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Monitoring Wilderness Quality: Kingsmere Wilderness Area, Prince Albert National Park

by

Wayne R. Tucker

A MASTER'S DEGREE PROJECT SUBMITTED TO THE FACULTY OF ENVIRONMENTAL DESIGN IN PARTIAL FULMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ENVIRONMENTAL DESIGN (ENVIRONMENTAL SCIENCE)

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ABSTRACT

Monitoring Wilderness Quality: Kingsmere Wilderness Area,
Prince Albert National Park

Wayne R. Tucker
September 1998

Prepared in partial fulfillment of the Master's of Environmental Design (Environmental Science) Degree in the Faculty of Environmental Design, The University of Calgary

Dr. J. David Henry, Supervisor

This research focused on the Kingsmere wilderness area of Prince Albert National Park. The purpose was to identify essential experiential values for the Kingsmere wilderness area that were determined through consultation with both the users and managers of the area with measurable indicators established to quantify each value. For each of the indicators established, the users determined what they felt were appropriate conditions which were then compared to the results of an inventory of current conditions. The results of the inventory and the definition of acceptable conditions led to a series of management recommendations.

This research has, in addition to the identification of essential values and acceptable conditions, developed a programme to monitor change in condition of each indicator. The monitoring programme was developed to detect changes in indicator conditions in a timely manner that would minimize both the deterioration of experiential and resource conditions in the Kingsmere wilderness area and guide future management decisions.

KEY WORDS: Kingsmere Wilderness Area, Accessible Wilderness, Wilderness Quality, Social Indicators, Resource Indicators, Thresholds, Monitoring, Management, User Survey, Warden Service, Visitor Services

EXECUTIVE SUMMARY

This research was intended to identify the fundamental values of the Kingsmere wilderness experience and to develop measurable objectives and a monitoring process for the long-term management of the area as an accessible wilderness.

Through consultation with both the users and managers of the Kingsmere wilderness area, five essential values of experiences in the Kingsmere area were identified: Quiet and Solitude, Natural Landscape, Range of Opportunities, Access, and Facilities and Levels of Service. Measurable indicators (objectives) were defined which collectively described each of the values. The users were consulted a second time to define what they felt were acceptable conditions for each indicator. The results of what the users defined as acceptable were compared to the current conditions in the area, as identified through a series of resource and social indicator inventories. Management recommendations were then made based on the discrepancies between what the users defined as acceptable conditions and the current conditions.

In addition to the above, a programme to monitor change in wilderness quality has been developed. Wilderness quality, for the purposes of this research, has been defined as the quality of both the natural and social settings experienced by the users of the wilderness area.

The users of the Kingsmere wilderness area are generally very satisfied with their experiences. The majority of users, (97.2%, 1996 and 96.6%, 1997) described their experiences as good or very good. The high level of satisfaction with experiences in the area suggests that current conditions in the area are appropriate. Through this research, however, a number of issues and areas for improvement have been identified.

The issues that require management attention identified most often by the users of the area were: noise from motors (34.2%), access (22.5%), litter (17.5%), the size of groups at the campgrounds (15.0%), and the number of people encountered while in the area (12.5%). Although the Kingsmere Working Group has defined that they desire the area to be managed as an 'accessible wilderness', the issues identified as needing particular management attention suggest that the area should be managed closer to wilderness

conditions, as described by the Parks Canada definition, which states that wilderness areas are:

> *"extensive areas which are good representations of a natural region and which will be conserved in a wilderness state. The perpetuation of ecosystems with minimal human interference is the key consideration."*
>
> Wilderness areas *"offer opportunities for visitors to experience, first hand, a park's natural and cultural heritage values through outdoor recreation activities which are dependent upon and within the capacity of the park's ecosystems, and which require few, if any, rudimentary services or facilities. Where the area is large enough, visitors will also have the opportunity to experience remoteness and solitude. Opportunities for outdoor recreation activities will be encouraged only when they do not conflict with maintaining the wilderness itself. For this reason, motorized access and circulation will not be permitted, with possible exception.... Parks Canada will use a variety of other direct and indirect strategies for managing public use, and will evaluate the effectiveness of these strategies on a regular basis"* (Canadian Heritage, Parks Canada 1994, pp. 31-32).

Through this research, a series of management recommendations have been made that suggest management actions that will elevate the resource and social conditions to acceptable levels. The recommendations focus on those indicators that users have identified as below an acceptable level, or those issues which, through comparison to current conditions, do not meet the standards specified in policy documents.

ACKNOWLEDGEMENTS

I am indebted to the members of my committee who have put a great deal of energy and creativity into this project. I am also grateful to the staff of Prince Albert National Park who continually answered my questions, provided insight, housing and funding.

I would also like to acknowledge the help provided throughout this project by my wife.

DEDICATION

Trying to dedicate this work to any one individual would mean a diservice to many others. The goal throughout this process has been to give the users of the Kingsmere wilderness area a legitinate voice, and I dedicate this work to all of those users that agreed to participate in the study.

I would also like to dedicate this work to my parents who gave me the courage and support to push my educational goals to this level.

And finally, I would like to dedicate this work to my wife for her help, support and tolerance of my mess.

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Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts.

Rachel Carson, *The Sense of Wonder*

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CHAPTER 1 INTRODUCTION

Parks Canada has the responsibility to manage and protect the majority of legislated wilderness areas in Canada. Sustained demand on the wilderness areas in Canada's National Parks, however, may lead to jeopardized quality of the area and experiences. To ensure that future wilderness users are able to have high quality experiences, and that wilderness areas are not showing an increase in adverse signs of use, the areas and experiences should be monitored to meet specific management objectives. Through this study a programme to monitor both ecological and social components of wilderness quality has been developed. Building on an established and tested methodology, the Limits of Acceptable Change for Wilderness Planning (LAC), a similar process has been developed specifically for the Parks Canada policy and regulatory framework.

This report is divided into two distinct sections. In the first section, three key topics are focused on: wilderness within the Parks Canada framework, a critical examination of LAC, (the process, the shortfalls, the requirements), and how the LAC process can be modified to work within the Parks Canada management framework. In the second section, a Prince Albert National Park case study, the process of developing and implementing the programme to monitor wilderness quality is described. The methods and results of each step are combined as a foundation for the next step in the process. This method of presentation allows the reader to identify the necessary steps and understand how the process evolves. The final chapter of the document is dedicated to management recommendations and a discussion of the most important findings.

1.1 Parks Canada Wilderness Definition

The Guiding Principles and Operational Policies document is "a comprehensive statement of broad principles that gives direction to both present and future initiatives in Parks Canada. It provides a framework for the delivery of heritage programs and for responsible management decisions that reflect the national interest while being sensitive

to local considerations" (Canadian Heritage, Parks Canada 1994). Wilderness areas in the National Parks, according to the Guiding Principles and Operational Policies document, are "extensive areas which are good representations of a natural region and which will be conserved in a wilderness state. The perpetuation of ecosystems with minimal human interference is the key consideration" (Canadian Heritage, Parks Canada 1994, p. 31). Wilderness (Zone II) areas "offer opportunities for visitors to experience, first hand, a park's natural and cultural heritage values through outdoor recreation activities which are dependent upon and are within the capacity of the park's ecosystems, and which require few, if any, rudimentary services or facilities. Where the area is large enough, visitors will also have the opportunity to experience remoteness and solitude. Opportunities for outdoor recreation activities will be encouraged only when they do not conflict with maintaining the wilderness itself. For this reason, motorized access and circulation will not be permitted, with possible exception of strictly controlled air access..." "Parks Canada will use a variety of other direct and indirect strategies for managing public use, and will evaluate the effectiveness of these strategies on a regular basis" (Canadian Heritage, Parks Canada 1994, pp. 31-32).

Based on the above national policy, the managers of Prince Albert National Park have adopted and ratified their own definition of wilderness, in the 1995 Prince Albert National Park Management Plan, which is intended to guide wilderness management in the park. Wilderness areas in Prince Albert National Park are recognized as "enduring natural areas of sufficient size to protect pristine ecosystems that may serve human physical and spiritual well-being. It is an area where little or no persistent evidence of human intrusion occurs, so that ecosystems may continue to evolve, and where the primary considerations are the intrinsic rights of ecosystems to exist and persist in an undiminished state" (Canadian Heritage, Parks Canada 1995, pp. 47). Three essential components of this definition guided this research: wilderness areas must be able to provide protection to the ecosystem in which it is found, they must simultaneously serve human physical and spiritual well-being, and wilderness areas must be able to evolve and persist in undiminished states. A balance, therefore, must be achieved between the effects of human use and the undiminished state of the wilderness area. The only way to

ensure that such a balance is not being upset is to monitor both the human and ecological components of wilderness conditions and act with appropriate management actions. Monitoring of wilderness areas, therefore, must focus on the effects of human intrusions on the functioning of the ecosystem while simultaneously allowing for human use.

1.2 Wilderness Policy

The National Parks Act (the Act), as modified and passed into legislation in 1988, is the document that guides all other policy directives that regulate the activities in the National Parks. The Act makes specific reference to the management of wilderness areas. The Act states "The Governor in Council may, by regulation, declare any region of a park that exists in a natural state or is capable of returning to a natural state to be a wilderness area." (Government of Canada 1988 N-14 s.5 (8)). The Minister is obligated to maintain the wilderness character in that activities that are likely to impair the wilderness character may not be authorized (Government of Canada Act 1988 N-14 s.5 (9)). The Minister may however "authorize activities to be carried out in wilderness areas for the purposes of park administration; public safety; the provision of basic user facilities including trails and rudimentary campsites; the carrying out of traditional renewable resource harvesting activities; and access by air to remote parts of such areas" (Government of Canada 1988 N-14 s.5 (10 a-e). The National Parks Act applies to all National Parks, and those sections outlined must be adhered to by all park management decisions.

The Guiding Principles and Operational Policies document specifies that wilderness is areas where the perpetuation of ecosystems with minimal human interference is the essential consideration (Canadian Heritage, Parks Canada 1994). Wilderness areas offer opportunities for visitors to experience a park's natural and cultural heritage values through outdoor recreation activities within the capacity of the park's ecosystems, and which require few, if any, rudimentary services and facilities (Canadian Heritage, Parks Canada 1994). The Guiding Principles document also makes specific management directives for wilderness areas, such as direct and indirect strategies to be used for managing public use in wilderness areas (Canadian Heritage, Parks Canada 1994). The

primary guidance for wilderness management provided by this document, however, is related to the ten broad principles (Canadian Heritage, Parks Canada 1994):

- Ecological and commemorative integrity
- Leadership and stewardship
- New protected heritage areas
- Education and presentation
- Human-environment relationship
- Research and science
- Appropriate visitor activity
- Public involvement
- Collaboration and cooperation
- Accountability.

Each national park has the responsibility to set specific management guidelines that must fall within the national policies and legislation previously mentioned. Prince Albert National Park has done this. Beyond the definition of wilderness areas, Prince Albert National Park has in its management plan decided that wilderness areas should "offer opportunities for visitors to experience first hand, a park's natural and cultural heritage values through outdoor recreation activities dependent upon and within the capacity of the park's ecosystems, and require few rudimentary facilities" (Canadian Heritage 1995, pp. 35). The direction stated for these areas requires research into the recreational capacities of ecosystems. Currently, no standard method to determine the recreational capacity of ecosystems exists.

1.3 Terms of Reference

1.3.1 Background

Kingsmere Lake of Prince Albert National Park (PANP) and the surrounding trail network represents a unique and highly valued wilderness experience opportunity. The area provides a wilderness setting that is accessible with a modest amount of effort.

Accessibility is enhanced in this area, as contrasted with other backcountry lakes, because the lake and river are zoned natural areas (Zone III) and permit motorboats while the surrounding area is zoned as wilderness (Zone II).

Consultation by the author with users of the Kingsmere area has identified accessibility to the area and the wilderness character of the area as the two fundamental elements of the experience. The consultative process resulted in the development of the idea of an 'accessible wilderness' which is described in the vision statement for Kingsmere:

> *...The functioning of a healthy, natural ecosystem will be what people want to see when traveling within the Kingsmere Lake and River system, and they will participate in activities which foster those values. Kingsmere will be an "accessible wilderness" in that effort is required to reach Kingsmere Lake, but the trip will be feasible for family groups...* (Kingsmere Working Group 1994).

Users and managers have recognized that these broad elements form a delicate balance which may be easily eroded should activity type, level, or access be allowed to change without consideration for the experiential impact. During the 1994 consultations, two of the three user working groups identified the need for defining 'carrying capacity' and monitoring to ensure that the area's unique values continue to coexist in a manner which maintains the character of the overall Kingsmere experience.

Alterations to access, the pending removal of the Kingsmere dam, demand for new forms of use in the Kingsmere wilderness and a lack of detailed information regarding the nature of the area and the experience have served to further highlight the need for study. Long-term wilderness quality objectives and a process of monitoring user's experiences are necessary in order to provide a sound basis upon which to make management decisions regarding the area.

1.3.2 Problem Statement

Currently, there are no specific management objectives directing visitor use in the Kingsmere Lake area. Decisions regarding approval for new uses and levels of acceptable use have been made with reference to the broad mandate of the park. While

this is the necessary starting point for any decision-making process, specific objectives are needed which reflect the unique values of the Kingsmere area and permit a process of management grounded in these values. The purpose of this study is to identify the fundamental values of the Kingsmere wilderness experience and to develop measurable objectives and a monitoring process for the long term management of the area as an accessible wilderness.

1.3.3 Objectives

The objectives of this study are as follows:

1. To characterize the Kingsmere experience through identifying essential experiential and associated biophysical, cultural and area-defining values,
2. To determine indicators and define thresholds for the identified values and develop a set of management objectives based upon these indicators,
3. To provide a set of recommendations for the management of the Kingsmere area which are consistent with public expectations and management requirements, and
4. To design a method of monitoring the indicators of the Kingsmere experience which will have the capability of providing information regarding the status of the wilderness experience (i.e. thresholds respected and objectives being met).

1.3.4 Scope of Study

The study area will focus on the Kingsmere river and lake area and the associated campgrounds and trails on the lakeshore. The study will focus on the development of management objectives, recommendations for management action to maintain the area and a system to monitor wilderness quality following modified limits of acceptable change methodology. Resource conditions (e.g., vegetation damage, and the provision of various facilities) will be considered to the extent that they result in some measurable effect on wilderness quality or experience. This work is intended to pilot an element of the human use monitoring strategy contained within the larger Parks Canada core monitoring program (Tarleton et al. in McCanny and Henry, 1995, Chapter 7).

Data collection on social parameters will be confined to individually administered schedules or questionnaires delivered to both public and park staff and management (including all park functional groups). Focus or working groups may be required with park management or staff. Baseline ecological data will be collected for ground monitoring efforts that will be developed and described.

As presented, the Kingsmere wilderness area study was initiated to identify the essential components of the Kingsmere experience, determine the associated wilderness values and identify measurable indicators to be used in monitoring the Kingsmere wilderness experience. The remainder of this section focuses on the LAC process and how it can be applied to Parks Canada wilderness areas.

CHAPTER 2 THE LIMITS OF ACCEPTABLE CHANGE (LAC) METHODOLOGY

Wilderness management focuses attention on maintaining or restoring the quality of the natural environment while simultaneously providing high quality user experiences. However, increased demand for wilderness recreation potentially jeopardizes the quality of both the environment and the experience. Limiting use of wilderness areas is not always a practical solution with demand increasing, particularly in areas which do not require registration, such as many day use areas. The challenge facing wilderness managers, therefore, is not to prevent human-induced change, but rather to determine how much change is acceptable, and to take the necessary actions needed to control change (Stankey et al. 1985).

The Limits of Acceptable Change (LAC) process focuses on defining what management actions are needed to achieve and maintain certain wilderness conditions. The process requires decisions regarding the kind of wilderness conditions that are acceptable and the prescription of actions to protect or achieve those conditions (Stankey et al. 1985). Because recreation is classified as an acceptable activity in wilderness areas, the process has evolved with recreational impacts as the focus, while recognizing that wilderness management involves more than recreation. The LAC process requires that attention be paid to achieve mandates for the protection of wilderness areas while simultaneously accommodating recreational use. The debate of human use and preservation initiated the development of the LAC process to determine acceptable wilderness conditions.

2.1 Overview of the Process

The LAC process is based on a sequence of steps with each step building on the previous ones. In the following, each step's purpose, process, and product are presented. Further discussion of the LAC process is presented in the next chapter where the discussion is focused on the modification and application of LAC within Parks Canada policy framework.

The premise on which the LAC has been established is that both managers and wilderness users should define acceptable wilderness conditions. This is accomplished through public consultation focusing on the values and concerns for the area. The acceptable conditions for the area should be defined, usually through a policy review process with a variety of resource and social indicators selected that are able to adequately describe the present and future conditions of the study area. With indicators selected, an inventory of the actual conditions of each indicator must be carried out. For each indicator a standard or acceptable level should be defined. Because the actual conditions may not adequately meet what had been defined as acceptable conditions, management actions to rectify the problems should be implemented and evaluated. The final step in the LAC process is to implement management actions capable of changing conditions to acceptable levels as well as the establishment of a monitoring process that will detect changes in indicator conditions.

The nine steps of the LAC process are presented as described by Stankey et al. (1985), with a brief explanation of each step written by the author.

Step 1: Identify area issues and concerns.

Purpose:

- Identify features or values of particular concern to be maintained or achieved.
- Identify specific locations of concern.
- Provide basis for the establishment of management objectives.
- Guide allocation of land to different opportunity classes.

Process:

- Identify issues raised during public involvement.
- Identify concerns raised by managers, planners and policy makers.
- Review agency policy.
- Analyze regional supply and demand.

- Analyze opportunities in the area from a regional and national perspective.

Product:

- Definition of unique values and special opportunities to be featured in the area's management and problems requiring special attention.

The initial step of the LAC process is primarily to understand the issues for the particular wilderness area. Integration of user and management perspectives is essential to the identification of the distinct characteristics of the wilderness area and for direction of management decisions. Through an understanding of what the objectives of the area are, different portions of the wilderness area can be allocated to different opportunity classes. Opportunity classes are managerial categories that are based on levels of protection and provision for specific areas. An example would be a primitive site with no facilities or a semi-primitive site which may have a picnic table, hibachi and tent pad. These two sites would represent different opportunity classes.

Step 2: Define and describe opportunity classes.

Purpose:

- Facilitate the provision and maintenance of inter- and intra-area recreational and managerial diversity.

Process:

- Review information collected during Step 1 concerning issues and concerns and select number and names of opportunity classes.

Product:

- Description of resource, social, and managerial conditions defined as appropriate and acceptable for each opportunity class.

Opportunity classes are intended to provide guidance for social and resource conditions for each class and the type of management actions necessary to maintain the conditions. Within any wilderness area, there is an assortment of conditions. The range of conditions

may be the result of use or direct management. The range of opportunity classes allows for the diversity that is valued about wilderness areas. The goal of the second step is to describe the appropriate opportunity classes in the area, the type of conditions for each and the type of management actions necessary to maintain the conditions of the area in relation to its designated opportunity class.

Step 3: Select indicators of resource and social conditions.

Purpose:

- Identify specific variables to guide the process for conducting an inventory of social and ecological variables.
- Provide means for identifying where and what management actions are needed.

Process:

- Review information outlined in Step 2.
- Review issues and concerns regarding specific conditions identified in Step 1 and select factors that reflect these issues and concerns.

Product:

- List of measurable resource and social indicators (preferably quantifiable).

Determining indicators for the resource and social conditions is an important step that will help guide management of the area. The indicators are variables that will be used to describe the conditions in the wilderness area and should, when broadly grouped, describe the values associated with the wilderness area.

Step 4: Inventory existing resource and social conditions.

Purpose:

- Know the range of conditions to help establish meaningful standards.
- Help allocate land to different opportunity classes.
- Determine critical steps to identify where and what management actions are necessary.

Process:

- Conduct field inventory of conditions of resource and social indicators and map resulting information.

Product:

- Map of existing conditions of each indicator throughout the wilderness.

The inventory of current conditions is the description of the condition of each indicator throughout the wilderness area. The information gained through this step should be used for comparison with what is determined as acceptable conditions. The inventory must be completed using scientific methods that may be repeated during the monitoring component of the process.

Step 5: Specify standards for resource and social indicators for each opportunity class.

Purpose:

- Provide a means whereby it is possible to evaluate where and what management actions are needed by permitting comparison of existing conditions with those defined as acceptable for each opportunity within each opportunity class.

Process:

- Review opportunity class descriptions developed in Step 2.
- Analyze inventory data collected in Step 4 for each indicator.

Product:

- Table of measures of acceptable conditions for each indicator in each opportunity class (quantified if possible).

This fifth step in the LAC process is used to define acceptable conditions of each indicator. The acceptable conditions should reflect user and management definitions. The acceptable conditions are similar to the threshold levels at which point management actions will be taken to ensure that conditions will not become unacceptable. The

definition of acceptable will be different for different opportunity classes. What may be acceptable for semi-primitive campsites would not be tolerated in primitive areas.

Step 6: Identify alternative opportunity class allocations reflecting area issues and concerns and existing resource and social conditions.

Purpose:

- Define what resource and social conditions will be provided in different parts of the wilderness.
- Provide allocation alternatives for public review and evaluation.

Process:

- Review information obtained from area issues and concerns, Step 1.
- Review information contained in opportunity class descriptions, Step 2.
- Review information derived from inventory of existing conditions of indicators, Step 4.

Product:

- Maps and tabular summaries of alternative opportunity class allocations.

This step dictates that the managers decide what facilities will be provided in the various opportunity class areas. Because different opportunity classes provide different facilities, infrastructure and experiences, the managers must at this point decide what each opportunity class will provide. The provision of facilities such as tent pads and picnic tables should be used as defining features for each opportunity class. Managers must critically analyze what is being provided in the area and determine in which opportunity class it should fit based on the facilities provided. A determination of the facilities provided should be completed for each area and determination of the opportunity class into which it falls. The result will be a consistent provision of facilities that users can expect in each campground based on the opportunity class in which it is classified.

Step 7: Identify management actions for each alternative.

Purpose:

- Evaluate the costs of implementing each alternative.
- Select specific management program.

Process:

- Review the managerial condition portion of the opportunity class description defining the appropriate types and actions.
- Analyze the differences between existing conditions and those defined as acceptable by the standards.
- Analyze the alternative management actions for bringing existing conditions in line with standards.

Product:

- List or map of all places where existing conditions are worse than standard and identification of what management actions would best bring conditions up to standard.

Managers must be willing to act whenever conditions begin to approach unacceptable standards. This step in the process is intended to have the managers think about the possible actions that are now necessary or what actions they will take when conditions approach unacceptable for each opportunity class.

Step 8: Evaluation and selection of a preferred alternative.

Process:

- Finalize opportunity class allocations and a specific management program to achieve allocation.

Process:

- Analyze resource, social, and managerial costs.

- Analyze resource and social benefits.

Product:

- Final allocation of opportunity classes and selection of a management program.

Some areas under study will not fall into specific categories as presented by the ideas for each opportunity class. To solve this problem, the managers must decide acceptable conditions for each class, and determine management actions to achieve the conditions set for the classes present. Although managers may prefer to have all areas meet primitive campsite standards, that may not be practical for high use areas or those that are more accessible. This step should confirm the presence of each opportunity class in the area, and select which opportunity classes they prefer for the areas. Areas within the wilderness area will be different and should therefore be classified differently.

Step 9: Implement actions and monitor conditions

Purpose:

- Implement a management program to achieve the objectives of the selected alternative.
- Provide periodic, systematic feedback regarding the performances of the management program.

Process:

- Periodically re-inventory condition of indicators - essentially a repeat of Step 4.
- Compare indicator conditions with standards (repeat of Step 8, but only considering the conditions of the opportunity class decided upon).
- Analyze performance of management program.

Product:

- Summary of relationship between existing conditions and standards for all indicators in all opportunity classes.

- Where necessary, recommend the needed changes in management program in order to obtain satisfactory progress toward bringing existing conditions up to standards (Stankey et al. 1985).

The final stage described in the LAC process is similar to what Noss and Cooperrider (1994) describe as adaptive management. They present the idea of evaluation, monitoring, re-evaluation and presenting new management actions as a means to deal with the management of ecological issues. The process of re-evaluation, and continuing to change and react to ecological and social conditions should ensure that the conditions of the wilderness area remain acceptable, as stated as the final, although continual step of the LAC process. Managers must be willing to continually adapt their management approach as changes in resource and social conditions are noticed.

The sequence established in the LAC method, indicates that it is much more than a system for wilderness planning. This method was designed to help resource managers accommodate human use while ensuring wilderness quality in creating new recreation opportunity areas (Stankey et al. 1985). One of the requirements of the LAC system is the implementation of actions and monitoring of existing conditions. The monitoring requirement is one that has been a focus of this research.

2.2 Monitoring Requirements within the LAC Process

The monitoring requirements within the LAC framework should provide feedback on how well management actions are working, and identify trends in conditions that may require new actions (Stankey et al. 1985). This step in the process is the most valuable for ensuring that wilderness conditions do not become unacceptable.

A major concern with monitoring is the frequency at which it needs to be applied. Due to financial constraints, not all indicators can be monitored in all areas. Stankey et al. (1985) suggest that determining the priorities for monitoring should be based on:

1. Conditions that were very close to standards at the time of the last assessment.
2. Rates of resource or social change are judged to be the highest.

3. The quality of the database is poorest.
4. The understanding of management effects is poorest.
5. There have been unanticipated changes in factors such as access, or adjacent land uses (Stankey et al 1985).

There is no more emphasis placed on monitoring than any other component of the LAC. However, throughout the process one must recognize its essential role to maintaining wilderness conditions at acceptable levels.

Monitoring efforts within Parks Canada has become a major initiative. McCanny and Henry (1995) have suggested numerous criteria for monitoring programmes within the Prairie and Northern National Parks:

- Monitoring measures should be easily and reliably measured at relatively low cost.
- Monitoring should, whenever possible, provide for early detection of change so that management action, if required, may be taken before the change becomes irreversible.
- Monitoring measures should provide information about ecological changes that could otherwise not be detected during regular park operations.
- Monitoring should be designed to differentiate between human induced and natural changes whenever possible.
- Monitoring must provide information about a wide range of spatial and temporal scales, from individual and community to ecosystem and landscapes.
- Monitoring measures should ideally have the capability to provide a continuous assessment from stressed to non-stressed conditions.
- Monitoring measures should be quantifiable and should be able to be combined in such a way as to interpret ecological integrity.
- Monitoring should provide a database that can be compared to databases of international, national or park-specific monitoring programs.

- For each variable that is monitored, a known or hypothesized relationship between changes in the variable and ecological integrity can be projected.
- Monitored variables should be interpretable by resource managers either directly or through ecological models that predict future scenarios.

Imposing the criteria suggested by McCanny and Henry (1995) with the considerations identified by Stankey et al. (1985) leads to the development of the monitoring programme established through this research. A complete explanation of the monitoring programme is presented in Chapter 9.

CHAPTER 3 APPLICATION OF LAC WITHIN PARKS CANADA MANAGEMENT AND POLICY FRAMEWORK

The LAC framework was initially designed to help wilderness managers decide what kind of wilderness conditions were acceptable, and then prescribe actions to protect or achieve those conditions (Stankey et al. 1985). Within the Parks Canada management and policy framework, directions for wilderness areas allow for few compromises concerning specific standards. The National Parks Act (1988) states " The National Parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment, subject to this Act and the regulations, and the National Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations (Government of Canada 1988, s.4). The underlying principles regulating all use of areas within the parks Canada system, according to this dedication clause of the Act is that human use must not impair these natural areas.

Managing wilderness areas with such broad principles is a difficult task. Considering only the function of the greater ecosystem provides little guidance for specific human use within the wilderness area. Policy dictates that human interference in wilderness areas must be minimal (Canadian Heritage, Parks Canada 1994). It is on that specific policy directive that the application of the LAC system most suitably fits, but not without modification.

3.1 LAC Adaptations

The management of wilderness areas within Parks Canada is restricted by the 1994 policy and the Act (see Chapter 1). As a result, it does not make applying the LAC process as it was developed possible; adaptations are necessary. Specifically, the guiding policies and legislated wilderness mandates do not allow a compromise of the quality in wilderness conditions. The LAC process, as it was created, suggests that a variety of wilderness conditions may be acceptable within larger wilderness areas (opportunity classes). Wilderness areas in Parks Canada, are not managed, or regulated in that manner. Broad

wilderness principles are equally applied throughout. Through discussions with PANP management, the LAC process has been modified in several important ways to in order to fit the Parks Canada management and policy directions for wilderness areas. At this point, some of the broader philosophical and managerial problems with application of the LAC within Parks Canada are presented.

The initial step of the LAC process requires that the study area be defined to include issues and concerns for the area. This is a managerial task that discounts what users of the area specify as concerns. The LAC process is founded in having users and managers of the area define what they feel are acceptable conditions. However, step one of the process allows only managers to define what they feel are issues and concerns.

Successful approaches to environmental issues, at any scale, generally involve all stakeholders from the outset rather than having them added later in the process. This allows all stakeholders to voice their concerns rather than speak to the concerns of managers. Involving the users of the area from the outset of the process is one modification that has been applied in this study. By allowing both users and managers to identify issues and concerns has led to a broader range of issues, incorporating all views, making the process more valuable from the users' point of view because they are essential in guiding future management decisions about the area.

The second step of the LAC process requires that opportunity classes be defined and described. Within the Parks Canada zoning scheme, wilderness areas do not allow for wide ranges in appropriate wilderness conditions. Undoubtedly some areas will show human-induced change. Guidance from the 1994 policy suggests that wilderness areas in national parks are not supposed to offer different opportunity classes, although some will show more signs of use than others. This is more often the result of use rather than strategic management. Therefore, defining the opportunity classes offered within the wilderness area is not a viable step in the process for wilderness areas within Parks Canada. Opportunities outside of the wilderness zoning, such as Natural Areas, (Zone III) would be a better place to apply such a task. Therefore, each campground within the

study area was treated equally and expected to have similar resource and social conditions.

The fifth step of the LAC process, to specify standards for resource and social indictors for each opportunity class, is also problematic. Although variations in resource and social indicators exist in wilderness areas, the logistical problem of managing for different standards or thresholds for areas within the wilderness area is not feasible. Undoubtedly, areas closer to trailheads and other access points will display different conditions than those that are much more remote. However, for managers to try to manage each specific site would prove to be a task much greater than current financial resources allow. Much of this issue can be resolved during the design of new areas that will dictate the type of use the site will accommodate.

Having both users and managers define thresholds for each indicator is a major goal of step five. These thresholds are the points at which management actions are necessary. Although users wish to experience certain conditions for that to be possible, many restrictions for use would have to be enforced. The user-defined thresholds, therefore, must be verified and perhaps changed by the managers because the thresholds defined by the users may be unrealistic for the area. Managers should acknowledge user thresholds and accommodate them when possible, without jeopardizing the wilderness area that they are managing.

The benefits of step five must not be overlooked by the fact that opportunity classes need different standards. This is an essential step in the process, which must be completed within the current Parks Canada policy framework. It will be difficult for managers to achieve specified conditions at particular sites with areas that have a history of use, but the standards must be identified, through both public participation and managerial consultation.

