how professional foresters perceive the usefulness of forest landscape management concepts and techniques used in British Columbia.

Q-8 To what extent do you feel that forest landscape management can contribute to each of the following? (Circle only ONE/category)

	(NOT AT ALL)				(VERY MUCH)
1. PUBLIC SUPPORT FOR FORESTRY	1	2	3	4	5
2. INCREASE TIMBER AVAILABILITY	1	2	3	4	5
3. PROTECTION OF IMPORTANT CULTURAL OR SOCIAL VALUES	1	2	3	4	5
4. BETTER TIMBER MANAGEMENT PRACTICES.	1	2	3	4	5
5. PUBLIC SCENIC ENJOYMENT	1	2	3	4	5
6. DECREASE TIMBER AVAILABILITY	1	2	3	4	5
7. TOURISM IN BRITISH COLUMBIA	1	2	3	4	5
8. INCREASE HARVESTING EXPENSE	1	2	3	4	5
9. PROTECTION OF IMPORTANT BIOPHYSICAL FEATURES	1	2	3	4	5
10. PUBLIC RECREATION ENJOYMENT	1	2	3	4	5
11. DECREASE HARVESTING EXPENSE	1	2	3	4	5

Q-9 At the present time, do you feel enough consideration is given to forest landscape management in forest harvesting decisions?

(NOT ENOUGH)		(JUST RIGHT)		(TOO MUCH)
1	2	3	4	5

Q-10 To what extent do you feel it is possible to retain or enhance visual values or forest landscape values and manage the forest according to integrated resource management concepts?

(NOT POSSIBLE)				(VERY POSSIBLE)
1	2	3	4	5

Next, we would like to know about your personal involvement with forest landscape management techniques.

Q-11 How frequently have you used forest landscape management techniques in your work?

(NOT AT ALL)				(VERY OFTEN)
1	2	3	4	5

Q-12 If you circled "1" in question 11, how much opportunity is there for using these techniques in your work? (Circle only ONE)

(NOT AT ALL) (VERY MUCH)
1 2 3 4 5

Q-13 If you have used forest landscape management techniques, how supportive have your superiors been of your efforts?

(NOT SUPPORTIVE) (VERY SUPPORTIVE)
1 2 3 4 5

One of the issues in forest and landscape management is public involvement in the planning and decision-making process. The following are some questions about your perception of this issue.

Q-14 To what extent do you feel the present level of public input into forest management decisions is satisfactory? (Please circle only ONE)

(NOT SATISFACTORY) (VERY SATISFACTORY)
1 2 3 4 5

Why? _____

_____

Q-15 In your opinion, to what extent does the general public have a satisfactory understanding of forest management issues?

(NOT SATISFACTORY) (VERY SATISFACTORY)
1 2 3 4 5

Q-16 If you circled "1" or "2" above, how important do you think it is that more energy (time and money) be put into public education?

(NOT IMPORTANT) (VERY IMPORTANT)
1 2 3 4 5

Q-17 To what extent do you think the public in your region is concerned about visual or aesthetic values in the forest landscape?

(NOT CONCERNED) (VERY CONCERNED)
1 2 3 4 5

Q-18 To what extent do you feel good forest landscape management can help resolve public concerns over forest management decisions? (Please circle only ONE)

(NOT AT ALL)				(VERY HELPFUL)
1	2	3	4	5

Another purpose of this study is to know more about how forest landscape management can be improved in British Columbia.

Q-19 How important do you feel each of the following are to increasing the effectiveness of forest landscape management in British Columbia? If you feel you do not know enough about a subject, circle 9. (Please circle only ONE per category)