Parks Canada managers do have some flexibility to direct specific management actions for wilderness areas. The process of developing Park Management Plans requires public consultation and ratification. Through the process, specific areas of the park may be identified as needing particular criteria to accommodate the needs and desires of the

managers and users. Although the areas may require specific management actions, they must still be representative of the zone in which it falls. This is not the same as opportunity classes as defined by Stankey et al. (1985), but rather uniquely different areas (non-site specific). Opportunity classes are not broad areas but rather specific locations, whereas zones are generally extensive areas established to represent particular characteristics.

3.2 Future Developments

The LAC system is now over ten years old, and has proven to be an excellent tool for wilderness managers to determine, evaluate and monitor acceptable wilderness conditions (Wright and Clarkson 1995, Hollenhorst and Gardner 1994, Cole and Bayfield 1993, and Roggenbuck, Williams, and Watson 1993). The LAC system is adaptable and should be further developed to accompany increased use of wilderness areas and their viability.

One area of development for the LAC system should focus on the incorporation of user attitudes with those of managers. As 'consumers' of wilderness experiences, users need to have a voice in defining issues and concerns and the opportunities offered. Managers must not, however, jeopardize wilderness conditions or philosophies to accommodate user demand, they should rather elevate expectations for wilderness experiences. User attitudes must be incorporated more into the management of wilderness areas without disrupting or lowering its quality. A dialogue between users and managers should lead to better management of our wilderness areas and more satisfied users.

A second area within the LAC system that should be further developed is that of the monitoring component. Although Stankey et al. (1985) defines the need for monitoring wilderness conditions, researchers should focus efforts on the monitoring of resource and social wilderness indicators. Identification of wilderness indicators that will change in detectable ways, like many ecological indicators, is the most difficult component of the monitoring process. Indicators are measurable components of the study area. These indicators should quantifiably describe the conditions of both resource and social conditions. The indicators, if properly selected, will enable changes in wilderness quality

to be detected before conditions become irreversible. A second important attribute of the indicators selected is their ability to describe, or at least infer, the conditions of a number of values, limiting the number of indicators thus monitoring efforts. Determining appropriate indicators that are capable of the above-mentioned attributes is one of the most pressing issues for monitoring wilderness areas.

3.3 Application to the Kingsmere Wilderness Study

Application of the LAC process to the Kingsmere wilderness study incorporated the above concerns for application within the Parks Canada management framework. Rather than follow the LAC methodology as described by Stankey et al. (1985), the following approach was developed:

1. define the study area both in terms of geography and guiding policy,
2. identify values for the area specified by both users and managers,
3. define acceptable social and resource conditions suggested by both managers and users,
4. inventory current conditions, and
5. recommend a monitoring strategy.

The following section outlines the methods and results of the application of the modifications made to the LAC process.

SECTION TWO: DEVELOPMENT AND APPLICATION OF A MONITORING PROGRAMME FOR THE KINGSMERE WILDERNESS AREA

CHAPTER 4 DESCRIPTION OF THE STUDY AREA

National policies and directives guide the management of wilderness areas in Parks Canada (Canadian Heritage, Parks Canada 1994). Each wilderness area is however, managed directly by park managers, according to park specific management plans. The objective of this chapter is to define the study area, describe its boundaries, and identify the specific policies that apply to it.

Goals:

1) Description of geographic boundaries and physical setting.

2) Definition of unique policy directions for area.

4.1 Setting

The area defined for this study is the Kingsmere wilderness area. The study area included the Kingsmere River Trail, the Grey Owl Trail, the Kingsmere River and Lake, Grey Owl's cabin, and the Bagwa-Lily-Clare canoe route (Figure 4.1). There are 9 campgrounds, which have 39 campsites in total. Two of the 9 campgrounds have provisions for large groups. There is also a campground that has been closed due to concerns for public safety.

The Kingsmere area is representative of the boreal plain natural region (Canadian Heritage, Parks Canada 1995). The vegetation assemblages, the climate and wildlife are typical of this region. The Kingsmere area has areas of old growth, mixed wood, and relatively new growth forest, with some wetland areas.

4.2 Unique Policies for the Kingsmere Wilderness Area

The Kingsmere wilderness area is somewhat of an anomaly within the park's zoning scheme. The area is divided between Wilderness (Zone II) and Natural Area (Zone III)

zoning. Kingsmere Lake and River is zoned as a Natural Area (Zone III), with some size restrictions to motors on boats. The land adjacent to the lake and the whole of the Bagwa-Lily-Clare canoe route is zoned as Wilderness (Zone II). This unique zoning structure has created a hybrid area that is fundamentally different from both of its designated zoning allotments. Although the area is zoned and managed as fundamentally different than a wilderness area, the managers and users do require that elements of wilderness be maintained. The users and managers desire that the Kingsmere area be an 'accessible wilderness' (Kingsmere Working Group 1994). An accessible wilderness is one that allows access to a range of users while simultaneously providing fundamental wilderness characteristics.

The Kingsmere area is currently managed to maximize the range of people that can experience it while ensuring essential wilderness components, thus meeting its goal as an accessible wilderness. Through making the area accessible, many activities have been deemed allowable. Day hikers, back-packers, canoeists, and motorboaters share the area, making it significantly different from other Wilderness areas (Zone II) found in national parks.

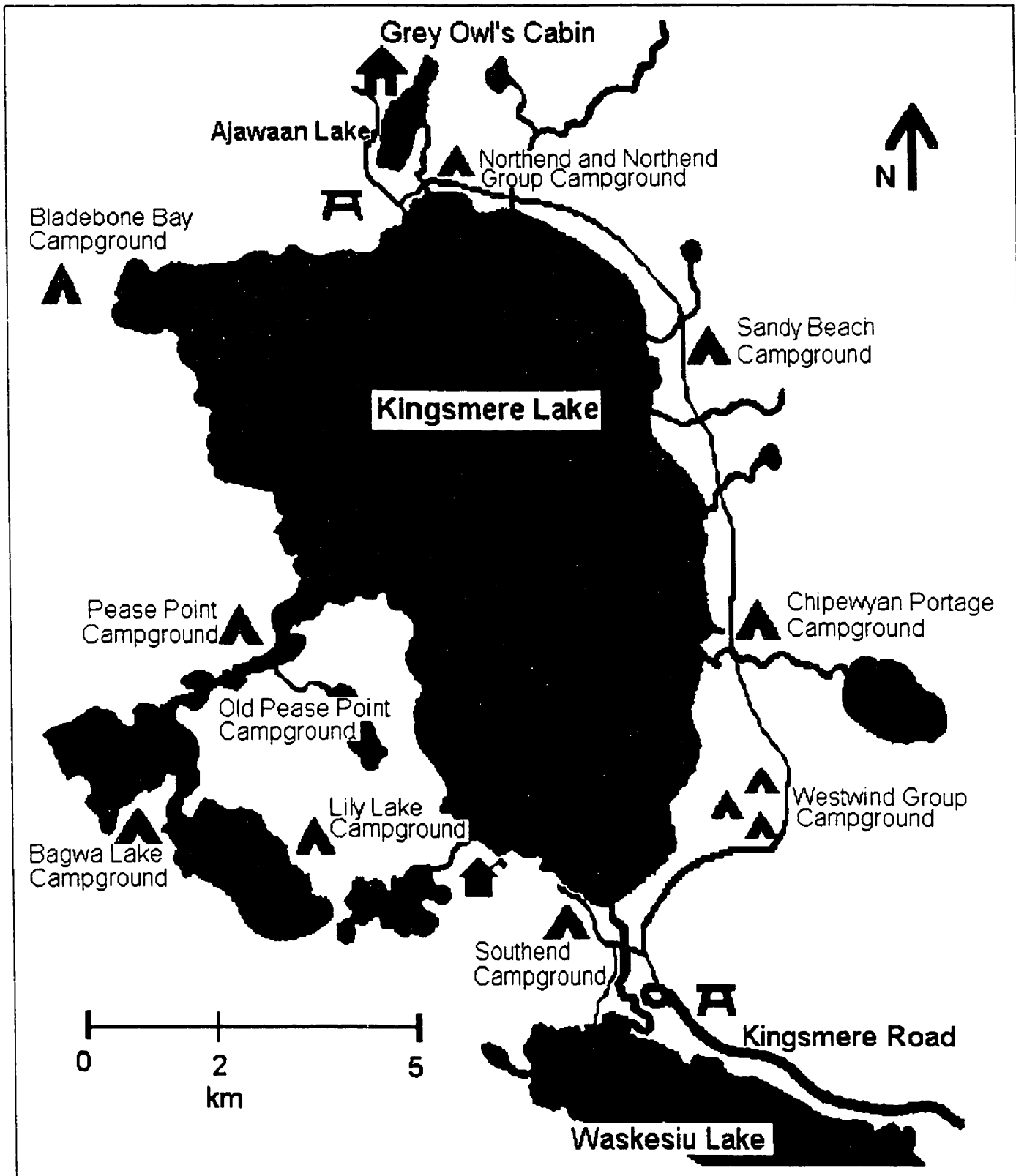

Figure 4.1 Kingsmere Wilderness Area adapted from Frith 1997

CHAPTER 5 DEFINITION OF VALUES AND INDICATORS

The second step in the development of the monitoring programme was to define what was valued, by both the users and managers, about the study area. A clear understanding of what attracts users to the area was essential. A description of the values, quantified by a series of measurable indicators that collectively describe the valued components of the experience, was developed. In this chapter, the methods used to determine what was valued about the area (section 5.1), the results of the methods (section 5.2), and an explanation of the essential values, and associated quantifiable indicators of experiences in the area (section 5.3) are presented.

The values of the area should broadly describe management goals for the area, as well as reflect why users prefer this unique hybrid area over wilderness areas that are managed completely by Zone II criteria. The wilderness values must reflect both the ecological and social components of experiences in the area. The indicators should quantifiably and collectively represent the essential values of the area, and they should direct management objectives for the area.

Goals:

1) Definition of the unique values of area.

2) Identification of measurable indicators that collectively describe the values.

5.1 Methods: Defining Values and Indicators

When decisions to restore the Kingsmere River were made in 1994, many of the issues related to the restoration of the river, and the Kingsmere wilderness area, became the topic of public consultation. Actions resulting from the restoration efforts had the potential to change the experiences users have in the area. The managers of the area realized that it was therefore necessary to define the essential values of users' experiences in the area, before the river restoration project changed essential experiential characteristics of the area. Definition of the values associated with the Kingsmere

wilderness area was accomplished through consultation with the users and managers of the area.

The Kingsmere Working Group, established to aid with public consultation in the Kingsmere River restoration project, developed a vision statement for the Kingsmere area. The themes from that vision statement became the focus of a user survey and management interview. The vision statement states:

> "*Respect for ecosystems and cultural values will be the foremost considerations in the way people use the Kingsmere ecosystem. The functioning of a healthy, natural ecosystem will be what people want to see when travelling within the Kingsmere Lake and River system, and they will participate in activities which foster those values. Kingsmere will be an "accessible wilderness" in that effort is required to reach Kingsmere Lake, but the trip will be feasible for family groups. The Kingsmere ecosystem will offer the visitor a distinct set of visitor opportunities and experiences.*
>
> *Scientific knowledge, which is generated through the rehabilitation of the lake and river system, will be made available to visitors, so that they can take an active role in caring for the system. This active role will bring visitors into the circle of people who bear responsibility for passing the lake and river, in an unimpaired condition, on to future generations. Visitors will continue to play an important role in determining how the quality of the wilderness experience will be managed*" (Kingsmere Working Group 1994).

The main themes from the Kingsmere wilderness area vision statement that the user survey and the management interviews focused on were those that would define the essence of the Kingsmere wilderness area most clearly, and dictate the role that the users should play in the management of the area. The themes focused on were:

- The activities in which the users participated in the Kingsmere wilderness area.
- Levels of access into the Kingsmere wilderness area.
- Why this area was chosen over others (the distinctness of the area).

- The users' role in determining wilderness quality and management of the area.

5.1.1 1996 Kingsmere User Survey

A survey was administered to Kingsmere wilderness area users between 19 July and 2 September 1996, for a total of 31 survey days. The purpose of the survey was to identify what the users valued about their experiences in the Kingsmere area, and to identify measurable indicators that were capable of quantifying those values. The survey also focused on issues relating to the quality of user experiences in the study area.

Potential respondents to the Kingsmere users survey were identified by using the 'next to pass' survey technique, whereby a potential respondent crossed an arbitrary line and was asked to voluntarily participate in the study (Sheskin 1985). The author chose an arbitrary line each day that all users had to cross when leaving the area. The location chosen was monitored for eight hours, each survey day during the peak times for users leaving the area. When a Kingsmere user crossed the arbitrary line, they were asked if they would like to voluntarily participate in the study, none of the users approached refused to participate. The survey script was read to the respondents, with all responses recorded verbatim. Each survey took approximately three minutes to complete. Each user of the area that was a potential respondent agreed to participate with the study, yielding a 100% response rate to the survey, with a total of 177 responses to the questionnaire.

5.1.2 Management Interviews

To gain a clear understanding of the values of the Kingsmere area, it was necessary to supplement users perspectives with those of the managers of the area. The LAC process required that the managers relay "concerns that relate to distinctive features and characteristics of the wilderness area" (Stankey et al. 1985, pp. 4). The process adopted for this study also required that managers have equal opportunity to express perspectives of the values of the area. The perspectives of the managers were identified through in-depth interviews that were conducted with five of the Prince Albert National Park managers during the week of 16-20 December, 1996, and one by telephone on 9 January,

1997. The purpose of the interviews was to supplement the user opinions with more specific management concerns for the study area.

The mangers interviewed were selected because of their knowledge of, and direct responsibilities for, the Kingsmere area. The interviews were conducted in the manager's offices in Prince Albert National Park, with the exception of the 9 January telephone interview. The managers were sent copies of the questions to be asked before the interview to give them opportunity to think about the questions and issues. The interviews began with a brief introduction to the study, the overall purpose of the study, the accomplishments of the study up to that point, and the specific purpose of the management interviews. Each interview was completed in approximately one hour.

5.1.3 Management Workshop

On 9 May 1997, a management workshop was conducted in Prince Albert National Park with the managers that participated in the interviews. The focus of the workshop was to present the preliminary values identified for the Kingsmere wilderness area. The workshop also allowed the managers of the area to suggest what could be realistically accomplished in terms of future monitoring efforts. During this workshop the managers formed a consensus about the values identified for the Kingsmere wilderness area, and the indicators that would be used to quantitatively describe the values. The workshop was lead by the author, and ran for approximately three and a half hours.

5.1.4 Integration of the User Survey with Management Interviews

To identify the values for the Kingsmere wilderness area, user responses to the surveys and management interviews were integrated. A comprehensive list of wilderness values, based on the responses to the surveys and management interviews, was established. Qualitative analysis of those combined responses resulted in distinct Kingsmere wilderness values. In addition to the user surveys and management interviews, the definition of wilderness provided in the Prince Albert National Park management plan (Canadian Heritage 1995) and the allowable activities provided in the Guiding Principles and Operational Policies document (Canadian Heritage 1994) were used to guide the definition of each wilderness value.

This study was initiated to "identify the fundamental values of the Kingsmere wilderness experience and to develop measurable objectives and a monitoring process for the long-term management of the area as an accessible wilderness" (Snell and Tucker 1996). Determining the wilderness values for the Kingsmere area was, for the most part, a qualitative exercise that combined the views of the users and managers into broad themes. Through literature sources, a wide range of wilderness indicators have been identified (Cole 1982, Stankey et al. 1985, Cole et al. 1987, Hammitt and Cole 1987). Comprehensive wilderness values, which apply to all areas, do not appear because the values are specific to the wilderness area of interest. Wilderness areas do have some broad similarities, but each area has very distinct attributes and provides opportunities that give these areas unique wilderness values.

To determine wilderness values, the responses to the user survey and management interviews were analyzed, and those responses most frequently mentioned were identified. From those responses obvious themes began to emerge. These themes were considered to be the Kingsmere wilderness values. These values were stated in such a way so as to be congruent with: (1) what the users expected and wanted to see in the area, (2) the vision statement for the area developed by the Kingsmere Working Group, (3) the concerns of managers expressed during their consultations, and (4) the Prince Albert National Park management plan. The management goals for the area, therefore, are those actions which ensure that the essential values of the area are upheld. The wilderness values identified represent the broad management goals for the Kingsmere wilderness area (Snell and Tucker 1996). To support these wilderness values, measurable indicators have been identified through analysis of the questionnaires, and other wilderness studies (Cole 1982, Stankey et al. 1985, and Cole et al. 1987). The wilderness indicators represent quantifiable measurements that will measure if management objectives for the area are being achieved. Thus, the indicators collectively and quantifiably will be used to monitor the maintenance of the essential Kingsmere wilderness values. The threshold levels for each indicator (determined by the managers and users of the area during the second survey) are the recommended warning signals indicating when management

actions should be taken in order to maintain the balance between access to the area and its wilderness qualities, ensuring that the Kingsmere area remains an accessible wilderness.

5.2 Results: Kingsmere Values and Indicators

The results presented in this section were used to define the values and indicators associated with Kingsmere experiences. The values identified represent the broad management goals for the Kingsmere area, with the indicators representing specific management objectives. Management objectives are discrete levels to which the managers must manage. Through meeting each management objective, the management goals for the area will also be met.

5.2.1 1996 Kingsmere User Survey Results

The results of the 1996 Kingsmere user survey were analyzed to determine simple frequency of responses. No analysis was conducted beyond frequencies in order to simplify future monitoring efforts. Through presenting the frequencies of responses to each question the percentage of users who identified each response is clear. From this information those affected by particular management actions are also identified. All responses were recorded verbatim unless otherwise indicated. The results presented below correspond with those questions that helped in defining the values and indicators of the Kingsmere experience. The complete survey and responses are presented in Appendix A.

This survey allowed the users of the Kingsmere wilderness area to express opinions related to the experience, both positive and negative, rate their experience, and suggest ways to improve their experience in the study area. In addition to the results presented below, detailed information about the background experiences of the users was also collected. The chosen activities of the users in the area were: day hiking (42.9%), canoeing (29.4%) backpacking (11.9%) and motorboating and fishing (12.4%), and other activities (3.4%), a complete summary is presented in Appendix A, Table 1. Group sizes were also recorded, and presented in Appendix A, Table 2. The majority of users were in groups of 2 to 5 people (88.1%), only 1.7% of the users travelled alone, with 10.2% of

the visitors travelling in groups of 6 or more people. The users of the Kingsmere area identified a number of reasons for visiting it rather than other areas in the park. The reasons most often cited were: previous experiences in the area (32.8%), the accessibility to the area (16.6%), a desire to visit Grey Owl's Cabin (15.8%) and because it was a new area to them (10.3%). Complete responses are presented in Appendix A, Table 3. Approximately 52% of the users of the Kingsmere area visit it one or two times per year, with approximately 36% of the users surveyed visiting the area for the very first time. The remainder of the users (12%) visit the Kingsmere wilderness area between three and twenty times per year. A complete summary of the number of times users visit the Kingsmere wilderness area is presented in Appendix A, Table 4. The final piece of background information collected through the 1996 User Survey relates to the participation in similar activities of the users in areas other than the Kingsmere wilderness area. Only 5.6% of the users identified the Kingsmere area as the only one where they participated in their chosen activity. The majority of the Kingsmere users (87.1%) indicated that they were able to participate in their chosen activities in areas other than the Kingsmere wilderness area. The importance of this finding is that the Kingsmere area does not provide for unique activities, but perhaps unique experiences. Complete responses are presented in Appendix A, Table 5. Through this study, the park now has a detailed record of the length of visits, frequency of use of the area, backcountry experience in other areas, reasons for visiting the area, group sizes, and a break down of the number of people participating in the various activities in the area. This information, as presented in Appendix A, is not central to the objectives of this study and thus not analyzed in this section, but it will be valuable when considering future management of the area.

The first question presented to the respondents to help define the values of the area was "What did you like about your experience in this area?" The results are listed in Table 5.1. The responses presented are an inclusive list of what the users felt were positive attributes of their experiences in the area.

Table 5.1 Positive Attributes of Kingsmere Experience

Positive Attributes	# of responses	% of sample	% of respondents
quiet	**82**	**18.2**	**48.0**
scenery	**79**	**17.6**	**46.2**
few people	**54**	**12.0**	**31.6**
facilities[1]	**45**	**10.0**	**26.3**
pristine	**43**	**9.6**	**25.1**
Kingsmere Lake	**43**	**9.6**	**25.1**
being outdoors	**34**	**7.6**	**19.9**
wildlife	**27**	**6.0**	**15.8**
NP provisions[2]	**16**	**3.6**	**9.4**
no commercial	**12**	**2.6**	**7.0**
Kingsmere River	**11**	**2.4**	**6.4**
wilderness	**4**	**0.8**	**2.3**
Total	**450**	**100%**	**100%**

Asking the Kingsmere users to identify what they liked about their experience appeared to be a very enjoyable component of this survey for most of the respondents. The users were quite willing to talk about their experience and often provided numerous positive attributes about them. As displayed in Table 5.1, the most often reported positive characteristics of the user experiences were the quiet, the scenery and limited number of people in the area. The limited number of people in the area and the facilities provided were two attributes mentioned as being positive contributions to the experience. These two attributes do not seem to be an appropriate level for the area, as illustrated in the responses presented in Table 5.2.

[1] This attribute refers to the structures that are provided in the area, such as picnic tables, hibachis, the railway cart system, docks and boat launching areas.

[2] This attribute refers to the knowledge of the safety and security provided by Parks Canada.

Although most users had very enjoyable experiences there were issues which could be improved. The users were asked; "What did you dislike about your experience in this area?" see Table 5.2.

Table 5.2 Negative Attributes of Kingsmere Experience

Negative Attributes	# of responses	% of sample	% of respondents
mosquitoes	**59**	**40.7**	**34.5**
weather	**16**	**11.0**	**9.4**
number of people	**16**	**11.0**	**9.4**
motorboats	**13**	**9.0**	**7.6**
facilities	**12**	**8.3**	**7.0**
trail markings	**7**	**4.8**	**4.1**
less access[3]	**5**	**3.4**	**2.9**
garbage	**5**	**3.4**	**2.9**
noise	**5**	**3.4**	**2.9**
people in campsite	**5**	**3.4**	**2.9**
docks	**2**	**1.4**	**1.2**
Total	**145**	**100%**	**100%**

Mosquitoes and weather were the two most frequently mentioned negative attributes to the user experiences and were conditions that are beyond the control of PANP (Table 5.2). The responses in Table 5.2 indicate that the number of people in the area, the presence of motorboats, and the facilities had negative effects on the experiences. This result indicates that an appropriate number of people, level of motorboat access, and provision of facilities has not been established for the area. There is no consensus among the users on the current number of people that is acceptable to met in the area as presented in the response of "few people" as positive in Table 5.1, and "number of people" as negative in Table 5.2.

[3] less access refers to the users feelings that the access to the area is too easy as it is now.

To identify if the users were satisfied with their experiences, the users were asked: "Overall, how would you rate your experience?" The results, as presented in Table 5.3, show that the majority of users in the area were pleased with their experience in the area.

Table 5.3 Rating of the Kingsmere Experience

Value	# of responses	% of sample
Very Good	**128**	**74.8**
Good	**38**	**22.2**
Average	**4**	**2.3**
Poor	**1**	**0.6**
Very Poor	**0**	**0**
Total	**177**	**100%**

The Kingsmere experience was good or very good for 97% of the survey respondents (Table 5.3). This shows a great deal of acceptance of the status quo in the area. The majority of users of the Kingsmere area were having satisfying experiences. Any changes from the current situation in the area may affect experiences negatively.

The final question of the survey related to defining what management actions could be taken to improve user's experience in the Kingsmere wilderness area. The question asked was: "How could your experience have been improved?" This question yielded the most diverse responses and allowed the users to suggest improvements for the management of the area, as presented in Table 5.4.

Table 5.4 How to Improve the Kingsmere Experience

Attribute	# of responses	% of sample
self preparation	**26**	**19.0**
same no change	**22**	**16.1**
signs[4]	**19**	**13.9**
campsite[5]	**14**	**10.2**
no motorboats	**13**	**9.5**
trails[6]	**12**	**8.8**
harder access[7]	**7**	**5.1**
smaller groups	**6**	**4.4**
bicycle access	**5**	**3.6**
more canoe routes	**4**	**2.9**
higher fish limit	**3**	**2.2**
less vegetation damage	**2**	**1.5**
bigger boats	**2**	**1.5**
no over booking	**1**	**0.7**
no dogs	**1**	**0.7**
Total	**137**	**100%**

The users of the area felt that there is room for improvement in the Kingsmere area. It is obvious that many of the users were not prepared for their backcountry experience from the response "self preparation" in the above table. People felt as if they could have either brought more gear to make their trip a little more comfortable, or more usually, that they should have had less gear so that the excursion was not so demanding. Many of the

[4] Users generally felt that the signs in the area are unclear. They are poorly designed and placed.
[5] Users indicated that the campsites did not meet their expectations, and they could be improved through better design and layout.
[6] The trails in the Kingsmere area need improvements in markings and erosion control, according to 8.8% of the respondents.
[7] The users mentioned that harder access could improve their experience because it would limit the number of people and type of activities in the Kingsmere area.

respondents felt as if the expectations they had for their trip in the area was met and that the area should not be changed in terms of provisions or access.

5.2.2 Management Interviews

The responses of the managers to the five questions asked during the interviews are presented in Appendix B. Analysis of the responses was completed through using a content analysis approach (Robson 1993). Content analysis is the extracting of themes from comments made which summarize and categorize the content of the interviews, without interpretation of the comments.

The responses to each of the questions asked during the management interviews are presented, with a summary paragraph that relates the users' views with those of the managers'. Although the similarities between the users' and managers' perspectives are highlighted in this section, it is important to acknowledge the additional information mentioned by the managers. The managers were much more able to speak about the complexities in the Kingsmere wilderness area because of the different interview techniques and setting, and their direct involvement in the management of the area. The importance of linking and emphasizing the similarities between the views of the users and managers is an essential component of this modified LAC process.

The first question asked was: "What does the Kingsmere wilderness area offer its visitors?" This question was asked to determine if the managers' view of what was being offered in the area was different than what the users were experiencing in the area.

The responses yielded by the mangers suggest that they are cognizant about what the area offers to many of the users. The manager responses to this question fell into the themes as presented below.

1. A chance to get away: The managers felt as if this area provided the users the opportunity to get away from the everyday life to experience a different place that has the capability of allowing one to experience nature on its own terms rather than in a controlled or structured manner.

2. An ecological message: This area allows the users to visit an ecosystem that is relatively undisturbed. For many users, this is a unique opportunity and one that is important.

3. A launching area: This area provides the users access to other areas in the park. This area is often used as a launching point to campsites that are more primitive, offering more pristine wilderness experiences.

4. Facilities: The facilities provided in the Kingsmere area make it more accessible and comfortable for a range of users.

5. Accessible: The Kingsmere area is accessible to a variety of users with a range of backcountry experiences. It was considered important to ensure that the users of the area continue to have access. Some managers felt that current access levels need to be revised, while others felt that it was important to maintain current levels.

6. Challenging experiences: The area should provide a challenging opportunity for each user. The challenge must be available as the user travels in the area. The area should not be so easily accessed that there is no associated challenge.

7. Variety of opportunities: The managers acknowledged that the Kingsmere area provides for a variety of experiences for the users. Some managers felt that the current range, namely the motorboats were inappropriate. There was no clear consensus between the managers on what the range of allowable activities in the area should be. Some felt that providing a commercial water taxi was an appropriate opportunity to offer the users, while others felt that all motorboats should be eliminated from Kingsmere Lake.

8. Unique experiences: Kingsmere offers the visitors to Prince Albert National Park the ability to experience many of the unique cultural and physical elements of the park.

9. Inappropriate conditions: Some managers felt that the current conditions in the Kingsmere area were not appropriate for a wilderness area. The inappropriate conditions include the social and physical conditions. The number of people at campgrounds and the heavy amount of day use were two social conditions identified

as inappropriate. The amount of vegetation damage in the Kingsmere River was a common reference made to the inappropriate resource conditions.

The responses that the managers made were similar, but more in-depth responses, compared to those presented in Table 5.1. The users identified attributes such as quiet, scenery, the low number of people and a pristine environment as attributes of the area, which was similar to the managers responses in Appendix B (sections 1A, 1B, 1H). The users also indicated that a wide range of opportunities and activities attracted them to the Kingsmere area (Appendix A Table 1), which was similar to what the managers mentioned (Appendix B sections 1D, 1F, 1G). The overlap between what the users experience in the Kingsmere area and what the managers perceive the area offers the users, is very similar. This indicates that the managers' of the area are aware of what the users can experience.

The second question that was asked of the managers was: "What should the area offer its visitors?" This question was intended to determine if the managers felt if the area is currently different from what it should be. The managers' responses are classified into the following categories:

1. Pure wilderness: Some managers realized that the Kingsmere area does not represent a pure wilderness area, but felt that it should.

2. Close to wilderness: Managers realized that the Kingsmere area is not pure or pristine wilderness and that perhaps it should not be. Those managers felt that the area should provide as close to wilderness as possible. Much of the difference between this and pure wilderness may be the result of the different interpretations people have of wilderness. Many managers felt that ensuring the area remains relatively unchanged will ensure it meets the criteria of being close to wilderness, or an accessible wilderness.

3. Safety and self-reliance: The area should offer safe experiences, including the need to have a patrol on the lake in association with educating the users about backcountry safety and the need for self-reliant excursions in the area.

4. Management definitions: One manager, in particular, felt as if the area was currently being managed by accident rather than with direction. There are no clear goals set for the area and that the management definitions have to be established if the area will ensure quality experiences and a functioning component of the Prince Albert ecosystem.

The other responses to this question were very similar to those offered to the previous question. The area should provide access to a range of users and activities, and the area should be a launching point to other areas within the park. Some consistencies and differences were mentioned by the managers between what the area currently offers and what the area should offer. Complete responses are presented in Appendix B, section 2.

The third question: "What do you perceive as the most serious issues in the management of the Kingsmere area?" was asked to understand if the managers perceived the same issues as the users had identified. There were probing questions asked which were associated with this question and are recorded in Appendix B. The responses were categorized as follows:

1. Access: The changing access to the Kingsmere area has been an important issue since the decision to restore the Kingsmere River was made in 1994. Resolving the access to the area, setting an appropriate level of effort, and deciding what the users will experience when accessing the area are vital to the entire Kingsmere experience.

2. Social issues: The various interactions among users are defined as the social issues for the Kingsmere wilderness area. The increasing number of users in the area has caused more social issues to arise between users of the area. The mangers perceived conflicts between user groups and user types, their activities, based primarily on their purpose for visiting the area.

3. Limited knowledge: Parks Canada knows very little about the traditional use of this area and its oral history. It is important to learn about and preserve this important part of the cultural resource of the area to ensure that any artifacts are not disturbed. This limited knowledge should be expanded, preserved, and interpreted for the users and future management of the area.

4. Commercialism: Many managers felt that the current provision of the water taxi in the area contradicted with what they envision the area to be. They felt that providing a commercial experience in the area was inappropriate. There was no consensus among the managers concerning the water taxi on Kingsmere Lake.

5. Ecological issues: The ecological issues in the area, as perceived by the managers, dealt mainly with the state of the aquatic resources in the area, namely the lake trout fishery and the limited knowledge that Parks Canada has about its viability, and the Kingsmere River ecology. Other issues were directly related to the number of people using the area and the ecological footprint of use, which refers to the extent of human damage as a result of use in the area.

6. Restoration: Some managers felt that restoration of the Kingsmere River was a very serious issue. Although restoration efforts are underway in the park, the actual restoration is still in its infancy. The need for this restoration was seen as a very important.

The questions from the user survey, which are most closely connected to this question, were: "What did you dislike about your experience in this area?" (Table 5.2), and "how could your experience have been improved" (Table 5.4). The users identified the number of the people in the area, motorboats, and noise as attributes of the area which they disliked (Table 5.2) which were similar to what the managers mentioned in Appendix B (sections 3A and 3B). The managers did, however, identify issues beyond the scope of those mentioned by the users, such as the ecological issues, the restoration of the Kingsmere River and commercial efforts in the area. The format of the interviews with the managers allowed them the opportunity to respond with more in-depth responses.

The fourth question asked of the managers was: "Do you perceive conflicts between the user groups in the Kingsmere wilderness area?" This question was intended to sense if the managers of the area realized that some users thought that not all users of the area were compatible. This question yielded responses that focused on the reason for the conflicts, mainly access, conflicting purposes for visiting the area and the provision of a commercial operator.

1. Access: The magnitude of the access issue within this area was again established. The managers felt that many of the issues in the area were related to access to the area. The current level of access enables canoers and motorboaters to access Kingsmere Lake. By allowing both user groups to have access, some managers felt as if the conflicts may be the result of users seeing a conflict between activities. With the restoration of the Kingsmere River, access will change, due to greater fluctuations in water levels. In an attempt to ensure equal access for both of the above mentioned user groups, the managers have been subject to strong lobby to both eliminate all motorboat access, and to make motorboat access to the lake easier. These two ends of the access spectrum have made the access issue very difficult for the managers.

2. Conflicting purposes: Because the users visit the area for varying reasons, they expect different experiences. The users' reasons for visiting, was seen by the managers, as the reason for any conflicts which may exist. The varied experiences may be causing the conflicts.

3. Commercialism: The provision of the commercial operator in the area is seen as causing a conflict between the users. Those who use the water taxi are having a markedly different experience in the area. Some managers felt that the commercial activity is philosophically unacceptable for an area that is to reflect wilderness characteristics.

One of the important potential reasons for conflicts among the users of the area identified by the managers was based on the users' different purposes for visiting the area (Appendix B, section 4B). The users' responses to the question "How could your experience have been improved?" indicated that some of the user felt that the experience could be improved by changing the purpose or activities in the area, similar to that mentioned by the managers. In Table 5.4, the responses indicate that addressing issues such as smaller groups, no motorboats, bicycle access, and harder access would be appropriate means to improve the experience.

To focus on the management direction for the area, the final question asked "Do you feel that the Kingsmere wilderness area is being properly managed in accordance with the

Prince Albert National Park management plan?" This question allowed each manager to look at current accomplishments and limitations in the management of the area.

1. Progress being made: Most managers felt that the area was not yet being managed as directed in the Prince Albert National Park management plan but progress was being made that would ensure that it would be. Closely associated to the progress being made was what the managers identified as current shortfalls such as resolving the access issue, restoring the Kingsmere River, and managing by accident rather than by objective. Some of the shortfalls identified by the managers were: overuse of the area, the allowance of commercial activity in the area, and the limited management direction defined for the area. A complete list of the current shortfalls as perceived by the managers is in Appendix B, section B5.

2. Advances through education: The managers mentioned the need to better educate the users of this area. The focus of the education programmes ranged from the need to inform the users about self-reliant travel in the backcountry to the reason for the restoration of the Kingsmere River.

3. Monitoring: The current monitoring programmes being developed for the Kingsmere Lake and River is helping to ensure proper management of the area. This study in its attempt to define the user experience and development of a monitoring programme was also seen as important to the managers.

The final question was asked to have the managers express how they felt the area was currently being managed. The managers spoke mostly about the progress that was being made to manage the area as described in the management plan and on the current short falls of the management of the area (Appendix B, sections 5A and 5C).

5.3 Kingsmere Wilderness Values and Indicators

The wilderness indicators identified for the Kingsmere wilderness area are somewhat similar to those identified in other wilderness areas (Cole 1982, Stankey et al. 1985, Cole et al. 1987, Hammitt and Cole 1987). The composition of the wilderness values selected for the Kingsmere area is the result of intimate familiarity with the area, its attributes,

indicators and opportunities. The values identified are meant to describe the broad values that the managers and users hold. Some values will be more important to some users than to others. However, the five values presented broadly define what is valued about experiences in the Kingsmere wilderness area. The values identified are meant to describe collectively the essential characteristics of the area.

The essential components of the Kingsmere experience are factors that have been grouped into wilderness values and comprise a variety of measurable wilderness indicators. A description of each wilderness value and its associated set of measurable indicators is presented below, followed by brief explanations on how they were determined.

5.3.1 Kingsmere Wilderness Values

Five measurable values have been described for the Kingsmere experience. The values presented are an amalgam of the responses to the user survey, management interviews, and a management workshop. Both managers and users value and appreciate the quiet and solitude, the natural landscape, access, the range of activities, and the facilities and level of services provided in the Kingsmere area. The values identified encompass the essential components of experiences in the Kingsmere wilderness area.

The values described cover broad issues. Many indicators span a variety of values, and also collectively describe the values. An example of the breadth of the indicators is related to the issue surrounding the water taxi. As a means to cover this issue objectively, this study has focused on the effect that groups and motorboats have on the Kingsmere experience. The two indicators, group size and noise from motors, relate to the water taxi, without directly addressing the philosophical issue of commercial activity in the Kingsmere wilderness area. This simple explanation illustrates how complex issues in the area may be covered using simple indicators. Because values are difficult to quantify, the approach used focused on quantifiable components that are associated with each value.

Described below are the five values associated with a Kingsmere experience. With each value is a value statement and associated indicators. The associated indicators

collectively will be used to quantify each value and help in the establishment of thresholds for each indicator. A brief explanation of how thresholds will be established for each indicator is also included.

1. Quiet and Solitude

One value associated with a Kingsmere wilderness experience is quiet and solitude. Impediments to experiencing quiet and solitude are the number of people and the sources and types of noise in the area.

Quiet and Solitude Value Statement

The quiet and solitude experienced while travelling through the Kingsmere area is valued. From the initial access into the area to the most remote campsite, the ability to experience quiet and solitude is an essential component of the Kingsmere experience.

Indicators Associated with the Quiet and Solitude Value

1A. Group Size

The Kingsmere users, managers in Prince Albert National Park, and other wilderness research have identified that the size of groups encountered while travelling or camping in backcountry setting affects the experience. Kingsmere is valued because users have the ability to experience solitude.

To establish a threshold for the group size indicator of the quiet and solitude value in the second user questionnaire (Chapter 6), the users were asked where, on a scale from less than acceptable to beyond expectations, how the size of the groups encountered affects their experience. Following the users' responses to the above question, they defined what they considered an acceptable group size to encounter while in the Kingsmere wilderness area.

1B. Number of People Seen

As users prepare to travel in the Kingsmere area, they often expect to experience solitude. When they encounter numerous people, of similar or different activities, their ability to feel alone is affected.

In measuring the effect of other users on the Kingsmere experience in the second user questionnaire (Chapter 6), the users were asked a series of questions about the number of people they saw while in the area. These questions focused on total number of people seen and how this affected their experience. To establish a threshold for this indicator the question, "What would be an appropriate number of people to see?" was asked. Focusing on the number of people seen, both on route and at the campsites, will help in future management decisions.

1C. Noise from Other Users

Impairments to experiencing quiet are largely based on noises from other users. Users were asked in the second user questionnaire (Chapter 6) how the noise from others in the area affected their experience. Through focusing on the types of noise and their effects on the experience, recommendations were made.

1D. Noise from Motors

The respondents to the 1996 Kingsmere user survey identified that noise from motors had affected their experience. Defining if the noise source affects the ability to experience quiet was accomplished by having the users indicate if they heard motors and, if it affected their experience. The threshold was determined by having the survey respondents identify how many motors would be acceptable to be heard.

2. Natural Landscape

The natural landscape that dominates the Kingsmere area is valued. Users have immediate reactions to the natural landscape because of the limited number of human-induced changes to it. The ability to experience the natural landscape is an important component of the Kingsmere experience.

Value Statement

The users of the Kingsmere area want to experience the natural landscape with as few human-induced changes as possible and appreciate it because of its naturalness.

Indicators Associated with the Natural Landscape Value

The indicators associated with the users' ability to experience the natural landscape are most seriously challenged by human-induced changes in the area. The indicators, therefore, focus on how those human-induced changes affect the users' experiences. All indicators associated with the natural landscape value were compared with current conditions, determined through the resource inventory. Users were asked how each indicator affected their experience, and the response was compared to the results of the resource inventory. The results of comparing what the users wanted to experience with what is in the area that might impede the natural scenery were used to make management recommendations.

The resource inventory is a categorical summary of the facilities provided throughout the area, and a description of the condition of the resource indicators, such as the vegetation damage near the campsites and campgrounds.

2A. Vegetation Damage

Although relatively few users identified vegetation damage as an issue in the 1996 survey, some managers felt it needed to be addressed. The users were asked if they noticed any vegetation damage, and what stage they felt the level of vegetation damage was at: more than acceptable, at an acceptable level, or worst than they had expected.

Thresholds for vegetation damage were determined through comparing the results of the resource inventory (Chapter 7) with the user responses (Chapter 6). The resource inventory focused on vegetation cover around the campgrounds and campsites.

2B. Natural Scenery

To determine the effects of human introduced structures on the user's experience, the users were asked in the second user questionnaire (Chapter 6) to identify what structures, if any, detracted from their experience. Through having the users identify the structure, the need to list the structures and perhaps lead the responses to focus on structures that they may not have noticed was eliminated.

2C. Campground Conditions

Users were not asked specifically about the effect of bare ground on their experience. To determine if bare ground was a serious issue for the users, they were asked to rate the campgrounds they visited on a scale from less than acceptable to more than acceptable. From the users rating of the campground conditions, the issue of bare ground was covered within the campground umbrella. The campground conditions were then compared to the results of the resource inventory to make management recommendations.

3. Range of Opportunities

The Kingsmere wilderness area allows for a wide range of activities to be experienced, which allows the most and least experienced backcountry travelers to have satisfying experiences. The range of opportunities is associated with the type of activities and mode of travel acceptable in the Kingsmere area.

Value Statement

Current management of the Kingsmere area tries to minimize the effects of the various user groups on each individual's experience, while ensuring a wide range of opportunities.

Indicator Associated with Range of Opportunities Value

3A. Range of Activities

There are a variety of allowable activities in the area, which may affect the users' experience. In the second user questionnaire (Chapter 6), by asking the users if their experience was affected by other users participating in other activities, a description of the activities that were the most and least intrusive to the users of the area was established.

4. Access

Access to Kingsmere Lake is a unique part of the entire experience. Many users and managers acknowledge that the trip is as important to the experience as is the destination. This requires that the type and level of access promote a sense of wilderness, which

requires a suitable amount of effort, while simultaneously providing the opportunity for a wide range of users to experience this unique area.

Value Statement

The access to the Kingsmere wilderness area allows a wide range of visitors with varying skills and experiences the opportunity to experience the area. Ensuring access for a variety of user types and groups, while not detracting from the ecological integrity or wilderness character of the area, is an essential value.

Indicators Associated with the Access Value

To measure the effect that the access to Kingsmere has on the user's experiences, the focus was on three indicators: level of difficulty, the time required, and the character of the access. These three indicators may be useful in the decision to change access to this area in the future. The three indicators represent measurable components of the access to the Kingsmere area.

4A. Level of Difficulty

Measuring the effect that the current level of difficulty had on the experience was accomplished through asking the users in the second user survey (Chapter 6) how the current level of access affected their experience. If the access was too difficult, or too easy, it may have had negative or positive effects on the experience. The users had to state directly the effect of the level of difficulty on their experience, thus helping to avoid biases caused by the questionnaire.

4B. Time Required

By measuring the time required to access the Kingsmere area and its effect on the experience, future access decisions may be influenced. The information gained from the second user questionnaire (Chapter 6) reflects what an appropriate amount of time to access the area was for the users and helps the managers' decisions regarding any new access routes to Kingsmere Lake.

4C. Character of Access

The character of the access to the area must reflect the desired wilderness attributes that are valued. The users were asked, "At what point would the level of access begin to affect your experience?"

5. Facilities and Level of Service

As with all Parks Canada's backcountry and wilderness areas, facilities are provided to minimize damages in camping and sensitive areas and to promote public safety. Many of the users and some managers felt that some facilities and services detracted from the wilderness experience. To understand how the current facilities and services provided in the Kingsmere area affected the user experiences, in the second questionnaire the users were asked how the level of service and facilities affected their experience.

Value Statement

The facilities and level of service that are provided in the Kingsmere wilderness area has direct effects on the user experiences. The provisions of facilities and services at various areas within the Kingsmere area should reflect the general character of the area in which they are provided.

Indicators Associated with Facilities and Level of Service Value

5A. Public Safety

To address the safety issue, the users were asked if the presence of a warden in the area affects their experience either negatively, positively, or neutrally. The users were also asked about the need to register in and out of this area, and how it affected their experience.

5B. Campground Conditions

Conditions in the various campsites throughout the Kingsmere area are not consistent. To identify how current campsite conditions affected user experiences, whom rated the campgrounds they visited as: less than acceptable, acceptable, or better than acceptable.

5C. Facilities Provided

The effects that the other facilities provided were completed through asking the users how the provision of each of the following affected their experience. Thresholds were established by the user responses to their presence as being positive, negative or neutral.

The facilities provided are: picnic tables, hibachis, a cooking shelter, bear caches, fire wood, a boat launch, a cart track, docks, and board walks. The user responses to the effect of the provision of each facility helped in determining an appropriate level.

The Indicators

The indicators that have been described are distinguished as either social or resource indicators. The social indicators describe what the users were able to quantify as socially acceptable in the Kingsmere area (Chapter 6). The social indicators that will be presented throughout the remainder of the document, and used by Visitor Services for monitoring the users' experiences are:

- Group size;
- Number of people in the area;
- Noise from other users;
- Noise from motors;
- Time to access the area;
- Range of activities.

The resource indicators describe what the users were able to describe as acceptable conditions in the Kingsmere area (Chapter 6). The resource conditions that will be presented throughout the remainder of the document, and used by the Warden Service to monitor resource conditions in the Kingsmere area are:

- The amount of vegetation damage around the campsites and campgrounds;
- Campground conditions;
- Natural scenery

- The facilities provided by the park;
- The character and level of difficulty of the future access to Kingsmere Lake.

The remainder of the thesis will focus on how acceptable limits for both the social and resource indicators were determined (Chapter 6), documentation of the current conditions for each indicator (Chapter 7), suggested thresholds for each indicator (Chapter 8) about which the managers must make the final decision, and a description of a systematic monitoring process for both the resource and social indicators that will alert the managers when thresholds of acceptable change have been crossed (Chapter 9). In the final chapter of the document, recommendations for the managers of the Kingsmere wilderness area to consider are presented based on observations made during this two year research project.

CHAPTER 6 DEFINING ACCEPTABLE WILDERNESS CONDITIONS

The Kingsmere users were surveyed during the summer of 1997 to describe quantitatively what they consider acceptable conditions for the various indicators of the Kingsmere experience identified by the users and managers during the previous year. Each respondent was asked to define how the various indicators affected their experience and what they felt were acceptable conditions for the indicator.

Goal:

Definition of acceptable conditions for social and resource indicators within the Kingsmere wilderness area.

Process:

- Define acceptable conditions through soliciting user input.
- Solicit manager input regarding resource conditions.
- Review management policies that describe wilderness conditions.
- Ensure that acceptable conditions defined by users are within limits and guiding principles for wilderness areas.

6.1 Methods

As discussed in Chapter 5, one of the main goals of the LAC process is to have users of the wilderness area define the point at which the condition of various indicators would begin to affect their experience (Stankey et al. 1985). For resource indicators the managers' views of the acceptable conditions should be given higher regard as they are better able to determine when resource conditions are at a detrimental level. The users may not be as likely to recognize the seriousness of particular resource conditions, as they may not have any training in that area and the resource conditions may not necessarily affect their own experiences. The users, however, are more likely to be able to define acceptable conditions for social indicators, as they are directly influenced by the social conditions during their visit. Conditions defined by both users and managers for

the wilderness area should be within the bounds of the policy framework for the wilderness area, as presented in Chapter 1.

6.1.1 Defining Acceptable Conditions: Integrating User, Manager and Policy Directions

Defining acceptable wilderness conditions was the main goal of the second user survey, administered between 28 June 1997 and 8 September 1997. The purpose of the survey was to allow the users of the Kingsmere wilderness area to define what they felt were appropriate conditions for the resource and social indicators. Its focus was to have the users define what they would like to experience, how current conditions affected their experience, and if they felt conditions were less than acceptable, acceptable or better than acceptable. Respondents were identified by using the 'next-to-pass' approach, the same approach used during the first survey. The author chose an arbitrary line each day that all users had to cross when leaving the area. The chosen location was monitored for eight hours, each survey day during the peak times for users leaving the area, based on observations made during the previous season. When a Kingsmere user crossed the arbitrary line, they were asked if they would like to voluntarily participate in the study, none of the users asked refused to participate. The surveys, which took between five and fifteen minutes to complete, were read to the users, with all responses being recorded verbatim. This survey approach yielded a 100% response rate, with 120 completed surveys.

The survey allowed the respondents to suggest what they felt were appropriate social and resource conditions. The respondents were asked how current social indicators affected their experience either as positive, neutral, or negative. For each social indicator, respondents were also asked to describe the appropriate condition for each indicator. They also described acceptable conditions for the resource indicators by evaluating current conditions as being less than acceptable, acceptable, or better than acceptable. (Complete survey form and results are presented in Appendix C).

Through the responses, the respondents were able to define acceptable conditions for some issues such as group size and number of people in the area. When respondents

were not able to describe quantifiably the conditions that were acceptable, they described current conditions as less than acceptable, acceptable, or better than acceptable.

The manager's role in defining acceptable conditions was less direct than that of the users. Historically, managers of the Kingsmere wilderness area have decided on what acceptable conditions were, and when necessary, have closed areas due to concerns for public safety and campground conditions. Their actions were guided by the objectives stated in the National Parks Act requiring the managers to provide public safety, and limit damage (Government of Canada 1988).

The managers role in defining acceptable conditions must be completed in a managerial discussion group where decisions on acceptable wilderness conditions for the area are to be made. The managers must consider the data collected, and set threshold limits for the indicators based on recommendations presented in Chapters 8 and 10.

Although users may determine conditions as acceptable for numerous indicators, the managers must meet their mandate for establishing wilderness conditions according to policy and management guidelines. The role of park managers in this step is to determine acceptable wilderness conditions as dictated by their mandates, and manage for these conditions. It is essential for managers to recognize user input. They must not, however, falter on their responsibility of protecting wilderness areas and ensuring that they are capable of allowing visitors to experience remoteness and solitude, nature on its own terms, with few if any modest services or facilities (Canadian Heritage 1995, pp.38). Managers' attention should focus primarily on resource indicators, while allowing users to define acceptable social conditions. Where conditions are determined to be unacceptable, managers must take adequate action to elevate conditions to a more acceptable level. What many users determine as acceptable may contradict policy statements for wilderness conditions. At this point managers must be proactive in their approach to establish conditions for the Kingsmere wilderness area.

Determining appropriate resource conditions proved a much more complex process than for social indicators. The users defined current resource conditions as acceptable, less than acceptable or better than acceptable. The respondents' preferences for the resource

conditions were then compared to current conditions as recorded by the author and data collected from Visitor Services. In the next chapter the methods used to determine current conditions are described.

6.2 Results

In this section, the focus is on those results that define acceptable conditions for the various indicators generated from the 1996 User Survey. All questions asked in the 1997 User Survey were guided by responses from the 1996 Survey. The questions built on the issues that arose in response to the 1996 User Survey that are related to quantifiable indicators of acceptable conditions in the area. The 1997 Kingsmere User Survey and results are presented in their entirety in Appendix C. The tables presented throughout this chapter indicate the frequency of each response, the percentage of the frequency compared to the total responses, and the valid percentage which presents the percentage of users that responded to the particular question, meaning that non responses to the question were not included.

6.2.1 Social Indicators

One of the defining functions of wilderness, according to the PANP management plan, is to allow users to experience solitude (Canadian Heritage 1995). To determine if the users were able to experience solitude, the following series of questions were asked. The first question was, "Did you see others users while you were in the Kingsmere area?" The response to the question indicated that 95% of the users did see other people while in the area. When asked "What affect did this have on your experience in the Kingsmere area?" 29.2% indicated that it was positive to see others, 52.5% indicated that seeing others had a neutral affect on their experience, and 18.3% of the users indicated that seeing other while in the Kingsmere area was negative. The threshold for the number of people acceptable to see in a day was determined by asking the users: "How many people is it appropriate to see while in the area?" Although this question reflects the users optimal preferences, the results, as presented in Table 6.1, reflect a range of quantifiable thresholds. The users' responses to the question, as presented in Table 6.1, indicate a

wide range of what they consider to be an acceptable number of people to see as they travel in the Kingsmere wilderness area. The responses range from no other people to 30 people per day.

Table 6.1 Appropriate Number of People to See

Appropriate # to See	Frequency	%	Valid %
0	6	4.9	5.5
1	3	2.5	2.7
2	7	5.7	6.3
3	2	1.6	1.8
4	14	11.5	12.5
5	4	3.3	3.6
6	8	6.6	7.1
8	6	4.9	5.5
10	24	19.7	21.4
12	11	9.0	9.8
15	4	3.3	3.6
16	1	0.8	0.9
18	1	0.8	0.9
20	2	1.6	1.8
24	2	1.6	1.8
30	2	1.6	1.8
current number of people	15	12.3	13.4
no response	8	6.6	-
Total	120	100.0	100.0

The significance of the results presented in Table 6.1 is the acceptable level that the users identified. Approximately 76% of the respondents identified that they would like to see 12 people or less as they travel in the Kingsmere area. The current number of people in the area was deemed appropriate by approximately 13% of the survey respondents. It is

difficult to determine the current levels of people in the area because of the day users that are not required to register in and out of the area, and because there is no accurate trail counting technique available for the trails in the Kingsmere wilderness area. Some efforts to count individuals as they entered the area were made, however, the information collected is not considered adequate enough to make conclusions related to the number of people in the area.

An issue directly related to the number of people seen in an area, is that of group size. Other wilderness researchers have identified that the size of group encountered in a wilderness affects the users experience differently than encountering individuals (Herrick and McDonald 1992, Roggenbuck, Williams and Watson 1993, Wright and Clarkson 1995). The Kingsmere users were asked, "Did you meet any groups while travelling in the area?" The response to that question indicated that 43.3% of the users did meet other groups. When asked, "What is an appropriate size group to meet while in the area?" the responses ranged from 2 to 20. The results presented in Table 6.2 signify that the majority of users (approximately 76%) want to meet groups of 6 people or less as they travel in the Kingsmere wilderness area.

Table 6.2 Appropriate Group Size to Meet

Appropriate group size	Frequency	%	Valid %
2	**4**	**3.4**	**3.7**
3	**5**	**4.2**	**4.7**
4	**40**	**33.6**	**37.4**
5	**4**	**3.4**	**3.7**
6	**31**	**26.1**	**29.0**
8	**7**	**5.9**	**6.5**
10	**8**	**6.7**	**7.5**
12	**5**	**4.2**	**4.7**
20	**2**	**1.7**	**1.9**
no response	**13**	**10.9**	**-**
Total	**120**	**100.0**	**100.0**

The users' responses to the first user questionnaire (Chapter 5 and Appendix A) identified that the amount of noise in the area affected their experiences. In the second user questionnaire, the users were asked, "Did the noise of others affect your experience?" This question intentionally did not cover the issue of noise from motors to clarify what particular noises users were most affected by. The results indicated that only 11.9% of the respondents were affected by the noise of other people in the area. Those users that were affected by the noise of others identified loud people/groups and motors as the noise sources that affected their experiences.

Although the users' responses to the above question revealed that only 11.9% were affected by the noise from other users, when asked about noise from motors, 91.7% of the users indicated that they did hear motors. The users, in the second questionnaire were asked "What affect did hearing motors have on your experience?" 54.8% of the users identified that hearing motors was negative, 41.7% identified it as being neutral or having little to no affect on their experience, and 3.5% of the respondents identified that hearing motors had a positive affect on their experience. To determine thresholds for the number of motors acceptable to hear the users were asked, "How many motors is it appropriate to hear while travelling in the area?" the results are summarized in Table 6.3.

The significance of the results presented in Table 6.3 is that over 20% of the respondents were unable to give a number that could represent what they considered an appropriate number of motors acceptable to hear as they traveled in the Kingsmere wilderness area. Of those that could give a number, approximately one quarter of the respondents did not want to hear any motors as they traveled in the Kingsmere area. Approximately 58% of the respondents felt that hearing less than 2 motors per day as they traveled was appropriate. This generally means that the users felt that the Warden's use of a motorboat to patrol the area is acceptable, other than that however, approximately a quarter of the users felt that it is unacceptable to have any motorboats travelling in the area.

Table 6.3 Acceptable Number of Motors to Hear

Number of Motors	Frequency	%	Valid %
0	**26**	**22.2**	**27.4**
1	**16**	**13.7**	**16.8**
2	**13**	**11.1**	**13.7**
3	**2**	**1.7**	**2.1**
4	**3**	**2.6**	**3.2**
5	**14**	**12.0**	**14.7**
6	**7**	**6.0**	**7.4**
7	**1**	**0.9**	**1.1**
10	**7**	**6.0**	**7.4**
12	**1**	**0.9**	**1.1**
15	**2**	**1.7**	**2.1**
20	**3**	**2.6**	**3.2**
Unable to give number	**25**	**20.8**	-
Total	**120**	**100.0**	**100.2**

There was no consensus among the users of the Kingsmere area as to what activities were appropriate. The 1997 survey respondents were asked "Did the activities of other users affect your experience?" In response, 18.3% of the respondents indicated that the activities of others did affect their experience. However, almost 82% of respondents were not disturbed by the activities of others in the area. When asked, "Which activities affected your experience?" The following were identified, as presented in Table 6.4.

Although only 22 of the 120 users surveyed responded to the above question, those that did identified motorboating as the activity that most seriously affected their experience in the Kingsmere wilderness area (40% of respondents). In comparison, all other activities that did affect users' experiences, as presented in Table 6.3, were mentioned by a limited number of survey respondents. The responses to the question were recorded verbatim therefore accurately reflecting the user's opinions.

Table 6.4 Activities Affecting Experience

Activity	Frequency	%	Valid %
motorboating	**9**	**7.5**	**40.9**
people with dogs off-leash	**3**	**2.5**	**13.6**
loud people or groups	**3**	**2.5**	**13.6**
poor information from Park	**2**	**1.7**	**9.1**
food left out at campgrounds	**2**	**1.6**	**9.1**
disrespectful use of area	**1**	**0.8**	**4.5**
camping in undesignated areas	**1**	**0.8**	**4.5**
people feeding wildlife	**1**	**0.8**	**4.5**
no response	**98**	**81.7**	**-**
Total	**120**	**100.0**	**99.8**

One of the unique characteristics of the Kingsmere wilderness area is the access that it provides for a variety of users, based on experience or chosen activity. The access to Kingsmere Lake issue has been the focus of the Kingsmere Working Group since 1994, and the 1997 User Survey also focused on this issue. The users of the area were asked, "How did the current level of access affect your experience in the Kingsmere area?" Eighty seven point two percent of the users that responded to the question felt that the level of access had a positive effect on their experience, 10.0% felt that the affect was neutral, and 2.8% felt that the level of access had a negative effect on their experience.

Although a large majority of the Kingsmere users felt that the current level of access positively affected them, the pending changes, due to the removal of the Kingsmere River dam, will change the level of access. The users were asked, "At what point would the level of access begin to affect your experience?" The users responded as to how certain changes in access would affect them, as presented in Table 6.5.

Table 6.5 Level of Access

Amount of Access	Frequency	%	Valid %
if there was a road (negative)	**26**	**21.8**	**28.2**
if access were easier (negative)	**17**	**14.2**	**18.5**
access is too easy now (negative)	**12**	**10.1**	**13.0**
if access was harder (negative)	**7**	**5.9**	**7.6**
if had to carry boat (negative)	**2**	**1.7**	**2.2**
if larger motors could have access (negative)	**1**	**0.8**	**1.1**
current level is good	**14**	**11.8**	**15.2**
portage would be good, no trolley (positive)	**7**	**5.9**	**7.6**
if there were no motors (positive)	**6**	**5.0**	**6.5**
no response	**28**	**23.3**	-
Total	**120**	**100.0**	**99.9**

The access issue affects only users that use watercraft to access Kingsmere Lake. Therefore, hikers did not respond to this question, hence the high no response rate. The significance of the results presented in Table 6.5 is that the majority of the users do not want access to Kingsmere Lake to become easier. The users responded to the above question by suggesting how particular changes in amount of access would affect their experience. Most respondents, approximately 70%, identified changes in access that would be negative. Other respondents, approximately 15%, identified what changes in access would make their own experiences better, with the remaining 15% of respondents identifying that the current level of access is appropriate.

Access to Kingsmere Lake, for those using water craft, is an experience on its own. Users initially paddle up the Kingsmere River, then must remove their water craft, and load it onto the trolley. After pushing the trolley approximately 400 metres, they must then place their water craft back into the River. Some users choose to carry their canoe if the trolley is busy, however, for motorboats to access the Lake, the trolley is essential.

The access issue to Kingsmere Lake involves numerous components. One is the amount of time to wait for the trolley. The users were asked "How long did you wait for the trolley?" The respondents indicated that most users waited for two groups or fewer, a time interval generally less than 30 minutes. To define how long the users would be willing to wait for a trolley, they were asked, "What do you feel is an acceptable amount of time to wait for a new trolley to access Kingsmere Lake?" The responses are presented in Table 6.6.

Table 6.6 Maximum Acceptable Time to Wait for the Trolley

Time in minutes	Frequency	%	Valid %
10	**5**	**4.2**	**8.3**
15	**4**	**3.4**	**6.7**
20	**18**	**15.1**	**30.0**
30	**16**	**13.4**	**26.7**
45	**2**	**1.7**	**3.3**
60	**1**	**0.8**	**1.7**
would not wait, would carry canoe	**12**	**10.1**	**20.0**
1 group	**1**	**0.8**	**1.7**
2 groups	**1**	**0.8**	**1.7**
no response	**60**	**50.0**	**-**
Total	**120**	**100.0**	**100.1**

Many users were unable to specify a time that they would be willing to wait for the trolley hence the high no response rate to the question. The majority of respondents to this question, approximately 75%, indicated that a wait longer than 30 minutes for the trolley would not be acceptable. This is very important for the managers of the area to consider when implementing any type of new access. There is very little that park managers can do to limit the wait for the trolley. They could make users more aware of when the highest amount of use is, such as the beginning or end of a long weekend. The managers should consider the amount of time acceptable to wait when designing the new trolley system to be implemented when the dam is removed from the Kingsmere River.