	(NOT IMPORTANT				(VERY IMPORTANT)	(DON'T KNOW)
1. STRONGER MINISTRY OF FORESTS POLICY	1	2	3	4	5	9
2. MORE TRAINED PERSONNEL	1	2	3	4	5	9
3. MORE ADMINISTRATIVE DIRECTION ...	1	2	3	4	5	9
4. MORE RESEARCH INTO PUBLIC LANDSCAPE PERCEPTION	1	2	3	4	5	9
5. INCREASED TRAINING IN FOREST LANDSCAPE MANAGEMENT AT UNIVERSITY	1	2	3	4	5	9
6. INCREASED TRAINING IN FOREST LANDSCAPE MANAGEMENT AT TECHNICAL INSTITUTES	1	2	3	4	5	9
7. INCREASED OPPORTUNITIES FOR FOREST LANDSCAPE MANAGEMENT TRAINING THROUGH CONTINUING EDUCATION ..	1	2	3	4	5	9
8. MORE INVOLVEMENT FROM FOREST INDUSTRIES	1	2	3	4	5	9
9. MORE PUBLIC PARTICIPATION IN THE PLANNING PROCESS	1	2	3	4	5	9
10. BETTER PUBLIC EDUCATION REGARDING FOREST LANDSCAPE MANAGEMENT CONCEPTS	1	2	3	4	5	9
11. MORE PUBLICATIONS (JOURNALS, BROCHURES, REPORTS) ON FOREST LANDSCAPE MANAGEMENT	1	2	3	4	5	9
12. MORE FIELD WORKSHOPS	1	2	3	4	5	9

13. OTHER SUGGESTIONS? _____

Finally, we would like to ask some questions about yourself to help understand and interpret the results.

Q-20 In which of the following aspects of forestry are you <u>priearily</u> involved? (Please circle only <u>ONE</u>)

1	ADMINISTRATION	9	RECREATION MANAGEMENT
2	ECONOMICS	10	WILDLIFE MANAGEMENT
3	ENGINEERING	11	HARVESTING
4	PLANNING	12	VALUATION
5	INVENTORY	13	HYDROLOGY
6	PROTECTION	14	SILVICULTURE
7	RANGE MANAGEMENT	15	ECOLOGY
8	TEACHING	16	LANDSCAPE MANAGEMENT
17	OTHER (Please specify): _____		

Q-21 In which of the following categories do you consider yourself to be <u>priearily</u> involved as a professional forester? (Circle only ONE)

1	CONSULTANT or CONTRACTOR	4	FEDERAL GOVERNMENT
2	PRIVATE INDUSTRY	5	PROVINCIAL GOVERNMENT
3	ACADEMIC	6	TRAINEE
7	OTHER: _____		

Q-22 How many years have you practised forestry?

1	0 - 5 YEARS	5	21 - 25 YEARS
2	6 - 10 YEARS	6	26 - 30 YEARS
3	11 - 15 YEARS	7	31 - 35 YEARS
4	16 - 20 YEARS	8	OVER 36 YEARS

Is there anything else you would like to tell us about forest landscape management and/or this survey research?

YOUR CONTRIBUTION TO THIS EFFORT IS VERY GREATLY APPRECIATED.

- - APPENDIX IV - -

PRE-TEST QUESTIONS

QUESTIONS

1) Were there any questions, words, or any parts of the questionnaire that you felt were confusing?

2) Did you feel that any of the questions were too demanding?

3) Did you feel confortable with the order of the questions?

4) Approximately, how long did it take you to complete the questionnaire?

5) Does the questionnaire create a positive impression?

- - APPENDIX V - -

COVER LETTER ACCOMPANYING THE QUESTIONNAIRE

- - APPENDIX VI - -

FIRST FOLLOW-UP LETTER

- - APPENDIX VII - -

SECOND FOLLOW-UP LETTER

- - APPENDIX VIII - -

GUIDE USED FOR REPORTING PERCENTAGES AS GROUP SIZES

Percentage Range	*Simple Fraction*	*Size as a Group*
01-10	One-tenth	Negligible Very few A handful
11-20	One-fifth	Small Few
21-30	One-fourth A quarter Three-tenths	Minority
31-40	One-third Two-fifths	Large minority Plurality (if true)
41-49	Nearly half	Very large minority Large plurality (if true)
50	Half One out of two	Evenly divided (if close to 50-50)
51-60	More than half Three-fifths	Majority Most people
61-70	Two-thirds Seven-tenths	Large majority Substantial Considerable
71-80	Three-fourths Four-fifths	Very large majority Great
81-90	Nine-tenths	Overwhelming Very great
91-99	More than nine out of ten	Nearly everyone Almost all

(Source: Backstrom and Hursh-Cesar, 1981, p.392)