To access Kingsmere Lake, boaters and canoeists must remove their vessels from the river, load them onto the trolley and put their vessels back into the river and travel up to the Lake. When the dam is removed, some portions of the river will be more navigable, while others will be less. The users were asked "Do you think that removing your boat from the river is an appropriate action to protect the river system?" Ninety-five point five percent of the respondents indicated that they felt it was appropriate.

The unique character of the Kingsmere wilderness area allows it to be accessed by users of various experience levels. One reason that the users feel able to access the area is due to the level of public safety provided by PANP. When asked, "How important is knowing that the area is patrolled for public safety to your experience?" Eighty-eight point three percent of the users indicated that it was positive, and 11.7% indicated that it had no real affect on their experience.

6.2.2 Resource Indicators

Determining acceptable conditions for the resource indicators of the Kingsmere area, was much more difficult than for the social indicators. It was very difficult to have users describe appropriate conditions or the point at which conditions would affect their experience. The users were, therefore, asked to describe the current resource conditions as better than acceptable, acceptable, or less than acceptable. These responses will be compared with the results of the resource inventory (Chapter 7) and the establishment of thresholds for each indicator are described (Chapter 8).

The first resource indicator that the users were asked about was vegetation damage. Users were asked: "Did you notice any damaged vegetation as you traveled throughout the Kingsmere area?" Sixty-six point seven percent of the users indicated that they did notice damaged vegetation. The users were not told what constituted vegetation damage, but rather they determined what they felt was damaged vegetation. Those users that indicated that they observed vegetation damage were then asked to rank the level the vegetation damage as either less than acceptable, acceptable, or better than acceptable. The results, as presented in Table 6.7, indicate that approximately 73% of the respondents feel that current levels of vegetation damage are at an acceptable level. The remaining

27% are split between describing the conditions as being less than acceptable or better than acceptable.

Table 6.7 Level of Vegetation Damage

Response	Frequency	%	Valid %
less than acceptable	**10**	**8.3**	**12.5**
at an acceptable level	**58**	**48.3**	**72.5**
better than acceptable	**12**	**10.0**	**15.0**
no response	**40**	**33.3**	**-**
Total	**120**	**100.0**	**100.0**

The majority of users that responded, approximately 88%, felt that the amount of vegetation damage observed around the campgrounds was better than acceptable (meaning less than they had expected to see) or at a level which they felt was acceptable. The results presented by the users signify that the historic and current use of the area has not impacted to a point beyond acceptable conditions.

To evaluate how the users felt human-introduced structures affected the natural landscape, they were asked, "Were there any structures that affected your appreciation of the naturalness of this area?" Most users (approximately 72%) did not respond to the question. The users that did respond (approximately 28.3%) indicated that there were structures that negatively affected their appreciation of the natural landscape. These respondents were quite adamant about the presence of the structure, and felt that they were not appropriate in the area. The structures identified are presented in Table 6.8.

Table 6.8 Structures Affecting Naturalness of Area

Responses	Frequency	%	Valid %
dam	**9**	**7.5**	**26.5**
cooking shelter	**7**	**5.8**	**20.5**
board walks	**5**	**4.2**	**14.7**
outhouses	**4**	**3.4**	**11.8**
signs	**4**	**3.4**	**11.8**
hibachis	**2**	**1.6**	**5.9**
tent pads	**1**	**0.8**	**2.9**
Warden's cabin	**1**	**0.8**	**2.9**
boat launch	**1**	**0.8**	**2.9**
no response	**86**	**71.7**	-
Total	**120**	**100.0**	**99.9**

Most of the respondents did not identify the structures as intruding into the sense of the naturalness of the Kingsmere area. The results presented in Table 6.8 indicate that the structures that the users found that detracted from the naturalness of the area are structures that are not common in wilderness areas, such as a dam and a cooking shelter. The mentioning of these structures by the respondents indicate that they feel the area should provide only structures that are of the type that they associate with wilderness. Because the response rate was low to this question, it is inappropriate to make broad generalizations.

The users of the Kingsmere area were also asked how they felt the campground conditions were. The majority of respondents (81.7%) identified the campground conditions as acceptable or better than acceptable.

The final resource indicator that the survey respondents commented on were the facilities provided in the area. The users were asked to identify how the provision of various facilities in the Kingsmere area affected their experience. The facilities, their effect on the users' experiences, and the rate of no response are identified in the following table.

Some facilities have lower response rates because they are not provided evenly throughout the area. Therefore, only portions of the sampled population could be affected by its presence. The responses are presented in Table 6.9.

Table 6.9 Effect of Facilities Provided

Facilities	Positive (valid %)	Neutral (valid %)	Negative (valid %)	No Response/ Total response
picnic tables	**87.9**	**6.1**	**6.1**	**5/120**
hibachis	**85.2**	**4.5**	**10.4**	**5/120**
cooking shelter	**48.2**	**21.4**	**30.4**	**64/120**
bear cache	**96.5**	**2.6**	**0.8**	**6/120**
fire wood	**90.2**	**4.4**	**5.3**	**7/120**
boat launch	**81.9**	**10.6**	**7.4**	**26/120**
docks	**71.1**	**18.4**	**10.5**	**44/120**
board walks	**78.3**	**8.7**	**13.0**	**51/120**

The responses recorded in Table 6.9 signify that the majority of the users of the area were satisfied with the facilities provided in the Kingsmere wilderness area, as indicated by the high positive responses to each of the facilities. The one facility that was the least acceptable to the respondents was the cooking shelter at Southend campground. This facility may be most problematic to the users because it does not reflect the wilderness character that they were seeking in the area, as the cooking shelter is very similar to those provided in other front-country areas, such as near the beach in Waskesiu townsite.

6.2.3 User Responses to Potential Management Recommendations

The final section of the 1997 Kingsmere User Survey allowed the users to identify the areas, on which they felt management attention should focus. The users were briefed on the thirteen issues described throughout the survey and were asked on which issues they felt managers should focus. The users were given the opportunity to voice their opinions to the managers of the area to direct what they felt were the most serious issues (Table 6.10).

Table 6.10 Management Issues

Issue	Frequency	%
noise from motors	**41**	**34.2**
access	**27**	**22.5**
litter	**21**	**17.5**
size of groups	**18**	**15.0**
number of people in the area	**15**	**12.5**
campground conditions	**12**	**10.0**
vegetation damage	**10**	**8.3**
facilities	**9**	**7.5**
trail conditions	**9**	**7.5**
allowable activities	**8**	**6.7**
public safety	**8**	**6.7**
structures	**7**	**5.8**
noise from users	**4**	**3.3**

The issues identified as being the most important for the managers of the area to focus on, as identified in Table 6.10, were issues that could be minimized through different management approaches in the Kingsmere wilderness area. The results presented in Table 6.10 identify each of the 13 issues used to determine acceptable resource and social conditions in the Kingsmere wilderness area and the number of users that felt each issue required immediate management attention. The numbers presented is the number of people that thought the issue required management attention out of a maximum potential number of responses for each issue of 120. Some users felt that no single issue required more attention than the others, however, when a cumulative list of responses was developed, the above hierarchy of issues requiring management attention was developed. The responses presented in Table 6.10 are listed from the issues most often identified as needing management attention to the issue least often mentioned by the users as needing management attention.

Through this study, defining what users determined to be acceptable conditions for an accessible wilderness and making management recommendations that reflect what users expected has been a primary goal. The allowance of both motors and the level of access to the Kingsmere wilderness area are part of its unique zoning that allows for the definition as of an "accessible wilderness", and yet it is these two issues, motors and access, that over half of the respondents identified as needing the most management attention.

The definition of acceptable conditions, as presented throughout this chapter, quantifiably described the values and measurable indicators. The users were asked to define acceptable conditions for the indicators, as presented in Chapter 5. From acceptable conditions, thresholds for the indicators need to be established. However, many indicators must be compared to the inventory of current conditions, as presented in Chapter 7.

CHAPTER 7 INVENTORY OF CURRENT CONDITIONS

The purpose of the inventory of current conditions of the wilderness indicators is to establish baseline data for each indicator. The methods used to establish the current conditions are similar to those that should be used during future monitoring initiatives. The results of the inventory will be the baseline data that the monitoring data collected in the future will be compared with. Any deviations from the baseline conditions of the indicators should be detected during the monitoring and significant changes should initiate management actions.

Goals:

1) Describe quantitatively current resource and social conditions in Kingsmere wilderness area.

2) Collect data that will serve as baseline conditions for future monitoring.

Process:

- Conduct inventory of current social and resource conditions to be used as baseline data during the monitoring process.

7.1 Social Indicator Inventory

The social components of a wilderness experience are very important. The inventory of the social indicators focused on those characteristics related to the human interactions of the Kingsmere experience. Through focusing on the social indicators, an evaluation of the indicators could be presented and compared to what the users determined as acceptable.

7.1.1 Methods

Overnight wilderness users are required to register in and out, as a means of public safety. All overnight users of the Kingsmere area must register with Visitor Services, where records are kept of the party size, activity, camping location, and duration of the

trip. Through analysis of the registration records a detailed account of the social indicators was developed.

The social inventory focused on the size of groups, the activity of each group, and the camping location for each day, from 27 June to 12 September 1997. The purpose of this approach to describe the characteristics of the use of the Kingsmere area is to provide Visitor Services with a detailed account of use of the area that may help in disseminating information to users of the area. By having access to such detailed information, Visitor Services may be better able to direct users as to where to travel so they may meet their wilderness expectations.

7.1.2 Results

The inventory of social indicators in the Kingsmere wilderness has resulted in a detailed account of the use of this area. This approach allowed for the quantifiable social indicators inventoried, to be compared against what the users defined as acceptable conditions (results of 1997 User Survey). The comparisons made between what the users described as acceptable conditions and the current conditions in the Kingsmere wilderness area is presented in Chapter 8 where threshold considerations are presented.

Many users identified the need to experience solitude as an important part of their Kingsmere experience. Solitude is an issue that is not easy to simplify. Solitude for the purpose of this study was assumed to be a function of the number of people and the amount of noise in an area. Because measuring noise levels is difficult, an approach to describe which campgrounds were most likely to be the quietest, because of the limited number of people, the total number of groups visiting each campground was recorded. A simple breakdown of where visitors stayed while in the Kingsmere wilderness area is presented in Table 7.1.

Table 7.1 Campground Use

Campground	% of Groups	% of People
Southend	**19.5%**	**19.4%**
Westwind	**0.7%**	**1.5%**
Chipewyan	**8.9%**	**9.5%**
Sandy Beach	**12.5%**	**13.1%**
Northend	**22.0%**	**22.2%**
Bladebone	**10.6%**	**9.3%**
Pease Point	**11.6%**	**12.4%**
Bagwa	**10.4%**	**9.9**
Lily Lake	**3.6%**	**2.8%**

The results presented in Table 7.1 indicate that approximately 43% of all the users in the Kingsmere area stay at Southend or Northend Campgrounds. These two campgrounds are the largest in the area and are obviously the favored destination for many of the Kingsmere users.

Another comment made by the users from the 1996 user survey identified that most user conflicts occur between different user types, therefore, when describing campground use, the activity of each group was also recorded. The results are presented in Table 7.2.

Table 7.2 Campground Use by Number of Groups per Activity

Campground	Canoeist groups	Hiker groups	Motorboater groups	Total groups
Southend	72	23	14	109
Westwind	2	0	2	4
Chipewyan	23	25	2	50
Sandy Beach	37	28	5	70
Northend	51	50	22	123
Bladebone	37	NA	22	59
Pease Point	61	NA	4	65
Bagwa	58	NA	NA	58
Lily Lake	20	NA	NA	20
Total Groups	361	126	71	558

The results presented in Table 7.2 indicate that each campground has a relatively high amount of use, with the exception of Westwind group campground and Lily Lake campground.

To describe the use of the Kingsmere area the description of user nights is a common technique. User nights record how many people over-nighted in the particular area of interest. The Kingsmere area had 1801 user nights between 28 June and 12 September 1997. This method to track use through time is a useful way to quantify the use of a given area each year. By knowing how many people use the area, managers are better able to design campgrounds and manage the area to minimize the amount of user contact at campgrounds, thus enhancing the ability to experience solitude. The size of groups in the area also affects the feeling of solitude. A complete analysis of the user nights and group size is presented in Table 7.3.

Table 7.3 User Nights in the Kingsmere Wilderness Area

Activity	Total # of Groups	Total # of People	Groups/day	People/day	People/Group
canoeing	**361**	**1216**	**4.5**	**15.8**	**3.6**
hiking	**126**	**304**	**1.6**	**3.9**	**2.4**
motorboating	**71**	**281**	**1.2**	**3.6**	**3.0**
Total	**558**	**1801**	**7.3**	**23.3**	**N/A**

From the results presented in Table 7.3, it is not obvious that the number of people in the area each day is an important issue. However, there is a great deal of day use in the area, particularly closer to the parking lot. The high amount of day use at Southend does affect the users' ability to experience solitude. The use of the area is not spread evenly throughout the peak summer season from late June to early September. Weekends and particularly long weekends are the busiest times in the Kingsmere wilderness area. Weekend nights (both Friday and Saturday) account for 35% of the user nights in the area. When Sunday nights are added, to account for long weekends, approximately 49.5% of all users nights are based on the use of those three nights.

The final quantifiable social indicator is the issue of safety in the Kingsmere area. During the 1997 season, the Kingsmere area was patrolled for 59 days between 28 June and 12 September 1997. Although the warden cannot cover the entire area with equal thoroughness, for many users, knowing that there is a warden was reassuring as they travelled through the wilderness area.

7.2 Resource Inventory

The resource inventory focuses on how human use of the Kingsmere wilderness area has affected the vegetation patterns, and how the current facilities provided in the area affects experiences. The effects are not quantified, but rather categorized. Rather than trying to measure the level of impact, the inventory focused on the location and extent of the

impacts around the campgrounds and campsites within the area. The vegetation impact was evaluated as the amount of cover at various forest layers.

The resource inventory will be an essential step in the monitoring process that must describe the resource conditions around the campgrounds and campsites, as these areas are important places for most of the user experiences. The Kingsmere area has nine campgrounds, each having between two and eight campsites. The users, managers and previous wilderness research helped to identify the resource indicators, and the indicators sampled are those that would reflect change most easily.

The methods used to conduct the campsite and campground inventories were similar, but the scale of data collection differed. The difference of scale is important to understand. The focus of the campsite inventories was on the extent of vegetation damage surrounding each campsite. The campground inventories also focused on vegetation damage, as the result of human movement around each campground, and also on the areal extent of the campground and the overall layout of the campground.

The nature of this work and the need for an efficient and effective monitoring programme lead to the creation of a methodology to measure the extent of campsite and campground impacts. There have been campsite studies completed in various jurisdictions that used a wide variety of techniques (Frissell 1978, Parsons and MacLeod 1980, Cole 1983, Hammitt and Cole 1987, Cole 1992, and Cole and Bayfield 1993), these studies were reviewed. The methods used to conduct the resource inventory builds on previous work, while incorporating the need for repeatable, efficient, and specific techniques to meet the requirements of this study. The methods used, therefore, reflect the most efficient and effective methods to detect human use around the campgrounds and campsites of the Kingsmere area.

7.2.1 Campsite Inventory Methods

Campsites are the areas within the campground that have tent pads, hibachis, and picnic tables. The focus of the campsite inventory is on the areal extent of impact, or footprint, of use surrounding the sites within the campground. The footprint reflects where people moved around their campsite. The areal extent of the campsite was measured as a

function of vegetation cover at three forest cover layers whose presence or absence is partially dependent on how people use the area. The shrub layer, (0.50m < Sh < 3.00m), for the most part prohibits people from moving around a campsite, and restricts where people move because of its height. Where there is significant shrub cover, it is assumed that there is limited human movement through the area. The herbaceous layer (0.04m < H <0.05m) is trampled by human movement, and the cover at this layer reflects the amount of use. When the herbaceous layer is subjected to human traffic, it often has very poor cover. The moss layer (M<0.04m), more so than the other layers, reflects human use. Moss does not grow well if subjected to repeated trampling. The presence and abundance of each species within each of the forest layers is dependent on a number of environmental conditions, such as moisture, shade, and soils. Human use, however, is a controllable factor that does affect the presence or absence of cover in each layer. In addition to the vegetation cover within each 1m *x* 1m plot, the amount of mineral soil, leaf litter and deadfall was recorded. Preliminary observations suggest that in many instances the amount of unvegetated mineral soil reflect human use of the area. Where there are high amounts of mineral soil, and thus low levels of vegetation cover, there often has been a lot of human traffic. The purpose for recording leaf litter was to indicate the limited amount of vegetation cover. Fires are permitted in the Kingsmere area, and many people use deadfall to start their fires. By looking at the amount of deadfall near the campsites, a record was kept that may reflect how users move around the campsite, scavenging firewood.

The variables measured in the resource inventory are not solely dependent on human use. Because diversity is a fundamental characteristic of the boreal forest, it is difficult to measure variables that are truly independent from influences of human use. The resource inventory, therefore, focuses on a range of variables that are directly influenced by human use of the area. The anomalies that occur, such as limited cover at any one layer, have been considered and accounted for in the methodology.

The methods outlined below were developed by the author and the Vegetation Manager in Prince Albert National Park and used to determine current conditions of vegetation

cover that will serve as the baseline conditions for monitoring. A schematic representation of the campsite inventory is presented in Figure 7.1.

1. Determine and identify the centre of the campsite as being the centre point of the tent pad, determined as the crossing point from the corners of the tent pad.

2. Set four transects from the centre point (North, South, East, West).

3. Measurements along the transect should begin where the transect meets the tent pad marker. Starting adjacent to the tent pad, 1m x 1m plots should be laid consecutively until the rule of campsite extent is met (see Step 4).

4. Measurements will focus on percent cover at the shrub (Sh), herbaceous (H), and moss (M) layers. In addition, the amount of mineral soils (Ms), leaf litter (ll) and deadfall (df) should also be recorded. The classes of species, either shrub, grass, sedge, or herb should identify the herbaceous layer.

   The percentage of cover at each layer is determined by looking directly down on the layer, for those layers below eye level, or directly up for those above. By focusing on each individual layer the researcher can visually subdivide the plot to determine how much of the particular layer has vegetation, and how much does not. This technique is commonly applied to vegetation studies (Chapman 1976, Pears 1977).

5. Campsite sampling transects will end where Sh+H+M+df-Ms $\geqq$70% cover for two consecutive plots[8].

   Campsites also end where the transect crosses any trails that are obviously well used. If a trail goes through the campsite, the campers do not use that area.

6. Results should be recorded as presented in Table 7.4.

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[8] The campsite rule (Sh+H+M+df-Ms $\geqq$70%) was the result of preliminary work completed in the area. Four tent pads were surveyed, (a total of eight transects) where obvious ends of use were present, the transect stopped. The data were recorded and analyzed to determine common features. The purpose of meeting the rule for two consecutive plots was to ensure that anomalies did not skew the results, and that the transect was ending at the end of the campsite. The result was the simple formula described, which can be applied consistently to the campsites throughout the Kingsmere area.

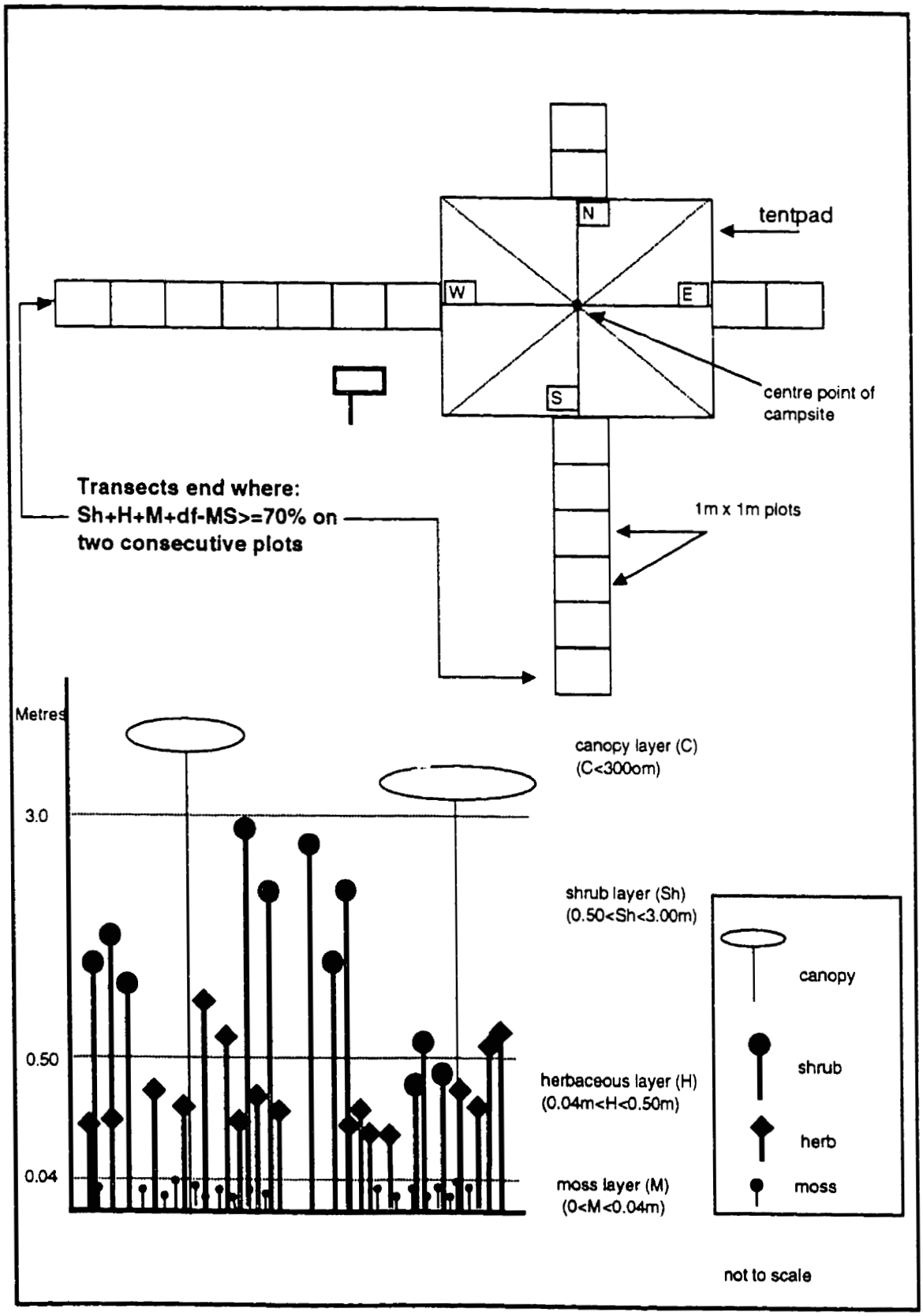

Figure 7.1 Schematic Representation of Campsite Inventory

Table 7.4 Sample Results from Campsite Inventory

Bladebone
Campsite 1

Direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	30	70	0	10	20	0	0	90	0	
N-2	0	30	100	0	0	0	0	0	90	0	
N-3	20	50	90	0	10	0	0	0	70	0	
N-4	40	20	50	0	50	0	0	0	80	0	3 trees in plot
N-5	0	30	0	0	0	100	80	0	20	0	
N-6	10	30	0	0	0	100	80	0	20	0	
W-1	70	60	30	0	0	70	20	0	80	0	
W-2	80	30	10	0	20	70	80	0	20	0	
S-1	0	50	70	0	0	30	0	0	80	0	
S-2	0	30	40	0	0	60	60	0	40	0	
S-3	20	70	10	0	20	70	30	0	70	0	spruce leaning in
E-1	0	0	0	0	0	0	0	80	20	0	
E-2	0	0	0	0	0	0	0	80	20	0	
E-3	0	0	0	0	0	0	0	80	20	0	
E-4	0	30	70	0	30	30	0	0	100	0	
E-5	0	40	20	0	0	80	5	10	80	0	
E-6	80	20	10	0	0	90	5	0	95	0	fir tree leaning in
E-7	60	30	0	0	20	80	80	0	20	0	

The results presented in Table 7.4 are intended to illustrate how to consistently record the data collected during the monitoring efforts. A complete explanation of how the data will be analyzed is presented in Chapter 9.

7.2.2 Campsite Inventory Results

Each campsite in the Kingsmere area was surveyed. The results for each campsite are presented in Appendix D. A sample of the results is presented in the Table 7.4. The results of the campsite inventory are recorded in a format that PANP can use for future monitoring initiatives. The data collected is the baseline data for the monitoring initiatives.

The results presented in Table 7.4 indicate that the footprint around the campsite is not evenly distributed. Users tend to move in directions that lead to particular facilities, such as an outhouse or picnic table. The layer that dominates the vegetation cover also varies. The West transect has high coverage in the shrub layer, while the North transect has more cover in the moss layer. It is notable that significant amounts of cover (20% cover) for moss and mineral soil do not usually appear in the same plot. It was felt that this negative correlation was due mainly to the limited ability of moss to withstand even minimal repeated trampling.

The data presented in Table 7.4 is the baseline data to which the data collected through the monitoring programme will be compared. Changes in the condition of the vegetation cover around the campsites will be detected as future data are compared to this baseline data. There was a need to set a threshold, based on the best available information and managerial constraints, that would signify significant change in the vegetation. Studies (Frissell 1978, Parsons and MacLeod 1980, Cole 1992, Cole and Bayfield 1993, Cole 1995, Shelby et al. 1998) were examined but did not provide any usable threshold values. Thus the Vegetation Manager in PANP and the author agreed that a 20% change or greater in vegetation cover would represent a significant change that should ignite management action. It was agreed that a 20% or greater change would be beyond natural variation and not be so high that it would cause irreparable damage.

To more clearly illustrate how the monitoring will work, some hypothetical data has been created to better illustrate how the monitoring system will work. If during the first year of monitoring the change in vegetation cover decreases by 10% in a plot at the end of a transect, no management actions would be taken. In such a scenario, however, the

managers responsible should pay particular attention to the conditions and particular transect for the next monitoring year. The hypothetical data for the second monitoring year reveals a vegetation cover decrease of 25% compared to the baseline data for the same plot. The shrub cover in the plot remained the same, however, both the herbaceous and moss layer have decreases in cover by 25%. The loss in vegetation cover is also accompanied by a 10% increase in litter cover, and an increase in exposed mineral soil by 15%. Because the vegetation loss is primarily at the lower forest layers (below 50 cm), it may be explained by people walking further from their campsite. The area must be checked to determine why the users are moving further from the tentpad, possible reasons may be due to the picnic table being moved or branches used for drying clothes are more exposed. The key point is to determine what is causing the users to move more, and rectify the problem when possible.

In some cases, revegtation of areas surrounding the campsites may be necessary. When revegtation is necessary, some campsites may need to be closed to allow the new vegetation the opportunity to grow. When a campsite is closed, a simple interpretive sign should be used explaining what is being done, and why it is being done. This should help the users understand that the area has be subjected to excessive use and that has sparked the management action to ensure that the overuse does not continue.

The revegetation of the area should be completed using native species seed, and possibly compost from the composting toilet in the area as a natural fertilizer and soil amendment.

7.2.3 Campground Inventory Methods

Similar to the campsite inventory, the campground inventory focused on the areal extent of impact to the surrounding forest from use of the site. Efforts were placed on the identification of the extent of impact versus trying to measure or define level of impact. The main difference between the campground and campsite inventories was the scale at which they were conducted. The campground inventory surveyed plots at three metre intervals along transects that were 45 degrees apart (90° for the campsites), resulting in eight transects per campground (as compared to four transects per campsite). The justification for the three metre intervals was to both limit the amount of effort for future

monitoring and to extensively cover the campgrounds. In addition to those forest covers measured in the campsite inventory, the campground inventory included the canopy cover. The creation of campgrounds requires that areas be cleared, and the return of a fully established canopy is thought to generally mark the perimeter of the campground. Although the canopy is an important variable, natural variations make it a less reliable factor. When recording the amount of cover in the canopy a percentage value was given where 0% canopy cover meant that no canopy (100% sky could be seen) was observed and 100% cover indicated that the sky could not be seen through the canopy. To account for both the natural variation in canopy cover and the limited direct effect that campground use has on the canopy, only half of the value of the canopy cover was used. That is to say that when the canopy cover outside the campground was determined as having 50% cover, a value of 25% (½ of 50% cover = 25% cover) was recorded and used in the formula developed to identify the end point of a campground transect. Thus relying less on the canopy cover which is more difficult to quantify, and less reliable in determining areal extent of the canopy. As a result, the rule for the ending the transects marking the end of the campgrounds was different from that of the campsites.

The steps used for the campground inventory were:

1. Determined and placed a permanent marker at the centre of the campground. The centre of the campground point was the mid-point of the longest axis of the campground (see Figure 7.2). A permanent marker was placed at the centre point of each campground. The markers used were 25 cm nails sunken approximately 15cm below the surface. A metal detector will be used to locate the centre point for monitoring purposes.
2. From the centre point eight transects were laid at 45° from the centre point (which was split into two transects 180° apart).
3. Along each transect a 1m *x* 1m plot was placed at 3m intervals, until the rule for campground extent was met for three consecutive plots. A plot is also placed around the centre point of the campground.

4. Measurements focused on percent cover at four forest layers, adding the canopy layer (>3m) to those previously mentioned. Measurements focused half of the canopy cover (½ C), versus the complete cover at each of the following forest layers, the shrub (Sh), herbaceous (H), and moss (M) layers. In addition, the amount of mineral soils (Ms), leaf litter (ll) and dead fall (df) was recorded.

   The percentage of cover at each layer was determined by looking directly down on the layer, for those below eye-level, or directly up for those above. By focusing on each individual layer the researcher visually subdivided the plot to determine how much of the particular layer had vegetation, and how much did not. This technique has been commonly applied to vegetation studies (Chapman 1976, Pears 1977).

5. Campground sampling transects ended where ½ C+Sh+H+M+df-Ms ≧ 100% cover for three consecutive plots[9].

   When the transect crossed either the main trail to the campground, or a trail leading out of the campground, the transect ended. It was assumed that if the transect crossed either type of the above trails that the end of the campground was evident, even if the rule for ending transects was not met.

6. The results were recorded as presented below in Table 7.5.

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[9] The campground rule (½ C+Sh+H+M+df-Ms ≧100%) was the result of preliminary work completed in the area. Two campsites were surveyed (16 transects). Where obvious ends of use were present, the transect stopped. With all the data recorded, it was then analyzed to determine common features. The purpose of meeting the rule for three consecutive plots was to ensure that anomalies did not skew the results, and that the transect was ending at the end of the campground. The result was the simple formula described, which could be applied consistently throughout the Kingsmere area. A permanent marker was laced at the end of each transect to ensure that the future monitoring efforts retrace the same transect. This will ensure that the same plots are being monitored.

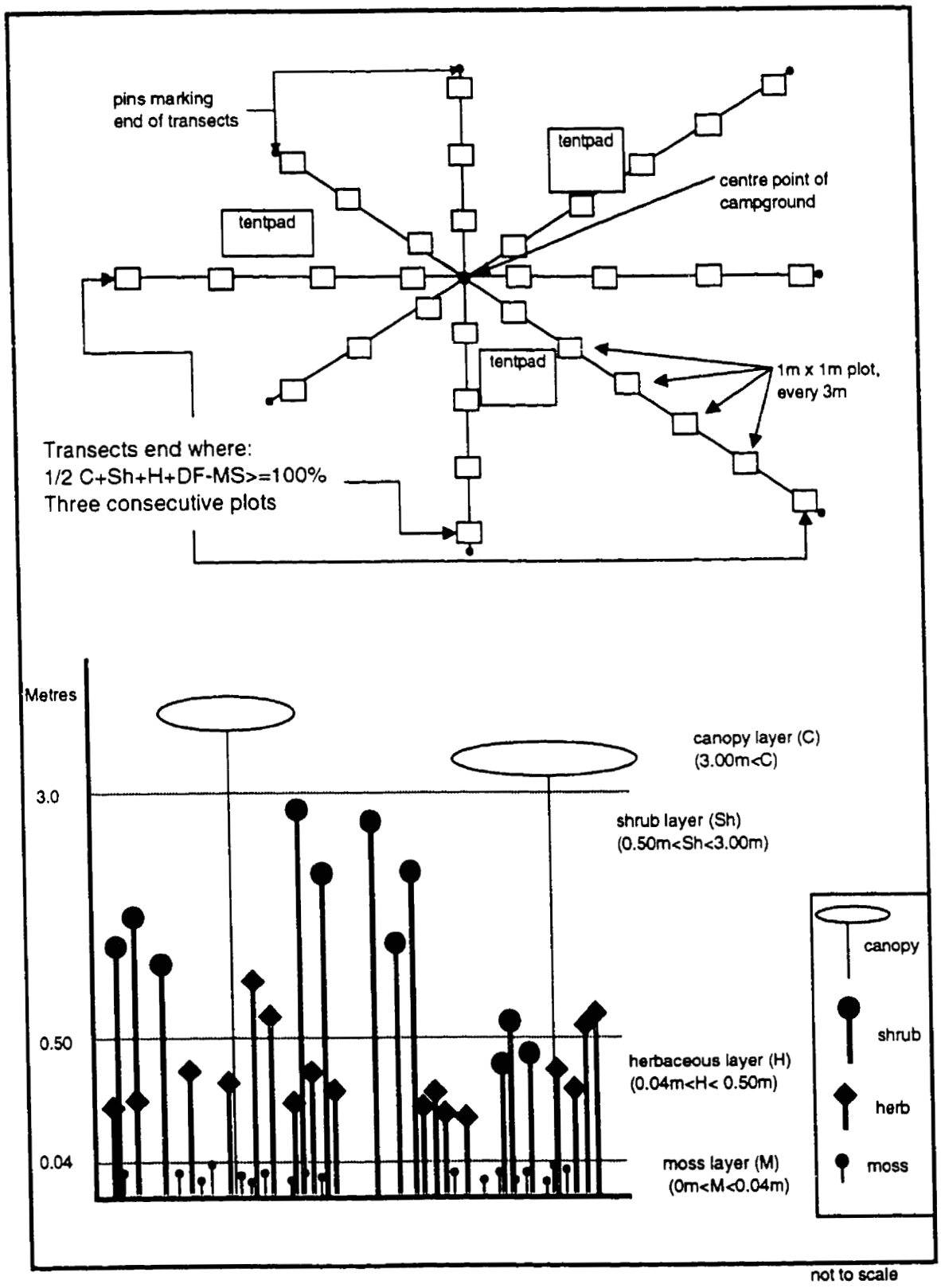

Figure 7.2 Schematic Representation of Campground Inventory

Table 7.5 Sample Results from Campground Inventory

Bladebone Campground

Transect F 245o

Distance (m)	**Canopy**	**Shrub**	**Herbaceous**					**Moss**	**MinSoil**	**litter**	**dead fall**	**Comments**
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	70	30	5	20	75	0	
6	0	20	20	40	0	60	0	10	20	60	0	crosses main trail
9	10	0	10	0	0	30	0	10	0	70	0	small spruce tree
12	20	10	20	0	0	10	70	80	0	20	0	fir tree leaning in
15	0	0	20	20	0	30	50	80	0	20	0	
18	0	40	20	0	0	70	30	30	0	30	0	40% plot tree stump
21	20	50	20	0	0	0	100	50	0	50	0	trail to campsites 3&4
24	40	0	20	30	0	10	60	90	0	10	10	
27	0	60	40	60	0	10	30	40	0	60	10	fir tree leaning in

The results presented in Table 7.5 are intended to illustrate how to consistently record the data collected during the monitoring efforts. A complete explanation of how the data will be analyzed is presented in Chapter 9.

7.2.4 Campground Inventory Results

The results of the campsite inventory are recorded in a format that PANP can use for future monitoring initiatives (Table 7.5). The data collected are the baseline data for the monitoring initiatives. The campground inventory results are presented in their entirety in Appendix D.

The results presented in Table 7.5 indicate that the amount of cover at the forest layers is not consistent. The methods used, which require cover at various forest layers eliminate the dependence on a single variable. Certain relationships are evident in Table 7.5. Moss cover is limited or absent where mineral soil is present. The variations between cover in the canopy, shrub and herbaceous layers confirm the variations within the area.

The data presented in Table 7.5 illustrates some of the common elements of all the campground inventories. The amount of mineral soil exposed in the campgrounds is primarily focused near the centre of the campgrounds, along trails and near campsites. This is not always the case depending on the chosen centre point, but as a general rule, the centre of the campgrounds have less vegetation cover, thus greater amounts of exposed mineral soil. Another common finding is that mineral soil and moss are very seldom found in the same plot in any significant proportions. When there is a great deal of mineral soil or moss, the other, if present at all, is generally a low value of cover. Sedges were used in the study, but very few plots had any amount of sedges, due to the specific conditions necessary for sedges to thrive.

7.2.5 Other Resource Inventories

The resource inventory focused on the facilities provided in the Kingsmere area. The facilities provided in the Kingsmere area were simply catalogued. The purpose was to determine the allocation of the facilities, to compare it with what the users felt was appropriate.

Trail conditions were not sampled due to the large amount of effort and limited information to be gained. The trails are regularly maintained by PANP. Therefore, sampling various conditions along the 20 km trail was determined ineffective. The

presence of litter in the area is predominantly around the campsites. An inventory of the litter was not completed because the campsites are regularly maintained by PANP. The results of the inventory of facilities are presented in Table 7.6.

The results presented in Table 7.6 are intended to be used simply as a list of facilities. The importance of the information is its comparison to what the users defined as acceptable. This information should be updated as facilities change. The information presented in Table 7.6 indicates that hibachis, bear caches and fire wood are standard facilities at each campground. Not all campgrounds have docks because some have beaches that are easily accessible for motorboats and canoes, while others are less conducive to landing.

Table 7.6 Facilities Inventory

Facility	**Location**									
	Southend	Westwind	ChipPort	Sandy	Northend	Bladebone	Pease	Bagwa	Lily	Other Location
picnic table	9	4	3	4	8	4	5	2	0	4 @ Day Use Parking Lot
hibachi	6	4	3	4	8	4	5	2	2	3 @ Day Use Parking Lot
bear cache	2	1	1	1	1	1	1	0	1	
cooking shelter	1	0	0	0	0	0	0	0	0	
fire wood	yes	yes	yes	yes	yes	yes	yes	yes	yes	Day Use Parking Lot
board walks	0	0	0	0	0	0	0	0	0	Along Trail approx. 8 sections
docks	0	0	1	1	1	0	1	0	0	2 @ Kingsmere River at each end of trolley, 1 @ entrance to Grey Owl Trail
boat launch	0	0	0	0	0	0	0	0	0	2 @ Kingsmere River at each end of trolley

7.3 Conclusion of Resource Inventory

The inventory of current conditions developed a systematic record of all quantifiable indicators and established the baseline conditions for both social and resource conditions in Kingsmere wilderness area. The baseline conditions will be used in comparison to the data collected during the future monitoring programme. There are some problems associated with using current conditions as the baseline, but as the area has been used for a number of years and an adequate data set is not available, current conditions must serve as the baseline. Any deviations from these conditions will be noticed during monitoring and subsequent management actions can be taken. Two PANP wardens tested the methods used. Their results were then compared with results collected earlier in the season. The range of difference between the three sets of results was 5%. This suggests that actual conditions were being measured, not differences in perspective due to the use of a qualitative technique to record vegetation cover.

The vegetation assemblage within the Kingsmere wilderness area varies a great deal. However, the methods developed and used accounted for the variations. For example, the relationship between exposed mineral soil and moss cover is clear: If there is significant exposed mineral soil, moss is absent, and conversely if there is abundant moss, mineral soil is scarce or absent.

Umplanned trails are those developed by users, which generally are direct paths to the lake or facility they want to approach. Observations made during the resource inventory indicate that when Kingsmere Lake is visible from a campsite, unplanned trails are often developed. Another example is when an outhouse is visible from a campsite, users often walk directly to the outhouse rather than following designated trails that may be less direct. The same is also true for visible bear caches. The users of the area do not necessarily stay on designated trails, if a shorted route is visible to whatever amenity they want to reach.

Day use of the Kingsmere area is primarily focused at Southend campground. Very few day users venture farther along the Grey Owl Trail. Based on observations made while in

the area, the day use area provided at the South end of the Kingsmere River, which is on the western shore of Waskesiu Lake, receives very little use.

CHAPTER 8 INDICATOR THRESHOLDS

Establishing threshold levels for the various indicators is the responsibility of PANP managers. Therefore, this section only provides guidance for the thresholds based on the information presented. The thresholds established must incorporate user input, without compromising the essential characteristics of the area. Each threshold should be set at realistic, practical, and manageable levels. The thresholds established are the critical points at which management actions are necessary.

Goals:

1) Establish manageable social and resource thresholds that will reflect a proactive approach to the management of the area.
2) Establish thresholds at a level that will be reached before the occurrence of irreversible change.

Process:

- Through management discussions, which should include the Warden Service, Visitor Services, and Maintenance, managers should agree upon the thresholds for each indicator. Managers should agree upon the necessary actions to mitigate the problem when the monitoring systems show that thresholds are being exceeded.

8.1 Threshold Considerations for the Five Kingsmere Values

The thresholds established must reflect user input and management consensus. The responsibility for the managers is to consider their various roles of protection of the natural environment, safety, and interpretation when establishing thresholds that when reached, will not impair the area.

Presented below are the five values identified for the area, and discussion points for each indicator. The purpose of this section is to provide the managers with a basis for discussion on the recommendations for specific thresholds.

8.1.1 Quiet and Solitude

The quiet and solitude experienced while travelling in the Kingsmere area is valued. From the initial access into the area to the most remote campsite, the ability to experience quiet and solitude is an essential component of the Kingsmere experience. As presented in Chapter 6, the only logical means to quantitatively describe quiet and solitude was to focus on the possible impediments to both, namely, group size, the number of people in the area and the various types of noise in the area.

Group Size

When the users of the area were asked about acceptable group sizes for the area, the responses ranged from two to twenty. The majority of users (70.7%) indicated that groups of six or fewer people was acceptable (Table 6.2). Limiting the size of groups entering the area may not be the best means to manage this issue. Managers should consider this and when registering groups out, and ensure that larger groups, more than six people, stay at campgrounds designed to accommodate them. During the shoulder seasons, when there are fewer people in the area, the issue of groups size may not apply.

Number of People

It may be virtually impossible to control or restrict the number of people that visit the Kingsmere area because many are day hikers (Appendix A). The users stated that an acceptable number of people to see, other than their own group, in the area per day are between zero and thirty people. The majority of users (69.7%) suggested that seeing fewer than twelve people was acceptable, with 12.3% suggesting that current levels of use was acceptable. The number of people seen in the area is primarily dependent on where the users travel in the area. If users focus their trips on the campgrounds that are known to accommodate more people, it is likely that more will be seen.

The area that sees the most use is Southend campground. The park currently promotes this area as a day hiking trail in its literature presented to the public, and also indirectly in its river restoration information which clearly shows the trail to Southend campground, while also managing it as a backcountry campground (Canadian Heritage, Parks Canada

unknown dates a, b). If the managers are concerned about the quality of the experience for the backcountry campers at Southend, efforts should be made to keep it a backcountry area, rather than promoting the trail as a day hike (Frith 1997).

Types of Noise

The users identified that loud groups and motors were the two noise sources that affected their experience. Loud groups are difficult to regulate other than through having the presence of a warden enforcing campground regulations. Motors, however, may be managed, although it will be difficult.

Approximately one-quarter (27.4%) of the users indicated that it was not acceptable to hear any motors in this area. Another one-sixth (16.7%) indicated that it was acceptable to hear one motor, the warden's. This suggests that almost half of the users who responded to the survey feel that there should be no motors in the area other than the warden's. Current zoning of the area, however, allows for motor access. This issue may not be solved unless the current zoning of the area is changed. When the amount of motorboat use throughout the summer was examined, the result was one point two motorboating groups per day. However, the use is not consistent, but rather a series of peaks and lulls. The amount of motorboat use may be dependent on the fishery in the area.

The zoning of the lake, the resource extractive fishery, the current level of access, and scheduling time of motoboat and non-motorboat use are possible areas to focus on to deal with the number of motors in the area. The park should also be sensitive as to when helicopters fly over the area. Their own activities can be more sensitive to the effects these activities have on the users of the area. Helicopter use in the area should be eliminated unless it is necessary for forest fires or public safety. Although it is often easier to use helicopters for transportation of supplies, the wilderness ethic promoted by the park should also apply to their own activities in the Kingsmere area.

8.1.2 Natural Landscape

The users of the Kingsmere wilderness area want to experience it with as few human induced changes as possible so as to appreciate the natural landscape.

Determining thresholds for the natural landscape value should be accomplished by considering what may impede the naturalness of the area. The users were asked questions pertaining to vegetation damage, campground conditions, structures, litter and trail conditions to determine how the users felt the natural landscape was being affected.

Vegetation Damage

The users generally felt that the amount of vegetation damage in the Kingsmere area was at an acceptable level (72.5% of respondents). Managers must, therefore, consider this level and realize that change will require action, as it may begin to affect the experience of the users. Current levels of damage were partially described through the resource inventory. The amount of cover at the various forest layers is described for each campground. The managers should focus on the data provided and decide if that level of damage is close to what they feel the threshold should be, and act to ensure that the level of vegetation damage does not change. Any damages to the vegetation beyond what has been deemed to be significant (20% or greater change in vegetation cover) when compared to the levels recorded in the resource inventory for each campground should spark management action, as current conditions were considered acceptable by the majority of users (87.5% of respondents).

Campground Conditions

The majority of users (87.5% of survey respondents) identified the campground conditions of the area as being acceptable or better than acceptable. There are campgrounds, however, that do show a great deal of use. Of the 12.5% of the users that identified the campgrounds that they visited as being less that acceptable, Southend (77.8%), Sandy Beach (11.1%) and Northend (11.1%) were the campgrounds mentioned. The problems identified for Southend is the high volume of people and the obvious overuse of the area. Northend Campground also shows a great deal of use, there is a lot

of exposed mineral soil. Sandy Beach possibly shows a great deal of use because Grey Owl's Trail passes each campsite within three metres and many hikers choose this campground to rest during their hike.

As a part of the resource inventory, the old Pease Point campground was surveyed (results presented in Appendix D). Park managers should look at the results of that inventory and compare the conditions there with the conditions at campgrounds currently being used. The old Pease Point campground is one of the oldest on Kingsmere Lake. This campground was often full every weekend during the summer, according to many repeat visitors to the area. The high volume of traffic around this campground has seriously impacted the vegetation. Although the campground has not been used for approximately five years, the area is sparsely vegetated by any species other than old trees. Very few shrubs, herbs or mosses are present near the main old Pease Point campground. The conditions at the old Pease Point campground may provide insight into what other campgrounds in the area may appear like in the future if repeated high volumes of use are continued. The old Pease Point campground may also prove to be a good place to test potential revegtation and reclamation efforts. Some of the other campground areas may also be suitable for revegetation and reclamation efforts. The managers should act on this issue immediately, as the level of damage at the campgrounds will continue to increase and possibly limit the success of the revegtation.

Structures

The users indicated that the structures currently in the Kingsmere area have little effect on the users experience. Only 28.3% of the respondents identified that the structures affected their appreciation of the naturalness of the area. Of those who responded, 26.5% indicated that the dam on the Kingsmere River was most intrusive, followed by the cooking shelter at Southend (20.5%). Although response rates to this question are relatively low, the two structures identified are undoubtedly unique for wilderness areas.

Litter

The Kingsmere users frequently saw litter (58.3%). Many suggested that it was negative to see the litter (63%). Others felt that the amount had no real affect on their experience

(37%). The litter problem can be solved through two means: First, through better education to the users about the affect that litter has on the area and the experience of others in the area. The park should continue to make the removal of litter from the area for each user as easy as possible. Second, but less plausible action, would be to increase the maintenance of the area. It would be impossible for the trail crews to keep the area litter free. Therefore, the focus should be put on the users.

Trail Conditions

The users generally like the trails, very few respondents (13 of 120) identified negative characteristics of the trails. The current level of maintenance along the trail is suitable.

8.1.3 Range of Opportunities

Current management of the area tries to minimize the effects of the various user groups on each individual experience, while ensuring a wide range of opportunities. The primary activities in the Kingsmere wilderness area are canoeing, hiking and motorboating. Through focusing on these activities and the effect they have on user experiences thresholds for the activities could be set but presently there appears to be no demand to do so.

Range of Activities

The users of the Kingsmere area do not seem to be affected by the range of activities occurring in the area. Only 18.3 % of the users suggested that the activities of others were inappropriate. Of that small percentage, 40.9% identified motorboating as the activity most seriously affecting their experience. The issue of motorboats has already been presented (Chapter 6, Tables 6.3, 6.4 and 6.5). Therefore, further discussion is not necessary.

8.1.4 Access

Access to the Kingsmere area allows a wide range of visitors with varying skills and experiences the opportunity to experience the Kingsmere area. Ensuring access for a variety of user types and groups, while not detracting from the character of the area is essential.

Access to the Kingsmere area is currently determined by the ability of canoers and motorboaters to load their boat onto a trolley, rather than having to carry or portage their boats. The provision of the trolley, for the majority of users, adds to their experience in the area.

Level of Difficulty

Most users accessing the Kingsmere area with boats or canoes feel that the current level of access required is appropriate (87.2%). Any changes, therefore, should try to mimic the current level of effort. User responses were presented in Table 6.5 relating to the level of difficulty. From the table, it is evident that 60.8% of the respondents do not want the access to Kingsmere to be any easier. Only 9.8% said that if it were harder than current levels it would be too difficult for them to access the area. Other users (15.2%) feel that the current level of access and effort required is appropriate. The remaining users opinions were divided between the issue of portaging a canoe into the area as being appropriate (7.6%), and if access was too difficult for motorboats, it would be a good level of difficulty (6.5%).

Time Required

The new access provisions to Kingsmere Lake should also focus on the amount of time required to access the area. The majority of users (75.1%) feel that a waiting time of less than thirty minutes (average of two groups) would be appropriate. That would require a return trip with the trolley being fifteen minutes, approximately the same amount of time as current conditions allow. During route and mechanism design, Park managers should consider what the users feel are acceptable time limitations to access the area.

8.1.5 Facilities and Level of Service

The facilities and level of service provided in the Kingsmere area has a direct effect on the user experience. The provisions at various locations within the area should reflect the general character of the area in which they are provided.

The Kingsmere users are generally very satisfied with the facilities and level of service within the area. The facility that is the most negatively accepted is the cooking shelter at

Southend. Almost one third of the users (30.4%) feel that this convenience is not appropriate for the area. Docks and boardwalks were the other facilities least accepted by the users, 10.5% and 13.0% respectively.

The dam on the Kingsmere River was mentioned by 7.5% of the users surveyed as detracting from the naturalness of the Kingsmere area. Because efforts are being taken by PANP to remove the dam from the river, its intrusion into the natural landscape will be alleviated.

8.2 Threshold Responsibilities

In consideration of the threshold responsibilities, two important principles should guide the discussion that arises from this section: according to Parks Canada Policy, the managers have a responsibility to ensure the natural functioning of the Kingsmere ecosystem, while providing the users with the opportunity to experience and enjoy the area (Canadian Heritage, Parks Canada 1994).

Undoubtedly, there will be points of disagreements for many of the thresholds. The managers must consider three key principles from PANP's definition of wilderness that states wilderness areas are "natural areas of sufficient size to protect pristine ecosystems that may serve human physical and spiritual well-being. It is an area where little or no persistent evidence of human intrusion occurs so that ecosystems may continue to evolve, and where the primary considerations are the intrinsic rights of ecosystems to exist and persist in an undiminished state..." (Canadian Heritage, Parks Canada 1995). The three principles that the managers should continually refer to when establishing thresholds for the various resource and social indicators are:

1. wilderness areas should serve physical and spiritual well-being;
2. in wilderness areas, little or no persistent evidence of human intrusion occurs so that ecosystems continue to evolve;
3. in wilderness areas, the primary considerations are the intrinsic rights of ecosystems to exist in an undiminished state (Canadian Heritage, Parks Canada 1995).

CHAPTER 9 MONITORING PROGRAMME

The final step in the development of a programme to monitor wilderness quality is to monitor the wilderness area to ensure that any human induced changes are detected before conditions reach a level that is unacceptable. With the entire wilderness experience in mind, efforts must be placed on monitoring both the social and resource indicators. Throughout this project, emphasis has been placed on integrating user opinions with management directions and opinions. Efforts have also been made to link sections within the Parks Canada organization, namely the Warden Service and Visitor Services. The Warden Service is responsible for ecosystem protection and public safety, with Visitor Services focusing primarily on park experiences. Both Visitor Services and the Warden Service, therefore, must participate in the monitoring strategy.

Goal:

Detect human induced changes in study area.

Process:

- Follow methodologies described for resource inventory.
- Complete survey form presented for monitoring social indicators.

The limited resources available within Parks Canada require that the monitoring initiative be efficient and effective. The techniques used for the describing resource conditions applied these two principles. Scheduling the monitoring efforts, therefore, is the only available way to limit expenditures.

9.1 Monitoring Resource Indicators

The Warden Service will be responsible for monitoring the resource indicators and conditions. The goal of monitoring the resource indicators is to detect human-induced changes in resource conditions in a timely manner. The steps necessary to monitor the conditions of the campsites and campgrounds are presented in detail in Chapter 7. In this

section, a description of the scheduling and justification of the monitoring programme is presented. A schedule for approximately the next decade is outlined.

Year 1 (1999)

The first monitoring year should focus on the techniques of data collection and verifying the baseline data. It is suspected that very few changes will have occurred in such a short time interval. However, it is important that PANP begin to schedule monitoring initiatives early and incorporate them into the season's planning. If the park delays the application of the monitoring programme, it will become more difficult to implement as time passes.

1. **Sample 18 random campsites, two from each campground.**

   The campsites are likely to reveal changes more quickly than campgrounds. By sampling two campsites at each campground a familiarity with the monitoring process will be gained and enhance the data set. Changes at the campsites will be detected and the park may be able to act to mitigate the problems.

The efforts necessary for sampling four transects at two campsites per campground should take the warden responsible approximately three field days. The data collected should be compared to the original data, as provided in Appendix D. The comparisons necessary to detect change should focus on:

- The length of the transects, as compared to the baseline data.
- The proportion of cover at each of the vegetation layers.
- The changes in amount of mineral soil present around the campsite.

Year 2 (2000)

The focus of the second monitoring year should be on the extent of impact at the campgrounds, and as a means to verify the baseline data.

At a point early in the monitoring strategy it may not be necessary to do complete transects, but rather focus on the last portion of the transects. From the permanent marker at the centre of the campground, transects should be laid along the declinations

mentioned, to the marker at the end of the transect (to be found using a metal detector). The warden responsible for the sampling may wish to recreate the final six plots rather than the entire transects.

The monitoring efforts for Year 2 should take the warden responsible not more than two field days. The associated costs with the monitoring will be minimal, due to the limited number of tools necessary. The warden will need a 1m x 1m plot, a metal detector, a logging chain, and a clipboard with appropriate datasheets (included in Appendix D). The park has all of the necessary tools to complete the monitoring programme without incurring new expenses.

1. **Sample least-impacted campground (Lily Lake Campground).**

   The reason for sampling the least impacted campground is that this area will most easily reflect change. If this area reveals a great deal of change, others may also be experiencing change. The Lily campground is the newest campground, and has a limited amount of use, therefore, it is an ideal location to track changes in resource conditions. This campground has very few unplanned trails, the campsites are well separated, and the tent pads are clearly marked. These three attributes will make detecting changes relatively easy.

   Previous campground studies have determined that the level of impact at campgrounds does level out when it reaches a particular point (Cole 1992, Cole 1995). Through tracking the changes at the Lily campground, PANP will gain valuable information about level of impact over time for wilderness campsites in the Kingsmere area.

2. **Sample a campground with an average amount of use (Sandy Beach Campground).**

   The amount of use at the campgrounds varies widely. Selecting the campground that has use by all three user groups (canoers, hikers and motorboaters) and an average amount of use will give the park a preliminary idea of how the level of use at the campground affect the resource conditions. If significant changes are detected at a

campground with average levels of use, other campgrounds should be sampled. Significant changes should be determined by the park, however, some important guideline should be considered.

- Significant changes in vegetation cover at any level (canopy, shrub, herbaceous, and moss) could be described as a change of 20% (as presented in Section 7.2.2). This amount of change would account for natural variations, and seasonal fluctuations. Park managers must realize that an important part of the monitoring process is to re-evaluate the thresholds. As the user population, data collected and new knowledge is gained relating to each indicator, the thresholds established through this study might need to be changed. If the thresholds are set inappropriately, the changes that initiate management actions may not be adequately responding to the change in condition, and, therefore, ineffective. Managers must be careful that thresholds that may be set are realistic and able to be reached without causing irreparable damage to the vegetation.
- Increases in mineral soil at the campground would mean a loss of vegetation. The increased amount of mineral soil would mean that the users are not remaining focused at the campsite.

Year 3 (2002)

The Warden responsible for the monitoring should plan to spend approximately nine days at the campsites monitoring the conditions. Similar techniques, to those used during the initial season will be followed, with the exception that all campsites should be monitored.

1. **Monitoring all campsites**

   Efforts should be placed on recreating the baseline data. The techniques described in Chapter 7 for campsite inventories should be applied.

- Significant changes in campsite conditions, 20% or greater change in vegetation cover, should initiate management actions.

Year 4 (2003)

With six years passed since the initial baseline data collection for campgrounds, the monitoring efforts should try to recreate the data set. All transects at each campground should be monitored, according to the techniques outlined in Chapter 7.

The warden responsible for the monitoring should plan to spend ten days, one at each campground, collecting the necessary data.

1. **Sample all Campgrounds**

   The warden responsible should recreate the techniques used during the collection of baseline data, following the methods described in Chapter 7. Starting from the centre point of the campground and running each transect to its end point. If time is limited, efforts may be on the last six plots along the transect, as these will indicate change in areal extent of the campground more so than those in the centre of the campground. The centre points are generally in areas that have already been significantly impacted by human use.

- Significant changes will again be described as changes in vegetation cover, or presence of mineral soil, a change of 20% or greater in any of the measurements constitutes a significant change. Although this value is arbitrary, it does reflect a detectable level of change.
- Identification of the least and most impacted campgrounds should be outlined as those which exhibit:
  - The least amount of mineral soil, thus highest levels of vegetation cover.
  - The shortest transects, other than those that end because they cross a trail.

Year 5 (2005)

Similar to those techniques applied during the first year of monitoring, 1999, two campsites at each campground should be monitored, not the two previously surveyed. Those campgrounds which only have two campsites, Bagwa, Lily and Chipewyan Portage, should be surveyed.

1. **Sample 18 random campsites, two from each campground.**

   The efforts necessary for sampling four transects at two campsites per campground should take the warden responsible approximately three field days. The data collected should be compared to the original data, as provided in Appendix D, and the data collected in Year 3 (2002) of the monitoring efforts. The comparisons necessary to detect change should again focus on:

- The length of the transects, as compared to the baseline data.
- The proportion of cover at each of the vegetation layers.
- The changes in amount of mineral soil present around the campsite.

Year 6 (2006)

Monitoring efforts should be placed on the two campgrounds. One that showed the least amount of impact from the baseline conditions (Lily Lake Campground), and the second the one with an average amount of use, based on user nights from the previous season.

The monitoring efforts should take the warden responsible approximately two days.

1. **Least Impacted Campground**

   Lily Lake campground should be used to track changes in campground conditions. A repeat of the methods used during the second year of monitoring (2000) should be applied.

2. **Campground with Average Use**

   Average use should be determined through describing user nights at the campground. The monitoring efforts should try to recreate the baseline data, placing each transect as they were in 1997.

Year 7 (2008)

1. **All Campsites**

Efforts should be placed on recreating the baseline data. The techniques described in Chapter 7 for campsite inventories should be applied.

- Significant changes in campsite conditions, with the same general rules for significant change, should be recorded and should initiate management actions.

Year 8 (2009)

1. All Campgrounds

The warden responsible should recreate the techniques for conducting the campground inventory used during the collection of baseline data, following the methods described in Chapter 7, and it should take approximately ten days. Starting from the centre point of the campground and running each transect to its endpoint. If time is limited, efforts may be on the last six plots along the transect, as these will indicate campground growth more so than those in the centre of the campground. The centre points are generally in areas which have already been significantly impacted by human use.

- A change of 20% or greater in the collective measurement of vegetation cover or extent of mineral soil constitutes a significant change. Factors causing this change should be searched out, and management actions to alleviate these factors should be initiated if this is practical and realistic.
- Identification of the least and most impacted campgrounds should be outlined as those which exhibit:
    - The least amount of mineral soil, thus highest level of vegetation cover.
    - The shortest transects, other than those that end because they cross a trail.

The monitoring efforts should be repeated as described above. The process should adapt to changes within the area. If new campsites, or campgrounds are developed, or if existing ones are closed, the monitoring efforts should particularly focus on those areas. New areas would be useful in tracking changes in extent of impact, and closed areas would be useful to understand revegetation of the area.

9.2 Monitoring Social Conditions

As Visitor Services are primarily responsible for the experiences of the visitors in PANP, they are responsible to monitor the social conditions experienced by the Kingsmere users. Their efforts will be continual throughout each year.

The goal of monitoring the social indicators is to detect changes in use of the Kingsmere wilderness area and to identify changes in the quality of experience that the users of the area are having.

Year 1 (1999) and Each Subsequent Year

The first year of monitoring the social conditions of the Kingsmere wilderness area should primarily focus on developing a routine of data collection and establishing the most efficient methods to do so. The sooner Visitor Services begins to develop their own calendar of use and administrative schedule for the user survey, the more efficient the monitoring will become as time passes and more data becomes available.

a) Create a calendar of use based on date, user activity (mode of travel), group size, number of visitors and campground (this should be an annual task, simplified if completed daily). Only basic analysis is required to gain valuable information.

The primary purpose for creating a calendar of use for the Kingsmere wilderness area is to identify patterns of use over time. The number of visitors, the size of groups, their activities (modes of travel), peak times of use during the season and where users stay are all important information that could be drawn from the calendar. Such detailed information will help in providing users information on what they may expect as they travel in the area.

The only analysis necessary on the calendar of use is simple comparative statistics. By comparing annually how the amount of use, such as the number of users, size of groups and primary modes of travel, Visitor Services can identify how certain of the social indicators identified are changing over time in the Kingsmere area.

b) Administer user survey to random users groups, with a proportional representation of canoers, hikers and motorboaters. Surveys should be administered to groups

registering out of the Kingsmere wilderness area. An approximate total of 100 surveys should be administered each season. A sample of a user survey is presented in Appendix E. If it were too difficult to administer the survey annually, Visitor Services may choose to administer it every second or third year to a slightly larger sample population.

Analysis of the surveys should focus on frequencies only, as this simple form of analysis will give a detailed account of user experiences in the area. The information collected through this user survey administered by Visitor Services should be compared with the data presented throughout this document, primarily section 7.1.2 and Chapter 8, where thresholds for each social indicator are suggested. If changes in quality of experience are identified, management actions should be taken.

The social indicator monitoring efforts described above should adapt to changes in user groups. The information provided is based on users that visited the area during the summers of 1996 and 1997. As the user population changes, some changes in what is considered acceptable may also change. That is not to say that the fundamental values for the area will change just that some of the tolerance levels may change and the thresholds suggested may also change. The social thresholds, perhaps more than the resource thresholds, are likely to change over time. The Visitor Services managers must be aware of this and adapt their management techniques accordingly.

CHAPTER 10 DISCUSSION AND RECOMMENDATIONS

This final chapter of the report is intended to provide a brief summary of the issues that require management attention and the management recommendations that have arisen as a result of this two year study.

10.1 Discussion

The main conclusion that can be made as a result of this research is that each user of the Kingsmere wilderness area values their experience. No matter what their mode of travel or purpose for their visit, each user approaches the Kingsmere area with high experiential expectations, the majority of which is being met.

The pending changes in access to Kingsmere Lake, as a result of the restoration of the Kingsmere River, will change the experience for all users entering the area with boats and canoes, approximately 77% of the users surveyed during 1997. Change is always difficult, particularly when people do not understand the need for it. Many users feel that the current trolley system for accessing Kingsmere Lake is adequate, and may not clearly understand the reason for having to change it. Although the users were not directly asked about their views on the restoration of the Kingsmere River through this research, anecdotal information obtained while speaking with the users of the area suggests that the users do not clearly understand the need for the restoration efforts. Those users that have been visiting the area for a number of years feel that efforts to restore the river to its natural state will disturb the state of the river as it currently exists and has for approximately 50 years. Change in access is the most likely management action to change user experiences in the Kingsmere area.

The vision statement created by the Kingsmere Working Group identified that they wanted the area to be managed as an accessible wilderness. Accessible, according to the statement, means that family groups can access the area, although effort will be required. The current level of access will be very difficult to recreate. However, when asked, the users indicated that more effort would be better than less effort. If the park does make

access to Kingsmere Lake slightly more difficult, most users will find this acceptable (Table 6.5, 67.3%). Very few users surveyed indicated that less effort would be appropriate (Table 6.5, 9.8%). Although the managers of the area have made decisions to recreate current levels of effort to access Kingsmere Lake, users who responded to the 1997 survey have indicated that marginal increases in effort would be acceptable.

The issue most often raised by the users of the area was the allowance of motors in the Kingsmere area. The issue of motor access, more than any other, was described as needing management attention. The proactive approach that the managers of the area have taken regarding the restoration of the Kingsmere River could be applied to the issue of motorized travel in the area. Through the restoration project, the managers are attempting to restore the river that has been subjected to years of damming that has impaired the natural functioning of the River. It may be time to proactively approach the allowance of motorized travel, as it, more than any other quantifiable indicator, affects user experiences.

Current zoning of Kingsmere Lake as a Zone III – Natural Area allows for motorized travel. The issue of motorized access defines the split between user opinions about acceptable activities in the Kingsmere area. Some users view the allowance of motors as contradictory to what the area should be. The differences between user views appear to be based on a philosophical level more than a practical level. There is little doubt that some users feel infringed upon as a motorboat passes their canoe, or as they are hiking along the trail. The relatively low number of motorboats, however, may indicate that many of the users may not have been directly affected, but see the potential impact that motorboats may have on their experiences. If the park remains committed to the recommendations of the Kingsmere Working Group, the allowance of motors in the area will not change. The results of this research indicated that 34.2% of the users surveyed found the noise from motors the most serious issue affecting their experiences in the Kingsmere wilderness area.

Another component of the accessibility of the Kingsmere area is that it is to provide safe experiences. Safety is an issue that is difficult to quantify. The park provides a warden

who is dedicated to the area, however, this does not necessarily make the area safe. Many users of the area are not prepared to travel on a lake the size of Kingsmere. The dominant westerly winds cause the lake to stir up very quickly causing canoeists to be stranded along the shoreline to wait out a storm. By making the area relatively easy to access, the park may be increasing the likelihood for canoeists to experience trouble. The warden, although essential to the area, is unable to completely cover the entire lake. The idea that the park can provide for safe experiences in the Kingsmere area is misguided and the users of the area should be made aware of these limitations when they sign out for the area.

10.2 Strengths and Weakness of the Study Approach

The approach used throughout this study naturally exhibited a number of strengths and weaknesses. Through presenting both strengths and weaknesses, future work in the area of monitoring wilderness quality may benefit. The main weaknesses of the approach used in the development of the programme to monitor wilderness quality are:

- This study placed a great deal of emphasis on the integration of both public opinion and managerial consensus. When the users describe what they feel are acceptable conditions for their experiences may not reflect guiding standards outlined for the managers of the area. In cases such as that, managers must be proactive in their approach and take their responsibilities as managers seriously to ensure that conditions are not jeopardized in order to meet public standards.
- Ideally, this approach allows users to determine what they feel are acceptable conditions for each of the indicators identified, but this was not necessarily the case. The users were unable to identify quantifiable thresholds for some indicators, particularly resource indicators such as vegetation damage. In cases such as that, it was necessary to look to different sources to define threshold levels, such as relevant literature and managerial opinions.
- The qualitative approach used to describe vegetation cover in each of the plots for the resource inventory, although a credible vegetation analysis technique has been

critiqued by several scientific sources (Dickinson 1992, Chapman 1976, Pears 1977, Stohlgren et al 1995, and Stokes and Yeaton 1994). Repeatability of measurements, however, does not seem to be a problem. The methods used were tested and results recorded were compared between two wardens and those collected by the author. The level of error was 5% or less.

The strengths of the approach used were:

- Throughout this study, user and manager perspectives have been integrated with policy guidelines to develop specific management objectives for the Kingsmere wilderness area.
- Wilderness management has been the sole responsibility of the managers without public involvement. This research allowed users to express opinions about what they like to experience and what they determine as acceptable wilderness conditions.
- Wilderness, according to the Parks Canada definition, links the natural environment with the human spirit, therefore, wilderness management must respect both the human and environmental conditions. To manage in this manner, it was essential to link the resources of both the Warden Service, which is primarily responsible for public safety and resource protection, and Visitor Services, which is primarily responsible for visitor experiences. Through this research, both management divisions, Warden and Visitor Services, have been continually involved to ensure that the management of the Kingsmere wilderness area includes both the resource and social conditions.
- The LAC process, which was developed for wilderness areas within the jurisdiction of the US Department of Agriculture, has been modified and applied in context that suits the policy and management directions of Parks Canada. The approach developed through this research could easily be applied elsewhere in the system of Canadian national parks.
- The monitoring programme developed through this research is capable of detecting change in resource and social conditions that will ensure that high quality user

experiences are maintained. The monitoring programme is inexpensive and designed to be applied by park staff with limited expertise with these methods.

- A clear definition of what is valued about experiences in the Kingsmere wilderness area was developed with an accompanying set of recommendations to ensure that the area is managed to meet policy and user expectations for high quality experiences and continued protection of valued resources in the Kingsmere accessible wilderness.
- The extensive user consultation process undertaken through this study in addition to management discussions led to the development of management objectives that reflect important values for both above mentioned groups. The results of this study identified management objectives that, if implemented, will ensure that high quality experiences in the Kingsmere wilderness area will be maintained.

10.3 Recommendations

The recommendations presented are the result of an in-depth knowledge of the Kingsmere wilderness area, its users and the policies that direct the management of the area. The recommendations presented are based on this two-year study which utilized extensive public and managerial consultation. There is no hierarchical order to the recommendations that are presented. The recommendations made represent both public and managerial opinions:

- Implement the monitoring programme presented which is capable of detecting changes in the resource and social conditions in the Kingsmere wilderness area. Implementing this programme will ensure that the users of the Kingsmere area continue to have enjoyable experiences.
- Install better trail head signs in the Kingsmere wilderness area. Users, particularly those in the area for the first time, mentioned the difficulty of knowing where the trails lead and what to expect along the trail.

- In association with the trail head sign, the park should place more emphasis for each user to pack all litter out with them, even if it is not their own. The provision of garbage bags is a simple and effective means to aid in the removal of litter.
- Install trail counters that would effectively count the number of people using the Kingsmere area, particularly on the trail to Southend campground. This area sees tremendous use compared to other campgrounds on Kingsmere Lake. By promoting this area as a day hiking alternative, the experiences of over-night users are being affected. Spreading out the day use in this area of the park may be the solution. More efforts could be placed on promoting the trail to the South end of the Kingsmere River where the West End day use area on Waskesiu Lake is located.
- Re-evaluate the presence of the cooking shelter at Southend campground. Determine if this facility is an essential wilderness provision for the users. The cooking shelter is seriously vandalized with graffiti and is a major focal point of the campground. The shelter is very convenient when the weather is poor, however, the park must determine if they want to provide experience of convenience or wilderness type experiences. There is a safety consideration to the cooking shelter, however, its presence does infringe upon the experiences of some users.
- Many users complained about the outhouses in the area, however, users that visited Bagwa campground often mentioned the unique and scentless composting outhouse. The park should try to install other composting outhouses, where appropriate. The environmental message associated with the composting toilet is a positive one for the users of the area. The park should take a leadership role that may encourage others to think about how they manage waste.
- The park needs to better promote the dangers associated with travel on Kingsmere Lake. Many users are unprepared for the conditions on Kingsmere Lake, and the speed at which the weather can change. The park has in its vision statement for the area decided that the Kingsmere area should offer safe experiences for the users. However, the provision of a single warden does not make the area safe. The park needs to inform the users about wilderness travel, particularly by watercraft.

Kingsmere Lake is relatively large, with the predominant winds from the west. With most of the campgrounds along the eastern shoreline of the Lake. This results in many paddlers and boaters travelling along that shore and having to cope with large waves. The information presented to the users should inform them that it is safer to travel along the western shore, in the lee of the wind, and that it is always safer to travel close to shore rather than directly across the lake, even on calm days.

- When determining future access to Kingsmere Lake, the park should not make it any easier. The users generally feel that a greater amount of effort would be better than less. Most users enjoy their experiences and feel that the current level of access adds to their wilderness type experiences because of the necessary effort required. Some users commented that if it becomes too easy, that they would have to share the area with more people, detracting from their own experience. If access becomes easier, some users feel that more people would use the area and that would not be acceptable to many of the current users. The level of access directly affects two components of the experiences: firstly, it is difficult and many users appreciate the area because of the effort required to get there, and secondly, the level of effort does limit the number of people that are in the area at any one time. Changes in level of effort to access the Kingsmere area will change the experiences of the users.

- The Kingsmere area has a great deal to offer, and many groups take advantage of the natural setting for school trips and other purposes. The park has realized that large groups use the area and have developed two group campgrounds, Westwind and Northend Group Area. The users of the area feel that groups larger than six people is unacceptable. Rather than turning these groups away, the park should ensure that they stay only at group sites, unless there are very few other groups in the area.

- The park should look at the message being presented to the users of the Kingsmere area through the permitting of sportfishing on the lake. Users cannot rationalize why they are allowed to fish, yet picking berries is an offense under the National Parks Act (1988). Although the number of users that mentioned this was limited, the park is trying to promote ecological awareness and performing in environmentally

sustainable ways, yet has very limited information on the affects of the fishery on the Kingsmere Lake ecosystem.

- The park should set quotas on the number of motorboats on Kingsmere Lake at all times. One means could be through allowing only a particular number of motorboaters to have access each day. Requiring day users, travelling by motorboats, to register would be a good preliminary step to accurately determine how much motorboat use there is. The park could also schedule weekends that would allow motorboats, and others that would not. The dates of these weekends could be published in advance so that users wishing to use motorboats could do so, and others could avoid travelling in the area on those weekends. Another possible management action would be to close the area to motorboats between mid-August to the end of September, as the fishery has slowed by that time due to warmer water temperatures.
- Some campsites in the Kingsmere area are showing adverse signs of extensive use. These campsites should be closed and revegetated. Prior to that, however, the old Pease Point campground could be used as a test area for revegetation techniques. The campsites that are closed could rotate from season to season, so as not to impact the others too severely.
- The park should only travel in the Kingsmere area with helicopters when users are not in the area or when it is an issue of public safety. The presence of a helicopter, and the time of day that it travels in the area, should be sensitive to the users of the area.
- The park should act quickly when any indicators reach their defined thresholds. Commitment to the monitoring programme is critical to ensure that the park knows when the thresholds are being approached or exceeded. If, through the monitoring programme it is determined that thresholds are being approached, managers should begin to identify what is causing the condition to change, and possibly change management practices prior to the threshold being met. It may not be feasible to change management actions prior to the threshold being met, however, it is critical that once any threshold is reached, that appropriate management actions are taken.

- As a part of the adaptive management that is required for the future management of the Kingsmere wilderness area is the need to re-evaluate the thresholds established as a result of the study.
- It is the responsibility of the managers to decide what specific threshold will be implemented for each selected indicator. The managers of the area should form a consensus on these thresholds in a timely manner, as certain indicators may be near the desired threshold at the present time. Managers should observe first hand the campgrounds and general area before deciding on specific thresholds.

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APPENDIX A: 1996 KINGSMERE USER SURVEY

The user survey administered during 1996 was presented as follows. All responses are also presented in the tables following the questionnaire.

My name is Wayne Tucker, and I am administering a user survey to the users of the Kingsmere area, as a component of the research for a Master's Thesis at the University of Calgary, Faculty of Environmental Design. This research will ensure the confidentiality of the respondents, and has been approved and supported by both the Faculty of Environmental Design and Parks Canada. This survey will take less than three minutes to complete and if at any time you would like to quite, you are free to do so. The information obtained will be used to make recommendations to Prince Albert National Parks management regarding the future of the Kingsmere area.

1. In which activity are you participating in the Kingsmere Lake area? _____
2. What is the size of the group you are with? _____
3. How often do you visit this area?
   once a year _____ twice a year _____ other _____
4. How often do you participate in this activity in other areas?
   once a year _____ twice a year _____ other _____
5. How long was your visit to the Kingsmere Lake wilderness? _____
6. Why did you choose the Kingsmere Lake area over other areas in Prince Albert National Park for this activity? _____
7. What did you like about your experience in this area?
   _____
8. What did you dislike about your experience in this area?
   _____
9. Overall how would you rate your experience?

very poor	poor	average	good	very good
1	2	3	4	5

10. How could your experience in this area have been improved?
    _____
    _____.

Table 1: Activities in Kingsmere Wilderness Area

Activity	Frequency	%
Day hiking	**76**	**42.9**
Canoeing	**52**	**29.4**
Backpacking	**21**	**11.9**
Motor boating	**11**	**6.2**
Fishing	**11**	**6.2**
Water taxi	**4**	**2.3**
Mountain biking	**2**	**1.1**
Total	**177**	**100%**

Table 2: Group Sizes in Kingsmere Wilderness Area

Group Size	Frequency	%
1	**3**	**1.7**
2	**74**	**41.8**
3	**23**	**13.0**
4	**34**	**19.2**
5	**25**	**14.1**
6	**10**	**5.6**
7	**3**	**1.7**
9	**2**	**1.1**
10	**2**	**1.1**
12	**1**	**0.6**
Total	**177**	**100%**

Table 3: Reason for Visiting Kingsmere Wilderness Area

Reason	Frequency	%
Previous experience	**83**	**32.8**
Accessible	**42**	**16.6**
Grey Owl	**40**	**15.8**
New area	**26**	**10.3**
Length of trail	**24**	**9.5**
See dam	**14**	**5.5**
Recommended	**13**	**5.1**
Fishing	**11**	**4.3**
Total	**253**	**100%**

Table 4: Frequency in Kingsmere Wilderness Area

# visits/year	Frequency	%
1	**71**	**40.1**
2	**21**	**11.9**
3	**12**	**6.8**
4	**5**	**2.8**
5	**1**	**0.6**
6	**2**	**1.1**
7	**1**	**0.6**
20	**1**	**0.6**
99*	**63**	**35.6**
Total	**177**	**100**

99* indicates first time in the study area

Table 5: Similar Activities in Other Areas

# times participate/year	# of responses	% of sample
0*	**10**	**5.6**
1	**52**	**29.4**
2	**26**	**14.7**
3	**21**	**11.9**
4	**7**	**4.0**
5	**3**	**1.7**
6	**12**	**6.8**
7	**2**	**1.1**
8	**3**	**1.7**
10	**11**	**6.2**
12	**5**	**2.8**
14	**1**	**0.6**
15	**5**	**2.8**
20	**3**	**1.7**
30	**2**	**1.1**
36	**1**	**0.6**
99*	**13**	**7.3**
Total	**177**	**100%**

0* Indicates the respondent only participates in the activity in the study area.

99* Indicates that this was the first time the respondent participated in the activity in the study area or elsewhere.

Table 6: Length of Visit to Kingsmere Wilderness Area

nights	# of responses	% of samples
1	**36**	**20.3**
2	**26**	**14.7**
3	**12**	**6.8**
4	**3**	**1.7**
6	**1**	**0.6**
9	**1**	**0.6**
11*	**98**	**55.4**
Total	**177**	**100%**

11* Signifies day users only.

Table 7: Positive Attributes of Kingsmere Experience

Positive attributes	# of responses	% of sample
Quiet	**82**	**18.2**
Scenery	**79**	**17.6**
few people	**54**	**2.0**
Facilities*	**45**	**10.0**
Pristine	**43**	**9.6**
Lake	**43**	**9.6**
Being outdoors	**34**	**7.6**
Wildlife	**27**	**6.0**
NP provisions**	**16**	**3.6**
no commercial	**12**	**2.6**
River	**11**	**2.4**
Wilderness	**4**	**0.8**
Total	**450**	**100%**

* This group refers to the structures that are provided in the area such as picnic tables, hibachi's, the railway cart system, docks and boat launching areas.

** This group refers to the knowledge of the safety and security provided by the National Parks.

Table 8: Negative Attributes of Kingsmere Experience

Negative attributes	# of responses	% of sample
Mosquitoes	**59**	**40.7**
Weather	**16**	**11.0**
# of people	**16**	**11.0**
Motor boats	**13**	**9.0**
Facilities	**12**	**8.3**
trail markings	**7**	**4.8**
less access	**5**	**3.4**
Garbage	**5**	**3.4**
Noise	**5**	**3.4**
People in campsite	**5**	**3.4**
Docks	**2**	**1.4**
Total	**145**	**100%**

Table 9: Rating of the Kingsmere Experience

Value	# of responses	% of sample
Very good	**131**	**74.0**
Good	**41**	**23.2**
Average	**4**	**2.3**
Poor	**1**	**0.6**
very poor	-	-
Total	**177**	**100%**

Table 10: How to Improve the Kingsmere Experience

Attribute	# of responses	% of sample
self preparation	**26**	**19.0**
same no change	**22**	**16.1**
Signs	**19**	**13.9**
Campsite	**14**	**10.2**
no motor boats	**13**	**9.5**
Trails	**12**	**8.8**
harder access	**7**	**5.1**
smaller groups	**6**	**4.4**
bicycle access	**5**	**3.6**
more canoe routes	**4**	**2.9**
higher fish limit	**3**	**2.2**
less vegetation damage	**2**	**1.5**
bigger boats	**2**	**1.5**
no over booking	**1**	**0.7**
no dogs	**1**	**0.7**
Total	**137**	**100%**

APPENDIX B: 1996 MANAGEMENT INTERVIEWS

The results presented are a cumulative list of responses to the management survey. There were five specific questions asked with some probing questions, which are identified in the question lists.

Purpose: To supplement the user opinions with more specific concerns for the area, and a tool used to obtain opinions from the managers of the study area.

The management responses have been recorded verbatim and have been categorized according to the main focus of each response. Many of the responses followed easily identifiable themes which have aided in presenting the responses in a coherent manner. Many of the issues and responses were mentioned numerous times, with others being mentioned only a single time. The results presented do not record if answers were mentioned more than a single time, but rather present the collective responses to the various questions.

1. What does the Kingsmere Lake area offer its visitors?

1A Get Away

- Wilderness experiences, an opportunity to get to a place to experience solitude.
- A true back-country experience, *i.e.* no car.
- A general lack of people and their signs.
- Wilderness is an opportunity to experience solitude.

1B Ecological Focus

- A chance to experience natural and cultural resources available in a pristine setting.
- A pristine environment that, overall, is still relatively untouched.
- An opportunity to experience the natural heritage of the large boreal lake to Canada's development; there area few of these opportunities available elsewhere.
- A contained ecosystem.

1C Launching Area

- A launching place for more pure wilderness experiences.
- The Kingsmere experience is a wilderness experience to some.
- The first step into a wilderness experience.
- A launch point to real wilderness experience.

1D Variety of Opportunities

- This is a wilderness experience to some and not to others. Much of the quality of the experience is based on what the users have as preconceptions of what they will experience in the Kingsmere area.
- An opportunity to explore the area and experience it on natures terms, a variety of experiential opportunities.
- A wide variety of allowable activities.
- Kingsmere provides a safe back-country experience and a launch to a real wilderness experience.
- Ability to visit Grey Owl site - symbol of the Parks cultural heritage resources.
- Trout fishing opportunities, traditional recreation for local peoples of the area.
- A good wilderness type experience.
- An opportunity to visit Grey Owl.

- Facilities - bear cache, can walk out, toilets, picnic tables, fire pits and wood. These facilities make the area and experience comfortable for a range of people.

1F Accessible

- It is important to maintain all modes of access.
- An easily accessible back-country experience via hiking, canoe and motor boat.
- An accessible area, which is bothersome because may detract from the experience.
- An area that is accessible for family day outings.

1G Challenging

- The effort required is an essential part of the experience.
- A place to have a challenging recreational activity.
- Longer hiking and canoeing opportunities.

1H Unique Experience

- A unique area because for the effort required.
- An experience that encourages self-reliance.
- An experience where one can feel like being away - absence of car makes it a unique experience, portage, and physical effort makes it an experience like no other in the park. Distinct from other areas in the park.
- An area to which people generally bring necessities rather than luxuries.
- Self reliance, safety, consciousness of natural environment more so than in other areas.

1J Not Appropriate Conditions

- Busy areas within Kingsmere would not be considered wilderness. These areas, as currently being used, are not acceptable for wilderness areas in the park

2. What should the area offer its visitors?

2A Pure Wilderness

- A wilderness experience in the real sense.
- Pure water and a free flowing river. People should be aware that this area is still pristine, that they are able to drink the water without worry. They should be able to see a river flowing its natural course.

2B Close to Wilderness

- Area should not show high levels of impact in campsites and trails, as currently exists.
- An experience as close to wilderness as possible. This back-country experience should be close, for those that are not able to have real wilderness experiences, not a pristine experience. The area should not become too restricted or unduly regulated.
- The experience should not be pure wilderness, but should provide for an experience that is close to that. If push people to that extreme many will never be able to experience it. This area makes a "wilderness type" experience available.
- Similar to what it currently is. The area provides a range of experiential opportunities, that should be maintained.
- Any commercial operations in this area significantly changes the setting and the experience from 'wilderness' to some much less than that. Herding tour groups through the area negates the potential for a close to wilderness experience.
- Campsites in this area should be significantly different than front country campsites. South End campsite may not be significantly different than front country. This campsite is pounded, but alternatives are not practical. May have to sacrifice this area to save others. Developing new campsites creates larger impact.
- Those activities there now protect the current values of this place.
- The current facilities that are provided allow people to gain new and different experiences. They allow people to get some portion of the spectrum of wilderness experiences. The experiential reward is based on the effort to get to this area.

2C Safety

- A safe experience, access is important to the safety of the area.
- The area should provide a relatively safe experience, but not as regulated or guarded as a front-country experience. This may be maintained through enforcement and allowable activities.

2D Launching Area

- This area should provide a launching step to an wilderness experience. The step to wilderness is still relatively easy. The effort required limits many and therefore improves the experience for those willing to expend the effort.

2E Access

- Zone II classification for entire area, eliminate motor boats - the effort for each experience should be comparable. The track to pull motor boats in is not comparable effort of canoeing around the lake.
- Dedicating it to a zone II would eliminate the water taxi which would improve the experience for the

majority. Zone II areas cannot be, by definition, accessible to all.

- Motor boats may be taking away the wilderness quality of the area. Altering the trail access for motor boats may be bending the rules of wilderness to accommodate the motor boat users.
- An area which brings the wilderness experience closer instead of extending the access.
- Access to the area must be comparable to what exists now. The access must not be easier, but not a great deal harder either.
- Good lake trout fishery, and to maintain that, access must remain difficult. If the experience becomes to easy, the natural lake trout populations may be harmed.
- Access is a tool that allows people to enjoy the area.
- There needs to be effort to get to this area, this limits use.
- Easier access would limit the ability to have a wilderness experience, access currently satisfies the user groups, but must know where to draw the line.
- The water taxi may have crossed that line and detract from peoples overall experience, be it truly wilderness or not. It does provide access to those that may not be capable, but it needs to be strictly regulated, and the park must know when to stop. If this mode of access invokes reaction from other users groups, it may not be appropriate for this area. The interpretive value of the water taxi is important.
- The area should be accessible but not too easy. There must be a degree of effort required for the wilderness potential to be there. The effort makes users that would not be normally compatible, tolerable of each other because of the effort exerted to get to the area to have the experience they are seeking.
- Access to this area must remain. Each user group is legitimate, and the park is committed to these users and ensuring that they will have access to their chosen experience in the Kingsmere area.
- Lower experience satisfaction may be attributed to number of people and motor boats.

2F Range of Opportunities

- There is a reward for the effort to get there. There is a range of wilderness experience opportunities available.
- A combination of natural and cultural components which comprise and make this area what is it. The extension to Grey Owl is retained.

2G Management Objectives Need Definition

- Critical for the management to decide what the experience should be in this area. That should arise as an objective rather than as an accident, which is common management technique.
- No expansion of what currently exists, that would deter from what the experience is all about. There should be no commercial facilities in the area. There is no way to accommodate everybody, and that should not be the goal of the area.

2H Self Reliance

- A wide variety of opportunities that are available to people with varying

levels of back-country comfort and experience.

- Should increase the self reliance aspect of back-country experience. People must become more self prepared and aware. The park does have a role to play here through education. This is difficult, however, because there may be no contact with the day users, and there is no guarantee that the back-country, overnight, users will pay any attention the numerous brochures available. Liability problems because if the brochures do not explain everything, they may be liable.

3. What do you perceive as the most serious issues in the management of the Kingsmere area?

3A Access

- People should be allowed to see this area as a wilderness area (in accordance with the zoning). Currently the dam does not let the people do that. Because this is a wilderness area, equal access is not in accordance with the wilderness setting. Equal access to this area will impair the wilderness experience that the users are trying to have.
- Access is creating a problem that will only be solved through rezoning the area would eliminate this problem.
- Solving the access issue for sustainable use of this area and sustain the experience that each user is trying to acquire in the Kingsmere area.
- Making sure that people are able to have the experience. People must take the experience of the natural home, and apply it to everyday life. Take these values from this setting and apply it to their own lives.

3B Social Issues

- Due to the various user groups there are social issues in the area which need to be resolved. Traditional users have preferred areas to camp. South End provides access for everyone, which may also be causing social problems related through noise, group size and crowding.
- Incompatible activities. Motor boats may cause tension between user groups, but due to public safety issues, it is important to have them there. Kingsmere lake is not a good canoe lake, and motor boats do provide a level of public safety.
- Potential for overuse in this area, which could be translated to conflicts between users.
- Overuse problems at certain campgrounds. Many of the sites are rundown and sensitive because of soil types. Vegetation trampling is a problem around many of the campsites, but it is a trade off. Do you create new campsites to restore others? or do you allow these areas to run as long as possible. These problems must be addressed through design solutions.
- User conflicts, particularly at South End, due to intermixing of day users and overnight users.
- The area is safe enough for family trips and those not prepared or comfortable with true wilderness experiences.
- Campsite overuse is a big issue. Many of the areas do not currently meet the expectations for wilderness campsites.
- The social issues are not so serious that they can not be managed. If users were aware of what the Kingsmere area is all about and what they will encounter, many of the social conflicts may be negated. Sometimes at South End there are front country social problems such as noise and crowding.
- Questionable if the camp kitchen is an appropriate facility in the back-country. It does have use, but is the convenience in accordance to what back-country experiences are suppose to be. Traditional users of this area are creating many of the problems.

The old ways and expectations may no longer be appropriate.

- Safety for those early season school groups.

3C Limited Knowledge

- Limited knowledge and study into traditional peoples in the area is needed. Fear that many cultural artifacts may be lost. Currently there is no management or protection of these sites around the Lake, and many of the sites may not be known.
- Park must begin to collect the oral history of this area, and begin to interpret it from a cultural point of view associated with the natural ecosystem.
- This area should put the message forward that managing the natural ecosystem is the best solution. The natural is much better than the human altered solutions. People must take the message back that every action causes and reaction. Try and instill and feeling of respect for this area, and all natural areas. To do this the area must remain natural.

3D Commercial

- Commercial operations on the lake take from the wilderness character of the area, and detract from everything that Grey Owl stood for. What the commercial operation tries to do, namely experience Grey Owl in his setting, is hypocritical. Grey Owl went to this area to escape much of what the commercial operator is bringing into the area.
- Grey Owl - put in the effort and the wilderness awaits you - how should the park provide the Grey Owl experience is an important issue. If people are prepared to travel there and put in the effort, it should be available. Water taxi is not a creative solution

3E Ecological Issues

- Ecological issues related to overuse. Must look at the alternatives. Is it better to maintain the current sites, or move it to destroy another site.
- Campsite problems due to design and use levels.
- State of the Kingsmere fishery is a concern. Need more definite population data to understand the viability of future fishery, and perhaps revisit the catch limits.
- Overuse may be destroying habitat in particular areas.
- Fishing pressure on this relatively unknown resource. The number of people fishing on Kingsmere Lake may be too high, because the population of the lake trout is unknown, it is amount of damage being done is questionable.
- Motor boats. The amount of pollution from 2 cycle motors is troublesome; perhaps the Park should allow 4 cycle motors only.
- Garbage. Scattered around the lake shore from tradition use and attitudes about fishing and ignorance of the damage.
- Campsite design. The methods used to mark out campsites, the physical layout of the campsites is not particularly well done in all areas.
- Revegetation of the more impacted campsites in addition to some restoration to improve the quality of these areas.
- Lake trout stability. Must ensure the long term health of the lake. This is

an ecological anomaly in SK. and it is vital that the park manages it for its significance and ensure the long term ecological integrity of it. Related to this is the need to educate the people that this is an important piece of SK, and Canada, and it deserves protection.

- Related to the fishery, people must get the message that wilderness is important. We benefit from it on various levels, from science to experience.
- South End is not acceptable at its current state as a wilderness or back-country experience.
- No serious ecological issues in this area, there are signs of extensive use, such as the packed campsites at both South End and North End, but that is acceptable to the users of these areas (they may not be there for pure wilderness experience). It would be better to maintain those campsites at the current level than eliminate them or try and revert them back.

3F Restoration

- River restoration. The removal of the dam and groin show that the managers are in the process of restoration. Still unsure if it will restore the ecological integrity of the area.
- River restoration. An important step for Prince Albert National Park.

3.1 Is the Park trying to make this area more than it can be?

- Yes, overuse is an issue, Pease Point campsite shows that.
- May have to limit use if it goes beyond current levels.
- Maybe, but that is the acceptable alternative vs. cutting off one or more of the current user groups of the area. The area has a great deal of historic use. In the past no one has stood up to the political screams of the local people, thus many of the problems with changing or limiting access to the area.

3.2 Has the park created the problems in this area?

- No. The Kingsmere users are getting what they were looking for in this area. They are able to get the experience that they were seeking from this area.

3.3 How do you feel about the access provided by the water taxi?

- From the users perspective, many do not know that it even exists. The users are accepting of other user groups in this area. This issue is no different that the motor boat issue, other than they start from South End rather than the launch.
- Personally, the water taxi is good. It has high interpretive potential of a key cultural figure to this area and the history of the Park. This is a safe experience that could seriously affect many of these people, hopefully they will take the message and apply it and lobby for this type of experience.
- Don't want the water taxi experience to become the gondola to the top of the mountain. People must still put in the effort to have this experience and that makes it acceptable and compatible with other experiences to be attained in the area. The required effort is the commonality to

Kingsmere experience for all of the user groups.

- The line has been drawn. There will be one operator with one boat in the area.
- This has high ecotourism potential. This must be properly managed. Grey Owl excursion is better than the boat ride alternative. The excursion allows people to better experience it.
- The private sector company needs to turn a dollar. Must give them flexibility and a quality product balanced with other users and the spirit of the area.

4. Do you perceive conflicts between user groups in the Kingsmere Lake area?

4A Access

- Yes, due to access/ modes of movement in the area.
- Access decisions are based on, or founded in, the questions around the entire access issue which may be causing conflict.

4B Conflicting Purposes

- Yes, due to users groups having conflicting purposes.
- Day users vs. campers at South End. This area has significant day use which may impair on the campers in the area. Many of the campers are there to get away, but much of what they are trying to escape from is following them to South End.
- Modes of transportation conflicts are diminishing, because on an average there is less use of this area by motor boats, seems to be a general shift in user groups.
- The conflicts which exist are between values and ideas, more so than between people and user groups.
- Conflict between users and the natural area. This is evident in bears being attracted to campsites for food. This could be further eliminated through educational programs in the Park.
- Many of the conflicts exist between the local people vs. the outsiders. Locals seem to think that the area is theirs, and are somewhat unwilling to accept outside views.
- Canoers should be willing to share the Kingsmere experience with the other groups, notably, the motor boat users.
- Some crowding problems because of peoples disregard with the rules. Many people go into this back-country area without registering, showing blatant disregard for the rules and regulations within the Park.
- Many people may perceive issue between motor boats and canoes, but can not see it personally. Perhaps if it is an issue, it would be at the landing or portage trailer.
- Minimal conflicts between canoers and motor boat users, but do perceive it to exist.
- Amisk, namely the water taxi vs. the other users of the area. The conflict exists because of the non-compatible activities and philosophies of use.
- Anglers vs. non-anglers. Exists due the consumptive nature of fishing vs. the non-consumptive nature of wilderness activities.
- Large groups/ parties vs. those seeking experiences closer to wilderness. Similar to the general camping problems.
- Bikers vs. hikers. Although bikes are not an allowable mode of transportation in this area, they do penetrate the area and do cause conflicts between groups. The bikers generally display disregard for the rules of this area.

4C Commercialism

- Yes there are problems due to commercialism in the area.
- Commercial outfit in the area may cause increasing problems in the future, because it may affect the experience of particular users that have contact with the commercial users. This will be first realized in the lower level of experience at South End campground (the launching point for the water taxi).

- The commercial activities are totally contradictory to what Grey Owl taught and stood for. The park is sending a poor message, the interpretive potential of Grey Owl can not be realized with this form of access and commercialism of this area.

4.1 How can these problems be solved?

- Time limits for the water taxi. Design a system that would have less effect on the other users of the area. Limit the number of trips per week, and possible the days of the week that the water taxi would be allowed to run.
- Change the pick up point to keep this user group separate from the other users. Could potentially be picked up at the old wood lot, approximately the same distance from the trail head.
- The conflicts in the area are not insurmountable. The stakeholder process has highlighted many of the conflicts, but the process is civil, and the user groups are generally willing to accept and validate the others views.

4.2 How could these conflicts be alleviated?

4.2 A Design

- Campsite conflicts. Much is due to poor design and site layout of the campsites. These problems could be alleviated with better design of the campsites.

4.2 B Rezoning

- If this area were rezoned so that all of it was classified as Zone II - wilderness area, many of the conflicts that exist would be eliminated. The user groups would be more compatible than they presently are. To reclass the area, however, it would be very difficult and politically sensitive.
- Conflict on the river between motor boats and canoes, and motor boats vs. the natural ecosystem of the river. The problem could be alleviated by taking motor boats off the river, but then have to solve the access issue, with how to get boats to the lake.
- If the area is rezoned, and canoeing is promoted, many of the conflicts would be eliminated by default. This would be a hard decision but would be supported by the wilderness and need to preserve it. The Park could promote this as a wilderness area, with a clear conscious if there were no motor boats in the area.

4.2 C Proactive Management

- Noise problems from motor boats could be solved by decreasing the motor size on the lake, although this lake is not really suitable for canoes because of its size.
- Any solutions will be difficult because of dealing with traditional users of the area, that have a valid reason to be there. The lake trout definitely attract motor boaters to the area
- The amount of physical effort required to get into the area eliminates much of the potential for conflict.

4.2 DEducation

- Bikers - make them aware of many of the other biking opportunities in the Park. Focus their demand to an area that is designated to handle it.

5. Do you feel that the Kingsmere Lake area is being properly managed in accordance to the Prince Albert National Park management plan?

5A Progress Being Made to Meet Management Guidelines

- No, the park is not being managed in accordance to the management plan. The park is making progress and some significant steps are in place. Until the access issue is solved for the Kingsmere area, the management plan will not be met.
- No, not being properly managed, but we are on the way.
- Currently trying to gather as much information as possible to work towards the stated goals for this area in the Prince Albert National Park. This area has a lot of historic value and dictates the need for public consultation, need for public support, and a monitoring of the process to ensure that the proper steps and procedures are being taken.
- Not yet being properly managed. We are on the way.
- Solving and providing access to this area will be a step in the right direction in managing the area properly.
- Restoring the Kingsmere river is another step that has been initiated to try and manage the area in accordance with the Prince Albert National Park management plan.
- If the access issue is not resolved, then they have not accomplished what the management plan has suggested that they should.
- No but the management is currently on the way to managing this area in response to the management plan.
- Trying to manage for both the experiential user values and inherent values of this area. Stakeholders in the process are vital.
- Restoration has been initiated, and the process has been established.
- The monitoring mentioned for this area has been started and will continue to be an ongoing process.
- Removal of the dam has been studied. It will affect the visitor experience and opportunities through altering access. This issue must be resolved and progress needs to be made in this area.
- No, the area is current being managed by accident. The management has no clear objectives for this area. All management actions are the result of reactions to situations rather than actions to eliminate more serious reactions.
- There is no clear understanding of the impacts being forced on this area. There is no understanding of the demand for this area. There is no clear understanding of the capacity of this area. The Park is beginning to work in a way that will help to understand each of the above.
- This is a wilderness area. The effort required to get there makes it so. We are properly managing the area
- Public support has been initiated, a public consultation forum is established, and generally the actions being taken are supported by the public. Interpretation of these activities should be of higher profile.
- Yes, almost. Restoring the ecosystem of the Kingsmere river, as outlined in the management plan.

- The area is to remain the same, with perhaps the addition of one new campsite.

5C Advancement Through Education

- Park must continually promote self reliance in the back-country, education will be the key.
- The river restoration has excellent educational potential, and all future decisions should be based on the fact that the dam will be gone and that it is important to restore, and maintain, these natural areas.
- All sections must work together, the Park and the stakeholders.
- Documentation of the history of the dam should be more clearly presented.
- Decide or evaluate the historic and cultural value of the current railway track to determine what role it should have in the future of the area.
- Park must begin to better stress the importance of self reliance in back-country settings. That reliance can be realized through less provisions being provided. Part of the back-country experience should be learning from mistakes and experiences.

5D Current Short Falls

- For a wilderness area, as it is currently zoned, this area has definite overuse.
- The park is committed to ensuring that this experience is attainable, but at the same time they are committed to the access to this area by all of the current user groups.
- Commercialism is taking from the wilderness philosophy of the Kingsmere lake area. This activity (the water taxi) may not affect the natural environment, but will affect the state of experience in the area.
- This area has too many directions for it to be sustainable as it currently stands. There needs to be a more clearly defined and compatible use system presented and initiated. This area currently is a stepping stone to a wilderness experience, the step should not be so drastic. The allowable uses make the step greater than it should be. Kingsmere should not be that stepping stone. The problems at Kingsmere are similar to those that existed on the West side, but the Park took a stand for the sake of the wilderness and park. The traditional users will provide opposition and rightly so, but there comes a point when the Park must take a stand. If more people use the area much of its character will be diminished. The more people that use the areas, the more allowable user groups, the greater the problems will be.
- Back-country user fees should go directly back to the area for restoration, maintenance, etc. The back-country sites can not be run on a cost recovery basis, thus it is essential to limit facilities, and ensure that the money will go directly back to the area.

5E Monitoring

- Restoration of the aquatic ecosystem is planned, time frame has been established, stakeholders identified and have had opportunities to participate in the project. They seem to be on side with the progress thus far. Trying to manage this area the best they can.
- Park must keep an eye on the Kingsmere situation to ensure that it does not become too popular, and

thus overused. To maintain current levels of use that the area seems to be capable of handling. Limit the range of allowable uses to those which currently exist and not expand them.

- Relatively compatible user groups in the area, they are there for back-country experiences which are attainable for this area. The users generally respect the rights and wishes of the other groups.

APPENDIX C: 1997 KINGSMERE USER SURVEY

The user survey administered during 1997 was presented as follows. All responses are also presented in the tables following the questionnaires.

My name is Wayne Tucker, and I am administering a user survey to the users of the Kingsmere area as a component of the research for a Master's Thesis at the University of Calgary, Faculty of Environmental Design. This research will ensure the confidentiality of the respondents, and has been approved and supported by both the Faculty of Environmental Design and Parks Canada. This survey should take less than ten minutes to complete and if at any time you would like to quite, you are free to do so. The information obtained will be used to make recommendations to Prince Albert National Parks management regarding the future of the Kingsmere area. Users of the Kingsmere area have identified essential experiential values. The purpose of this survey is to have the users determine appropriate levels for many of those identified values.

1. How often do you visit the Kingsmere area?(average trips/year)
2. How many people are in your group?
3. How long were you in the Kingsmere area? (nights)
4. What was your primary activity?
5. What was your primary destination in the Kingsmere area?
6. Did you see other users as you travelled in the area?
7. What affect did this have on your experience?
8. What is an appropriate number of people to see as you travel in the Kingsmere area?
9. Did you encounter any groups as you travelled?
10. What size of group is an appropriate to encounter?
11. Did the noise from other users affect your experience?
12. What type of noise did you find most intrusive?
13. Would the time that you heard the noise made a difference?
14. Did you hear any motors as you travelled in the Kingsmere area?
15. Did hearing motors affect you experience?
16. How many motors are acceptable to hear in a day as you travel in the area?
17. Did you notice any damaged vegetation as you travelled in the area?

18. How would you classify the level of damage?
19. Did any structures in the area affect your appreciation of the natural landscape?
20. Which structures affected your appreciation of the natural landscape?
21. What did you like about the trails that you travelled on?
22. What did you dislike about the trails that you travelled on?
23. Did the activities of other users affect your experience?
24. Whci activities did you observe others participating in that affected your experience in the area?
25. How did the current level of access affect your experience?
26. At what point would the level of access begin to affect your experience?
27. How long did you have to wait for the trolley?
28. What is the maximum amount of time that you would be willing to wait for the trolley?
29. Currently you must remove your boat or canoe from the river, do yopu feel that this is appropriate?
30. The Park currently patrols the area for public safety. Does knowing this affect your experience?

30 B. How important is it to your experience to know that it is patrolled?

31. How would you rate the campgrounds you visited?
32. Did you see any litter as you travelled in the area?
33. How did the amount of litter that you saw affect your experience?
34. How did the provision of the following facilities affect your experience?

	positive	neutral	negative
picnic tables	1	2	3
hibachi's	1	2	3
cooking shelter	1	2	3
bear cache	1	2	3
fire wood	1	2	3
boat launch	1	2	3
cart track	1	2	3
docks	1	2	3
board walks	1	2	3

35. Thirteen issues have been presented. Which do you feel the managers should focus their attention on?

    number of people in the area
    size of groups
    noise from other users
    noise from motors
    amount of damaged vegetation
    structures in the area
    trail conditions
    activities of others
    access
    public safety
    campground conditions
    amount of litter
    current facilities

36. Overall, how would you rate your experience in the Kingsmere wilderness area?

37. Would you like to make any comments regarding this study, the management of the area, or any concerns or suggestions to ensure that future users have high quality experiences and the natural resources of this valued area are sufficiently protected?

Table 1: Number of Visits to Kingsmere per Year

Number of Visits	Frequency	%
1	**52**	**43.0**
2	**18**	**15.0**
3	**9**	**7.5**
4	**4**	**3.3**
5	**3**	**2.5**
6	**3**	**2.5**
20	**1**	**0.8**
First time	**30**	**25.0**
Total	**120**	**100.0**

Table 2: Size of groups

Number of people in Group	Frequency	%
1	**6**	**5.0**
2	**55**	**45.8**
3	**13**	**10.8**
4	**24**	**20.0**
5	**9**	**7.5**
6	**7**	**5.8**
7	**4**	**3.3**
8	**2**	**1.7**
Total	**120**	**100**

Table 3: Length of visits?

Nights	Frequency	%
1	**32**	**26.7**
2	**48**	**40.0**
3	**9**	**7.5**
4	**4**	**3.3**
5	**2**	**1.7**
7	**2**	**1.7**
Day Use Only	**23**	**19.1**
Total	**120**	**100**

Table 4: Main activities

Activity	Frequency	%
Canoeing	72	61.0
Backpacking	23	19.5
Motor boating	8	6.8
Fishing	10	8.5
Day hiking	3	2.5
Kayaking	2	1.7
Total	120	100

Table 5: Overnight campground use

Location	Frequency (% sampled population)
Southend	25.8
Westwind	1.7
Chipewyan Portage	5.8
Sandy Beach	12.5
Northend	15.8
Bladebone	10.8
Pease Point	15.0
Bagwa	7.5
Lily	8.3

Table 6: Frequency of seeing others in the Kingsmere area

Response	Frequency	%
Yes	114	95.0
No	6	5.0
Total	120	100.0

Table 7: Affect of seeing others

Affect	Frequency	%
Positive	35	29.2
Negative	22	18.3
Neutral	63	52.5
Total	120	100.0

Table 8: Appropriate number of people to see

Appropriate # to See	Frequency	%	Valid %
0	6	4.9	5.5
1	3	2.5	2.7
2	7	5.7	6.3
3	2	1.6	1.8
4	14	11.5	12.5
5	4	3.3	3.6
6	8	6.6	7.1
8	6	4.9	5.5
10	24	19.7	21.4
12	11	9.0	9.8
15	4	3.3	3.6
16	1	0.8	0.9
18	1	0.8	0.9
20	2	1.6	1.8
24	2	1.6	1.8
30	2	1.6	1.8
Current Levels	15	12.3	13.4
No Response	8	6.6	-
Total	120	100.0	100.0

Table 9: Frequency of meeting other groups

Response	Frequency	%
Yes	52	43.3
No	68	56.7
Total	120	100.0

Table 10: Appropriate group size to meet in the Kingsmere wilderness area?

Appropriate group size	Frequency	%	Valid %
2	4	3.4	3.7
3	5	4.2	4.7
4	40	33.6	37.4
5	4	3.4	3.7
6	31	26.1	29.0
8	7	5.9	6.5
10	8	6.7	7.5
12	5	4.2	4.7
20	2	1.7	1.9
No response	13	10.9	-
Total	120	100.0	100.0

Table 11: Affect of noise on experiences

Response	Frequency	%	Valid %
Yes	14	11.7	11.9
No	104	86.7	88.1
No response	2	1.7	-
Total	120	100.0	100.0

Table 12: Noises that were most intrusive

Response	Frequency	%	Valid %
Motors	4	3.4	28.6
People	10	8.3	71.4
No response	106	88.3	-
Total	120	100.0	100.0

Table 13: Time of noise

Response	Frequency	%	Valid %
Yes	3	2.5	42.9
No	4	3.34	57.1
No response	113	94.1	-
Total	120	100.0	100.0

Table 14: Frequency of hearing motors

Response	Frequency	%	Valid %
Yes	110	91.7	92.4
No	9	7.5	7.6
No response	1	0.8	-
Total	120	100.0	100.0

Table 15: Affect of hearing motors

Response	Frequency	%	Valid %
Positive	4	3.3	3.5
Negative	63	52.5	54.8
Neutral	48	40.0	41.7
No response	5	4.2	-
Total	120	100.0	100.0

Table 16: Acceptable number of motors to hear in a day?

Actual number	Frequency	%	Valid %
0	26	22.2	27.4
1	16	13.7	16.7
2	13	11.1	13.6
3	2	1.7	2.1
4	3	2.6	3.2
5	14	12.0	14.7
6	7	6.0	7.4
7	1	0.9	1.1
10	7	6.0	7.4
12	1	0.9	1.1
15	2	1.7	2.1
20	3	2.6	3.2
No response	25	20.8	-
Total	120	100.0	100.0

Table 17: Frequency of noticing damaged vegetation

Response	Frequency	%	Valid %
Yes	80	66.7	68.4
No	37	30.8	31.6
No response	3	2.5	-
Total	120	100.0	100.0

Table 18: Level of vegetation damage

Response	Frequency	%	Valid %
Less than acceptable	10	8.3	11.8
At an acceptable level	60	49.2	70.6
Better than acceptable	15	12.5	17.6
No response	35	29.2	-
Total	120	100.0	100.0

Table 19: Frequency of structures affecting appreciation of the natural landscape?

Response	Frequency	%	Valid %
Yes	30	25.0	25.4
No	88	73.3	74.6
No response	2	1.7	-
Total	120	100.0	100.0

Table 20: Structures that affected appreciation of the natural landscape?

Response	Frequency	%	Valid %
Dam	9	7.6	26.5
Cooking shelter	7	5.9	20.6
Board walks	5	4.2	14.7
Outhouses	4	3.4	11.8
Signs	4	3.4	11.8
Tent pads	1	0.8	2.9
Wardens Cabin	1	0.8	2.9
Hibachi's	1	0.8	2.9
Boat launch	1	0.8	2.9
No response	86	72.3	-
Total	120	100.0	97.0

Table 21: Liked attributes of trails in the area

Response	Frequency	%	Valid %
Well maintained	15	12.5	40.5
Variety	10	8.3	27.0
Well marked	5	4.2	13.5
Width	4	3.3	10.8
Length	3	2.5	8.2
No response	83	69.2	-
Total	120	100.0	100.0

Table 22: Disliked attributes of trails in the area

Response	Frequency	%	Valid %
Wet areas	3	2.5	23.1
Deadfall	3	2.5	23.1
Too worn	3	2.5	23.1
Poorly marked	2	1.7	15.1
No stopping areas along trail	1	0.8	7.7
Too far from Lake	1	0.8	7.7
No response	107	89.2	-
Total	120	100.0	99.8

Table 23: Frequency of others' activities affecting experiences

Response	Frequency	%	Valid %
Yes	20	16.7	17.1
No	97	80.8	82.9
No response	3	2.5	-
Total	120	100.0	100.0

Table 24: Activities that affected experiences

Response	Frequency	%	Valid %
Motor boating	9	7.5	40.9
People with dogs off-leash	3	2.5	13.6
Loud people/groups	3	2.5	13.6
Poor information from Park	2	1.7	9.2
Food left out at campgrounds	2	1.6	9.2
Disrespectful use of area	1	0.8	4.5
Camping in undesignated areas	1	0.8	4.5
Feeding wildlife	1	0.8	4.5
No response	98	81.7	-
Total	120	100.0	100.0

Table 25: Affect of current level of access

Response	Frequency	%	Valid %
Positive	95	79.2	87.2
Negative	3	2.5	10.0
Neutral	11	9.2	2.8
No response	11	9.2	-
Total	120	100.0	100.0

Table 26: Point where level of access would be negative

Response	Frequency	%	Valid %
If there was a road	26	21.8	28.2
If it were easier	16	13.4	18.5
Current level is good	14	11.8	15.2
It is too easy now	12	10.1	13.0
Portage would be good	7	5.9	7.6
If it was harder	7	5.9	7.6
If there were no motors	6	5.0	6.5
If had to carry boat	2	1.7	2.2
If larger motors could have access	1	0.8	1.1
No response	28	23.3	-
Total	120	100.0	99.9

Table 27: Length of time spent waiting for the trolley

Time in minutes	Frequency	%	Valid %
0	**30**	**25.0**	**35.7**
5	**1**	**0.8**	**1.2**
10	**3**	**2.5**	**3.6**
20	**2**	**1.7**	**2.4**
25	**1**	**0.8**	**1.2**
60	**1**	**0.8**	**1.2**
1 group	**1**	**0.8**	**1.2**
2 groups	**45**	**37.5**	**53.6**
No response	**36**	**30.0**	**-**
Total	**120**	**100.0**	**100.1**

Table 28: Maximum amount willing to wait for the trolley

Time in minutes	Frequency	%	Valid %
10	**5**	**4.2**	**8.3**
15	**4**	**3.4**	**6.7**
20	**18**	**15.1**	**30.0**
30	**16**	**13.4**	**26.7**
45	**2**	**1.7**	**3.3**
60	**1**	**0.8**	**1.7**
Would not wait	**12**	**10.1**	**20.0**
1 group	**1**	**0.8**	**1.7**
2 groups	**1**	**0.8**	**1.7**
No response	**59**	**49.6**	**-**
Total	**120**	**100.0**	**100.1**

Table 29: Feelings about having to remove canoe or boat from Kingsmere River

Response	Frequency	%	Valid %
Yes	**85**	**70.8**	**95.5**
No	**4**	**3.4**	**4.5**
No response	**31**	**25.8**	**-**
Total	**120**	**100.0**	**100.0**

Table 30: Affect of knowing are is patrolled for public safety

Response	Frequency	%	Valid %
Positive	113	94.2	96.6
Negative	4	3.3	3.4
Neutral	3	2.5	-
Total	120	100.0	100.0

Table 30 B: Importance of knowing the area is patrolled?

Response	Frequency	%	Valid %
Positive	106	88.3	88.3
Negative	0	0	0
Neutral	14	11.7	11.7
Total	120	100.0	100.0

Table 31: Rating of campgrounds

Response	Frequency	%	Valid %
Less than acceptable	9	7.6	12.5
Acceptable	45	38.1	72.5
Better than acceptable	53	44.9	15.0
No response	13	10.8	-
Total	120	100.0	100.0

Table 32: Frequency of seeing litter

Response	Frequency	%	Valid %
Yes	70	58.3	58.3
No	50	41.7	41.7
Total	120	100.0	100.0

Table 33: Affect of amount of litter seen

Response	Frequency	%	Valid %
Positive	0	0	0
Negative	46	38.3	63.0
Neutral	27	22.5	37.0
No response	47	39.2	-
Total	120	100.0	100.0

Table 34: Affect of facilities

Facilities	Positive (valid %)	Neutral (valid %)	Negative (valid %)	No Response
picnic tables	**87.9**	**6.1**	**6.1**	**5**
hibachis	**85.2**	**4.5**	**10.4**	**5**
cooking shelter	**48.2**	**21.4**	**30.4**	**64**
bear cache	**96.5**	**2.6**	**0.8**	**6**
fire wood	**90.2**	**4.4**	**5.3**	**7**
boat launch	**81.9**	**10.6**	**7.4**	**26**
docks	**71.1**	**18.4**	**10.5**	**44**
board walks	**78.3**	**8.7**	**13.0**	**51**

Table 35: Issues managers should focus on

Issue	Frequency	%
noise from motors	**41**	**34.2**
Access	**27**	**22.5**
Litter	**21**	**17.5**
size of groups	**18**	**15.0**
number of people in the area	**15**	**12.5**
campground conditions	**12**	**10.0**
vegetation damage	**10**	**8.3**
Facilities	**9**	**7.5**
trail conditions	**9**	**7.5**
allowable activities	**8**	**6.7**
public safety	**8**	**6.7**
Structures	**7**	**5.8**
noise from users	**4**	**3.3**

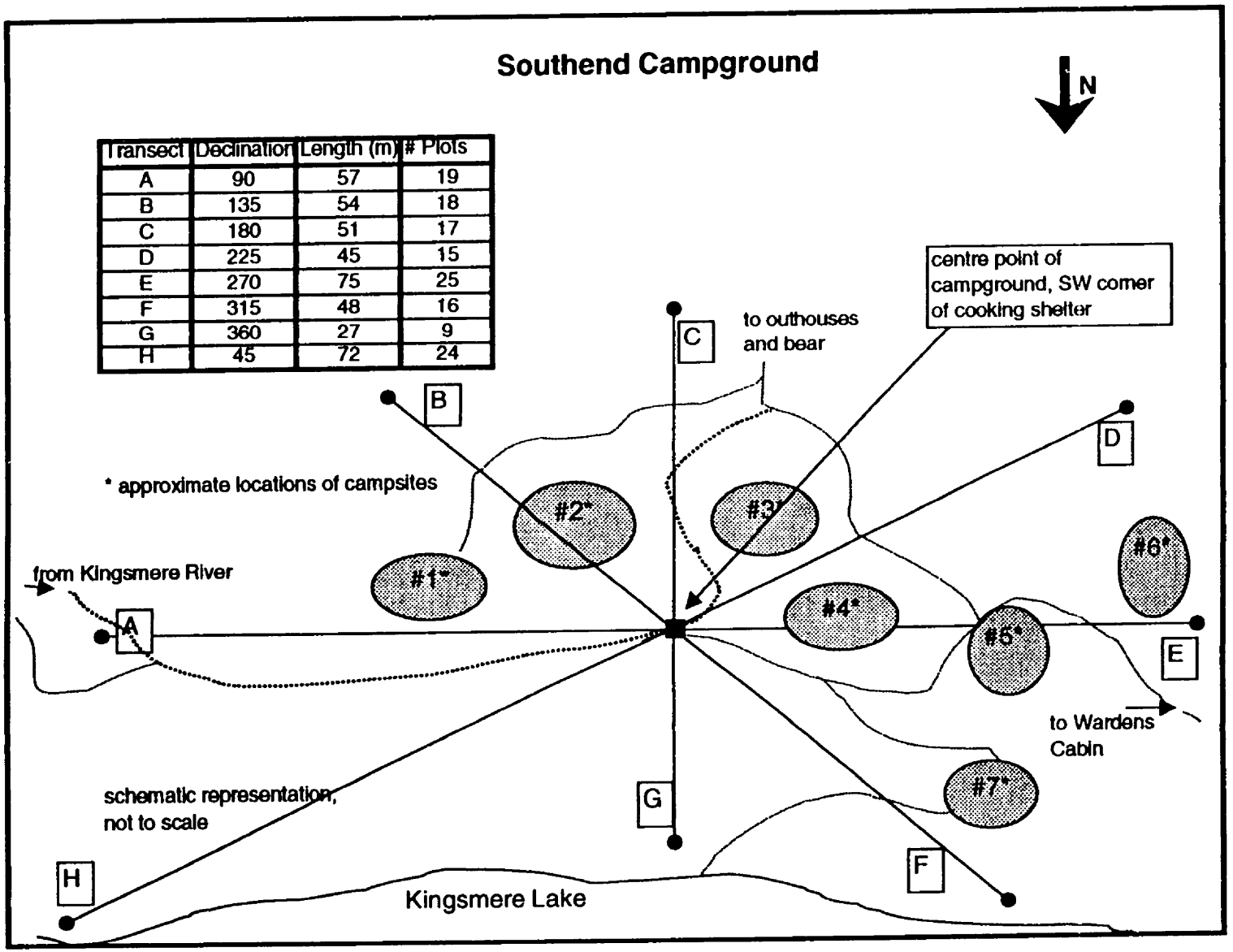
Table 36: Rating of Kingsmere experience

Response	Frequency	%
Very Poor (1.0)	**0**	**0**
Poor (2.0)	**0**	**0**
Average (3.0)	**3**	**2.5**
3.5	**1**	**0.8**
Good (4.0)	**25**	**20.8**
4.5	**13**	**10.8**
Very Good (5.0)	**78**	**65.0**
Total	**120**	**100.0**

APPENDIX D: BASELINE DATA FROM CAMPGROUND AND CAMPSITE INVENTORIES

In this appendix, all of the data collected as a result of the campground and campsite inventory is presented. Because this is the first year of data collected, no analysis is presented. The purpose for presenting the information in this manner is to aid future monitoring efforts in collecting data in a consistent manner. A schematic representation of each of the campgrounds in the Kingsmere area is also presented. The order of the campground information presented is as follows:

- Southend Campground
- Westwind Campground
- Chipewyan Portage Campground
- Sandy Beach #1 Campground
- Sandy Beach #2 Campground
- Northend Group Area Campground
- Northend #1 Campground
- Northend #2 Campground
- Bladebone Campground
- Pease Point Campground
- Bagwa Lake Campground
- Lily Lake Campground
- Old Pease Point Campground


Southend Campground
N
Transect | Declination | Length (m) | # Plots
A | 90 | 57 | 19
B | 135 | 54 | 18
C | 180 | 51 | 17
D | 225 | 45 | 15
E | 270 | 75 | 25
F | 315 | 48 | 16
G | 360 | 27 | 9
H | 45 | 72 | 24
centre point of campground, SW corner of cooking shelter
to outhouses and bear
* approximate locations of campsites
#1*
#2*
#3*
#4*
#5*
#6*
#7*
from Kingsmere River
to Wardens Cabin
schematic representation, not to scale
Kingsmere Lake
A
B
C
D
E
F
G
H

Southend Campground

Centre: SW corner of cooking shelter, pin is in place

Centre	Canopy	Shrub	erbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
0	0	0	10	0	0	100	0	0	60	0	0	30% concrete from cooking shelter

Transect A (90o)

distance	Canopy	Shrub	erbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	0	0	0	0	0	5	95	0	0	
6	0	0	20	0	0	100	0	10	60	10	0	
9	0	0	5	0	0	100	0	60	40	0	0	
12	0	0	10	0	0	100	0	5	80	30	0	
15	20	0	5	0	0	100	0	30	60	40	0	
18	0	0	5	0	0	100	0	5	90	60	0	
21	0	0	0	0	0	0	0	10	60	60	0	
24	20	0	5	0	0	100	0	15	50	40	0	
27	10	0	5	0	0	100	0	15	20	70	0	
30	0	0	0	0	0	0	0	5	30	70	0	
33	0	0	0	0	0	0	0	10	10	70	0	
36	10	20	10	0	0	100	0	15	0	70	0	pine leaning into shrub layer
39	10	20	20	50	0	10	40	30	0	70	0	
42	20	40	10	0	0	20	80	30	0	70	0	pine leaning into shrub layer
45	10	10	30	0	0	10	90	50	0	50	0	pine leaning into shrub layer
48	0	0	10	0	0	0	0	20	20	60	0	
51	0	0	40	40	0	20	40	60	20	30	0	
54	10	30	30	50	0	20	30	70	0	30	0	aspen in shrub layer
57	20	0	70	50	0	10	40	60	0	40	0	between two trails leading to campground

Transect B (135o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	100	0	50	30	50	0	
6	0	0	20	0	0	100	0	60	20	40	0	
9	0	0	20	0	0	60	40	80	10	30	0	
12	0	0	10	0	0	0	100	80	5	20	0	
15	0	0	30	0	0	80	20	70	10	30	0	
18	0	0	0	0	0	0	0	10	90	20	0	
21	in tentpad #2											
24	in tentpad #2											
27	in tentpad #2											
30	10	0	5	0	0	100	0	20	70	40	0	
33	20	0	20	70	0	10	20	5	30	60	0	
36	20	0	20	20	0	20	40	10	20	80	0	spruce leaning into herb layer
39	30	60	20	70	0	0	30	10	0	90	0	80% shrub layer >1.5m
42	0	0	5	0	0	50	50	20	10	90	0	
45	0	0	0	0	0	0	0	10	10	70	10	
48	0	60	40	10	0	30	60	10	0	80	10	
51	20	50	60	40	0	0	60	20	0	20	0	
54	20	30	30	40	0	0	60	20	0	40	60	

Southend Campground

Transect C (180o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	100	0	50	20	30	0	
6	0	0	0	0	0	0	0	40	40	60	0	
9	0	0	20	0	0	10	90	70	20	20	0	
12	70	0	0	0	0	0	0	20	30	70	0	
15	70	0	0	0	0	0	0	20	10	80	0	
18	20	0	5	0	0	0	100	10	10	20	0	main trail to bear cache
21	10	0	10	100	0	0	0	20	0	80	0	main trail to bear cache
24	20	0	0	0	0	0	0	10	10	80	0	main trail to bear cache
27	10	20	20	0	0	50	50	20	0	80	0	
30	0	50	70	50	0	0	50	30	0	20	0	
33	20	20	30	40	60	0	0	70	0	10	20	
36	10	30	50	40	0	0	60	20	15	30	5	trail to wood pile
39	10	0	10	0	0	0	100	30	30	40	0	
42	30	20	0	0	0	0	0	0	0	50	0	
45	20	20	20	30	0	0	70	90	0	10	0	
48	20	60	10	0	0	0	100	40	0	60	0	fir and pine leaning into shrub layer
51	20	30	20	0	0	0	100	90	0	10	0	

Transect D (225o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	100	0	70	30	0	0	
6	0	0	10	0	0	100	0	80	20	0	0	
9	0	0	10	0	50	50	0	40	60	0	0	
12	0	0	10	0	0	70	30	20	40	40	0	
15	0	0	5	0	0	100	0	10	90	0	0	
18	0	0	10	0	0	60	40	10	70	20	0	
21	0	0	40	0	0	30	60	50	40	20	0	
24	0	40	40	0	0	40	60	40	0	70	0	spruce leaning into shrub layer
27	0	0	20	50	0	0	50	0	0	90	0	
30	0	0	20	0	0	20	60	10	40	80	0	
33	in tentpad											
33	10	0	40	0	0	30	70	0	30	70	0	
39	20	60	40	50	0	50	0	0	0	90	0	
42	20	20	40	20	0	10	70	60	0	40	10	
45	30	70	20	0	0	0	100	40	0	40	20	

Southend Campground

Transect E (270o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	100	0	40	50	10	0	moss layer is all trampled grass
6	0	0	20	0	0	80	20	30	40	30	0	moss layer is all trampled grass
9	0	0	20	0	0	100	0	0	80	20	0	
12	0	0	20	0	0	40	60	0	80	10	0	moss layer is all trampled grass
15	0	0	80	0	0	80	20	20	20	70	0	moss layer is all trampled grass
18	0	0	10	0	0	100	0	20	60	30	0	moss layer is all trampled grass
21	0	0	10	0	0	10	90	80	20	30	0	
24	0	0	10	0	0	100	0	30	60	30	0	moss layer is all trampled grass
27	10	0	0	0	0	0	0	40	40	20	0	moss layer is all trampled grass
30	10	0	10	0	0	100	0	40	30	60	0	moss layer is all trampled grass
33	0	0	5	0	0	100	0	70	10	20	0	
36	10	10	40	0	0	50	50	40	40	30	0	birch leaning into shrub layer
39	0	10	0	0	0	0	0	10	90	20	0	
42	in tentpad #5											
45	in tentpad #5											
48	in tentpad #5											
51	10	0	0	0	0	0		0	100	30	0	
54	10	0	0	0	0	0		0	100	30	0	
57	10	0	0	0	0	0		0	100	30	0	
60	0	0	0	0	0	0		0	100	60	0	
63	0	0	0	0	0	0		0	95	30	0	tree stump covers 5% plot
66	0	20	30	40	0	0	60	10	40	70	0	small fir in shrub layer
69	10	20	40	50	0	20	30	40	0	70	0	
72	10	20	70	20	0	10	70	80	0	30	0	
75	20	0	70	20	0	10	70	40	0	60	0	

Transect F (315o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	30	0	0	100	0	20	30	50	0	
6	0	0	20	0	0	50	50	10	10	80	0	
9	0	0	20	0	0	80	20	20	10	70	0	
12	0	0	10	0	0	40	60	20	50	30	0	
15	0	0	40	0	0	100	0	30	0	60	0	
18	20	0	10	0	0	0	100	0	60	40	0	
21	10	0	5	0	0	50	50	40	20	40	0	
24	0	0	10	0	0	20	80	60	0	40	0	
27	0	0	20	0	0	0	100	70	20	30	0	
30	30	0	10	0	0	50	50	40	0	60	0	
33	50	0	60	0	0	20	80	0	0	40	0	
36	40	0	50	50	0	10	40	20	10	70	0	trail to campsite #7 from beach
39	0	30	60	70	0	0	30	0	0	80	0	
42	20	80	20	0	0	0	100	10	0	80	0	alder bush in plot
45	30	30	40	40	0	0	60	30	0	70	0	
48	30	50	20	0	0	0	100	50	0	50	10	

Southend Campground

Transect G (360o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	20	30	50	0	40	10	20	0	80	0	
6	0	0	10	0	0	0	100	70	0	30	0	
9	0	0	10	0	0	100	0	30	70	20	0	trampled grass in moss layer
12	0	20	10	0	0	100	0	60	30	40	0	50% trampled grass in moss layer
15	20	0	10	80	0	20	0	70	20	10	0	80% trampled grass in moss layer
18	20	0	50	0	0	80	20	60	10	30	0	spruce in shrub layer
21	10	20	40	0	0	50	50	80	0	10	0	
24	0	0	50	10	0	50	40	80	0	20	0	
27	0	80	20	30	0	10	60	30	0	70	10	alder in plot

Transect H (45o)

transect runs through cooking shelter to beach. Transect begins at back of shelter, near NE corner

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	0	10	0	0	100	0	0	90	20	0	behind cooking shelter
6	20	0	5	0	0	100	0	0	60	40	0	
9	0	0	10	0	0	100	0	100	0	10	0	
12	0	0	30	0	0	100	0	60	10	30	0	small pine in herb layer
15	20	0	10	0	0	100	0	60	30	20	0	
18	30	0	5	0	0	100	0	0	60	40	0	main trail to beach
21	10	0	0	0	0	0	0	40	20	50	0	
24	20	0	5	0	0	100	0	40	60	30	0	trampled grass composes 20% of moss layer
27	30	0	5	0	0	100	0	70	10	30	0	
30	20	0	5	60	0	40	0	70	10	20	0	
33	0	30	40	0	0	10	30	70	0	20	0	small birch in shrub layer, pines in herb layer
36	0	0	5	0	0	100	0	90	10	10	0	
39	10	0	10	0	0	100	0	50	40	10	0	
42	30	0	0	0	0	0	0	20	60	40	0	trampled grass composes moss layer
45	20	0	0	0	0	0	0	10	80	20	0	trampled grass composes moss layer
48	30	0	0	0	0	0	0	10	80	20	0	trampled grass composes moss layer
51	20	0	0	0	0	0	0	20	70	40	0	
54	0	0	0	0	0	0	0	0	90	5	0	
57	0	0	5	0	0	100	0	30	40	30	0	
60	0	0	5	0	0	100	0	30	70	20	0	
63	20	5	0	0	0	0	0	30	50	40	0	
66	0	40	30	0	0	50	0	60	0	40	0	
69	80	60	30	10	0	30	0	20	0	70	0	
72	70	70	30	20	0	0	0	20	0	80	0	alders in shrub layer

Southend Campsites

Campsite #1

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	10	90	30	0	grass in moss layer
N-2	0	0	0	0	0	0	0	95	30	0	
N-3	0	0	0	0	0	0	0	90	20	0	10% exposed roots
N-4	0	0	0	0	0	0	0	100	50	0	
N-5	30	0	0	0	0	0	0	100	80	0	pine leaning into shrub layer
N-6	40	20	70	0	0	30	0	40	60	0	pine leaning into shrub layer
N-7	60	20	40	0	0	40	0	0	60	0	small pine in plot
W-1-9	transect goes to campsite #2 hibaci. 100% mineral soil.										transect enters adjacent campsite
S-1	0	0	0	0	0	0	80	20	0	0	grass in moss layer
S-2	10	20	80	0	20	0	40	20	40	0	grass in moss layer
S-3	20	10	40	0	60	0	0	70	50	0	
S-4	0	10	0	0	80	20	0	80	60	0	
S-5	50	40	10	0	20	70	20	20	30	0	
S-6	0	90	10	0	40	50	0	0	30	0	
E-1	20	20	50	0	0	50	0	10	90	0	
E-2	30	40	30	0	0	70	20	0	80	0	small apsen in shrub layer
E-3	20	20	30	0	0	70	40	0	60	0	grass in moss layer

Campsite # 2

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	20	0	
N-2	0	0	0	0	0	0	0	100	30	0	
N-3	0	0	0	0	0	0	0	100	10	0	
N-4	0	0	0	0	0	0	0	100	0	0	
N-5	0	0	0	0	0	0	0	100	0	0	
N-6	0	0	0	0	0	0	0	100	10	0	
N-7	0	0	0	0	0	0	0	100	20	0	
N-8	0	0	0	0	0	0	0	100	60	0	
N-9	0	0	0	0	0	0	0	100	80	0	
N-10	in main campground area, no need to continue transect										
W-1	0	15	100	0	0	0	0	90	80	0	
W-2	0	15	100	0	0	0	0	30	70	0	
W-3	0	40	80	0	0	20	0	10	90	0	
W-4	0	40	80	0	0	20	0	0	80	0	80% plot is tree trunk
W-5	0	10	100	0	0	0	0	20	80	0	
W-6	0	0	0	0	0	0	5	90	60	0	1.5m from campsite #1, grass in moss layer
S-1	0	5	100	0	0	0	0	80	20	0	
S-2	0	10	50	0	50	0	20	20	70	0	
S-3	20	20	50	0	50	0	60	10	30	0	
S-4	40	20	100	0	0	0	10	0	70	40	
E-1	10	30	10	0	30	60	30	30	50	0	
E-2	70	40	10	0	20	70	0	0	70	0	
E-3	40	80	10	0	30	60	50	0	50	0	

Southend Campsites

Campsite #3

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	10	0	
N-2	0	0	0	0	0	0	0	100	20	0	
N-3	0	10	100	0	0	0	0	90	10	0	
N-4	0	10	100	0	0	0	0	90	10	0	main area of campground
N-5	0	10	100	0	0	0	0	90	10	0	main area of campground
N-6	0	30	60	0	0	40	0	70	0	0	main area of campground
N-7	0	80	60	0	0	40	0	20	0	0	main area of campground
N-8	0	90	60	0	0	40	0	10	0	0	main area of campground, transect ended
W-1	40	60	50	0	50	0	0	10	40	0	
W-2	70	40	40	0	0	60	0	0	30	0	40% tree trunk in plot
S-1	20	10	30	0	0	70	0	0	50	0	
S-2	60	30	30	0	70	0	0	0	30	0	small trail to bear cache
E-1	0	60	50	0	20	30	0	40	20	0	
E-2	0	10	0	0	20	80	0	80	30	0	trail to outhouse
E-3	30	60	20	0	40	40	80	10	10	0	in fork of two trails to outhouse
E-4	30	60	10	0	10	80	100	0	0	0	in fork of two trails to outhouse

Campsite #4

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	20	90	0	10	0	10	10	80	0	
N-2	0	20	10	0	20	0	20	30	50	0	
N-3	80	20	30	0	0	0	30	0	70	0	pine leaning into shrub layer
N-4	20	40	30	0	20	50	30	0	70	0	pine leaning into shrub layer
W-1	40	30	0	0	50	50	50	10	40	0	30% of plot moss covered stump
W-2	20	50	20	0	30	50	70	10	20	0	
S-1	20	70	30	0	30	40	20	10	20	0	small apsen in shrub layer
S-2	60	60	20	0	10	70	30	0	40	0	
E-1	0	0	0	0	0	0	0	100	10	0	
E-2	0	0	0	0	0	0	0	100	10	0	
E-3	0	0	0	0	0	0	0	100	10	0	
E-4	0	0	0	0	0	0	0	100	10	0	
E-5	0	10	100	0	0	0	0	50	30	50	
E-6	0	10	100	0	0	0	0	30	60	70	
E-7	0	10	0	0	0	100	0	30	70	0	
E-8	transect enters campsite #3										

Southend Campsites

Campsite #5

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	10	100	0	0	0	0	30	70	0	
N-2	0	10	30	0	70	0	0	70	40	0	on trail to campsites #6 and #7
N-3	0	30	10	0	60	30	0	15	80	0	
N-4	20	40	20	0	0	80	0	10	70	0	
N-5	0	60	40	0	0	60	40	0	60	0	
N-6	0	40	20	0	0	80	60	0	40	0	
W-1	0	0	0	0	0	0	0	100	70	0	
W-2	0	0	0	0	0	0	0	100	70	0	
W-3	0	15	50	0	0	50	20	60	40	0	
W-4	20	50	0	0	0	100	20	10	90	0	
S-1	10	10	0	0	50	50	40	50	0	0	spruce leaning into shrub layer
S-2	60	30	0	0	0	100	0	0	100	0	
S-3	50	20	0	0	0	100	40	0	60	0	
E-1	20	30	10	0	20	70	10	50	40	0	birch leaning into shrub layer >1.5m
E-2	10	50	20	0	20	60	10	40	40	0	birch leaning into shrub layer >1.5m
E-3	0	20	70	0	0	30	20	60	30	0	
E-4	0	20	80	0	0	20	10	40	50	0	grass in moss layer
E-5	transect enters main campsite area										

Campsite #6

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	30	0	
N-2	0	0	0	0	0	0	10	95	30	0	grass in herb layer
N-3	0	0	0	0	0	0	0	100	20	0	
N-4	0	0	0	0	0	0	0	100	40	0	
N-5	0	0	0	0	0	0	0	10	90	0	stump in plot
N-6	50	30	0	0	0	100	10	0	90	0	fir leaning into shrub layer
N-7	50	30	0	0	0	100	80	0	20	0	fir leaning into shrub layer
W-1	0	0	0	0	0	0	0	100	70	0	pine leaning into shrub layer, tree trunk in plot
W-2	20	10	0	0	0	100	0	60	50	0	pine leaning into shrub layer
W-3	0	30	40	0	0	60	0	0	90	0	
W-4	50	40	50	0	0	50	0	0	80	0	
W-5	70	30	0	0	0	100	0	0	90	0	
S-1	30	60	20	0	40	40	20	10	50	0	
S-2	70	40	0	0	40	60	0	0	100	0	
E-1	0	10	50	0	50	0	0	70	40	0	
E-2	0	20	100	0	0	0	0	40	40	0	20% plot covered by pine tree
E-3	10	20	10	0	80	10	10	20	80	0	
E-4	10	40	10	0	50	40	10	10	80	0	
E-5	30	50	10	0	20	70	0	0	80	0	spruce and pine leaning into shrub layer
E-6	50	40	20	0	0	80	20	0	80	0	

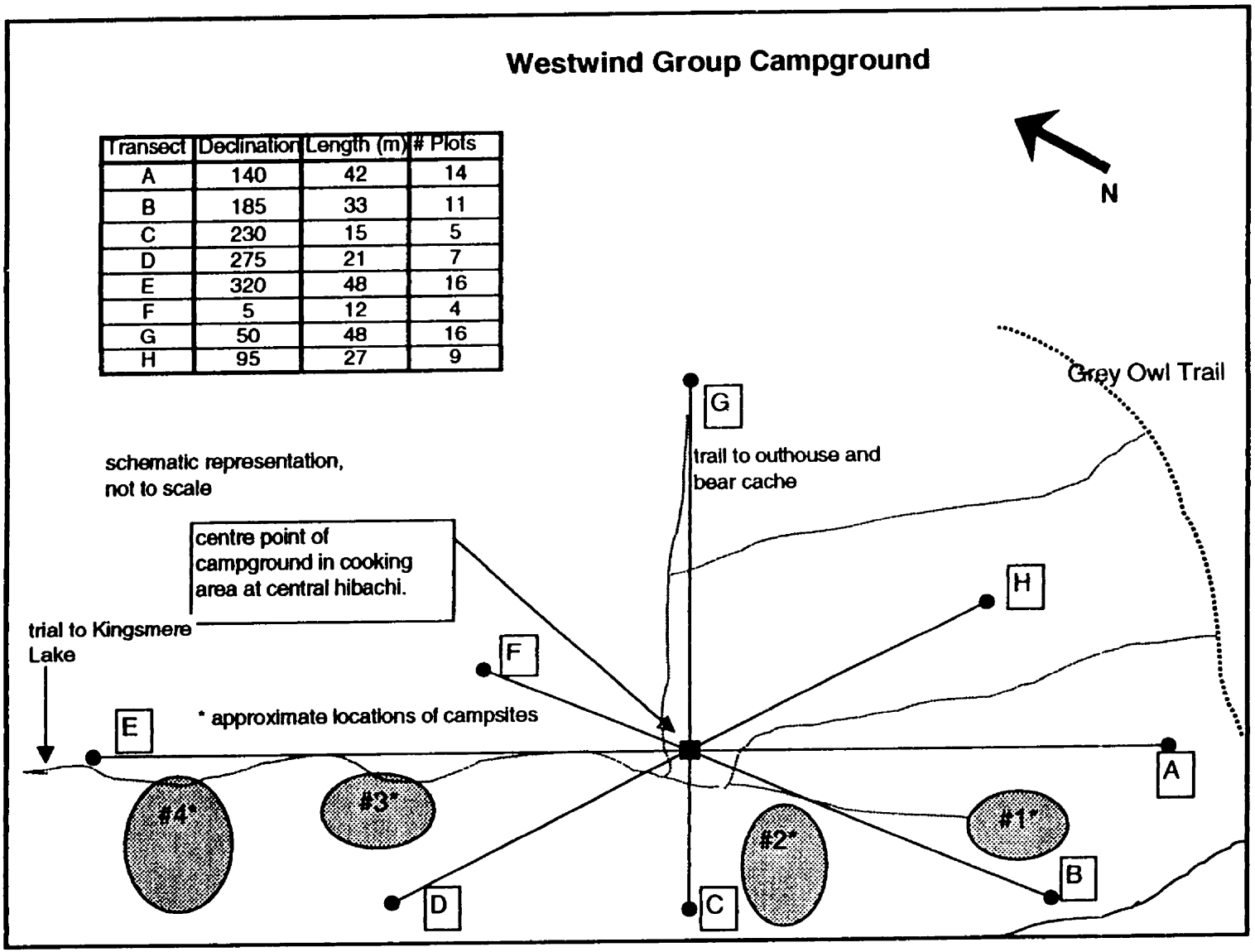
Southend Campsites

Campsite #7

direction/	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	70	20	0	0	0	100	0	0	100	0	
N-2	50	40	20	0	0	80	0	0	100	0	
W-1	80	20	0	0	0	100	0	0	100	0	pine leaning into shrub layer
W-2	80	40	20	0	0	80	0	0	70	0	
S-1	20	0	0	0	0	0	0	100	20	0	fir leaning into shrub layer, crossing trail to #6
S-2	20	0	0	0	0	0	0	100	20	0	fir leaning into shrub layer
S-3	20	0	0	0	0	0	0	100	20	0	fir leaning into shrub layer
S-4	20	0	0	0	0	0	0	100	20	0	fir leaning into shrub layer
S-5	20	0	0	0	0	0	0	100	20	0	fir leaning into shrub layer
S-6	0	10	0	0	0	100	20	80	20	0	
S-7	60	20	0	0	0	100	0	0	20	0	between campsites #5 and #6
E-1	70	10	50	0	0	50	0	0	80	0	spruce leaning into shrub layer
E-2	90	20	10	0	0	90	0	0	100	0	spruce leaning into shrub layer

Westwind Group Campground

Transect	Declination	Length (m)	# Plots
A	140	42	14
B	185	33	11
C	230	15	5
D	275	21	7
E	320	48	16
F	5	12	4
G	50	48	16
H	95	27	9



Westwind Group Campground

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	40	0	20	70	0	0	30	10	40	20	0	5% plot is 2 rocks, 20% 2 birch trees

Transect A (140o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	0	0	0	0	0	0	0	40	80	0	5% tree roots, 5% rock
6	60	0	10	0	0	0	100	0	10	70	0	30% exposed rock
9	50	10	15	0	0	100	0	20	10	70	0	10% rock, birch leaning into shrub layer
12	70	70	5	50	0	0	50	0	0	100	0	spruce leaning into shrub layer
15	70	40	0	0	0	0	0	10	0	90	0	spruce leaning into shrub layer
18	70	10	30	0	0	70	30	30	0	70	0	spruce leaning into shrub layer
21	50	0	20	0	0	50	50	0	60	40	0	main trail into campground
24	50	0	20	0	0	20	80	30	0	60	10	
27	30	0	10	0	0	100	0	80	0	20	15	
30	30	0	10	0	0	20	80	15	0	70	15	
33	60	40	5	0	0	0	100	0	0	100	0	spruce leaning into shrub layer
36	50	40	0	0	0	0	0	20	0	80	10	fir leaning into shrub layer
39	20	10	0	0	0	0	0	80	0	20	0	
42	30	60	0	0	0	0	0	5	0	95	5	

Transect B (185o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	10	0	0	0	0	0	0	0	100	70	0	
6	60	0	0	0	0	0	0	0	95	60	0	5% tree roots
9	80	0	5	0	0	0	100	0	75	50	0	25% tree and roots
12	40	10	10	0	0	0	100	0	90	70	10	spruce leaning into plot, >1.5m
15	0	30	10	80	0	10	10	10	15	80	5	
18	0	20	30	20	0	50	30	0	60	40	0	crosses trail to campsites #1
21	0	40	40	50	0	20	30	30	20	60	0	crosses trail to campsites #1
24	0	70	20	0	0	50	50	30	0	100	20	
27	in tentpad of campsite #1											
30	20	40	20	0	0	0	100	30	0	70	0	poplar leaing into shrub layer
33	40	70	30	20	30	30	20	0	10	90	0	

Westwind Group Campground

Transect C (230o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	50	0	0	0	0	0	0	0	95	60	0	5% tree roots
6	10	10	20	0	0	0	100	0	70	30	0	spruce leaning into shrub layer
9	0	50	30	0	0	10	90	30	0	70	5	
12	10	40	30	30	0	0	70	20	0	70	10	
15	30	30	60	0	0	20	80	10	0	90	0	

Transect D (275o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	10	0	5	0	0	0	100	0	100	30	0	
6	0	10	30	0	0	0	100	20	60	40	0	aspen leaning into shrub layer
9	0	20	70	0	0	10	90	10	10	80	0	aspen leaning into shrub layer
12	10	5	30	0	0	0	100	40	0	60	10	aspen leaning into shrub layer
15	50	30	40	0	0	0	100	0	0	90	5	aspen and spruce leaning into shrub layer
18	60	30	20	40	0	0	60	20	0	80	0	spruce leaning into shrub layer
21	60	60	5	0	0	0	100	10	0	90	10	spruce leaning into shrub layer

Transect E (320o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	0	20	70	0	0	30	10	0	90	0	5% rock exposed
6	80	0	10	0	0	0	100	10	0	90	0	under larger spruce
9	50	50	10	0	0	0	100	40	0	60	0	spruce leaning into plot
12	0	20	10	0	0	0	100	70	10	30	0	spruce leaning into plot
15	0	5	10	0	0	0	100	30	60	20	0	spruce leaning into plot, trail to campsites 3&4
18	0	10	20	10	0	10	80	20	80	10	0	spruce leaning into plot
21	0	0	10	20	0	20	60	10	70	20	0	trail
24	0	0	30	0	0	30	80	20	60	20	0	
27	0	20	30	0	0	10	90	20	50	30	0	trail in portion of plot
30	0	0	10	40	0	0	60	30	30	60	0	
33	0	30	20	0	0	40	60	10	10	80	0	
36	0	50	40	80	0	10	10	40	5	60	0	
39	0	10	50	20	0	60	20	20	0	80	0	spruce leaning into plot
42	0	80	0	0	0	0	0	20	0	40	40	
45	0	60	20	0	0	100	0	60	0	20	20	
48	0	30	10	0	0	0	100	10	0	10	10	fir tree leaning into plot

Westwind Group Campground

Transect F (5o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	10	5	0	0	80	20	30	20	30	0	30% rock exposed, birch in shrub layer
6	10	30	10	0	0	100	0	70	0	20	0	15% birch in plot
9	60	0	5	0	0	0	100	70	0	20	0	2 trees in plot
12	30	80	20	0	0	50	50	20	0	80	20	spruce leaning into shrub layer

Transect G (50o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	0	10	0	50	50	0	20	40	30	0	10% rock exposed
6	20	0	30	0	0	70	30	20	10	70	5	
9	40	0	20	0	0	60	40	20	80	30	0	on trail to outhouse
12	60	0	10	50	0	50	0	5	70	40	0	adjacent to trail to outhouse
15	40	0	10	0	0	0	100	20	60	30	0	10% birch tree covering plot
18	60	0	10	20	0	10	70	20	70	20	15	on trail to outhouse
21	Outhouse in plot											
24	0	0	20	80	0	0	20	40	20	40	0	fir leaning into plot
27	0	0	20	100	0	0	0	5	0	95	0	
30	0	0	20	60	0	0	40	80	0	20	10	
33	0	20	10	0	0	0	100	20	0	80	10	spruce leaning into shrub layer
36	70	30	5	0	0	0	100	0	0	100	0	spruce leaning into shrub layer
39	80	0	0	0	0	0	0	0	0	100	0	
42	60	0	0	0	0	0	0	80	0	10	20	
45	30	20	0	0	0	0	0	70	0	20	10	spruce leaning into shrub layer
48	0	0	20	100	0	0	0	100	0	0	0	

Transect H (95o)

distance	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	0	30	0	0	60	40	15	40	30	0	15% exposed rock
6	30	0	10	0	0	100	0	15	10	60	0	25% exposed rock
9	30	0	70	40	0	40	20	30	0	70	0	
12	50	0	60	0	0	70	30	10	0	60	30	
15	60	40	5	0	0	50	50	20	0	80	0	pine leaning into shrub layer
18	80	40	20	0	0	40	60	10	0	90	0	pine leaning into shrub layer
21	60	20	40	30	0	30	40	10	0	80	10	
24	30	10	40	0	0	0	100	60	0	40	0	
27	30	40	10	0	0	0	100	50	0	30	20	apsen leaning into shrub layer

Westwind Campsites

Campsite #1

direction/t	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	15	15	0	70	15	0	80	20	0	
N-2	30	30	20	0	50	30	0	40	60	0	
N-3	10	30	50	0	30	20	0	70	30	0	trail to main campground area
N-4	20	50	80	0	0	20	20	40	40	0	intersection of 2 trails
W-1	50	40	40	30	70	0	20	10	70	0	spruce leaning into plot
W-2	80	40	40	0	20	50	0	0	80	0	spruce leaning into plot, 60% >1.5m
S-1	70	20	20	0	0	100	0	0	80	0	
S-2	80	10	10	0	0	100	0	0	80	0	1/2 m from Lake
E-1	20	10	0	0	0	100	20	60	0	20	pine leaning into shrub layer,
E-2	20	30	0	0	0	100	30	0	70	0	pine tree in plot
E-3	0	20	20	0	0	80	20	40	40	0	main trail in campground

Campsite #2

direction/t	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	10	30	50	0	40	10	5	70	25	0	birch leaning into shrub layer
N-2	20	20	20	0	60	20	30	40	30	0	trail to cooking area
N-3	0	10	30	0	30	40	10	50	40	0	trail to cooking area
N-4	0	20	20	0	70	10	0	80	20	0	trail to cooking area
N-5	60	20	30	0	70	0	10	15	70	5	
N-6	80	20	0	0	10	90	20	0	80	0	adjacent to trail
W-1	80	10	0	0	0	100	0	0	90	0	10% tree in plot
W-2	80	10	0	0	0	100	10	0	70	20	fir leaning into shrub layer
S-1	60	30	40	0	0	60	20	0	60	20	pine leaning into shrub layer
S-2	40	60	40	0	0	60	70	0	30	0	pine, birch and aspen leaning into shrub layer
E-1	0	20	0	0	20	80	10	70	20	0	
E-2	0	10	30	0	0	70	30	65	0	0	
E-3	0	10	0	0	90	10	25	75	0	0	trail from Lake
E-4	10	30	0	0	40	60	60	0	40	0	
E-5	20	30	10	0	0	90	20	0	70	10	

Westwind Campsites

Campsite #3

direction/n	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	30	60	0	0	40	60	15	0	85	0	
N-2	20	70	10	0	0	90	20	0	80	0	
W-1	0	60	10	0	0	90	10	20	70	0	
W-2	20	70	10	0	0	90	40	0	60	0	
W-3	30	40	10	0	30	60	40	0	50	10	
S-1	20	0	0	0	0	0	15	60	25	0	
S-2	20	50	0	0	0	100	30	20	50	0	
S-3	10	60	0	0	0	100	30	0	70	0	
E-1	0	15	0	0	0	100	10	50	25	0	15% exposed rock
E-2	90% of plot in trail to campsite #4										trail to campsite #4

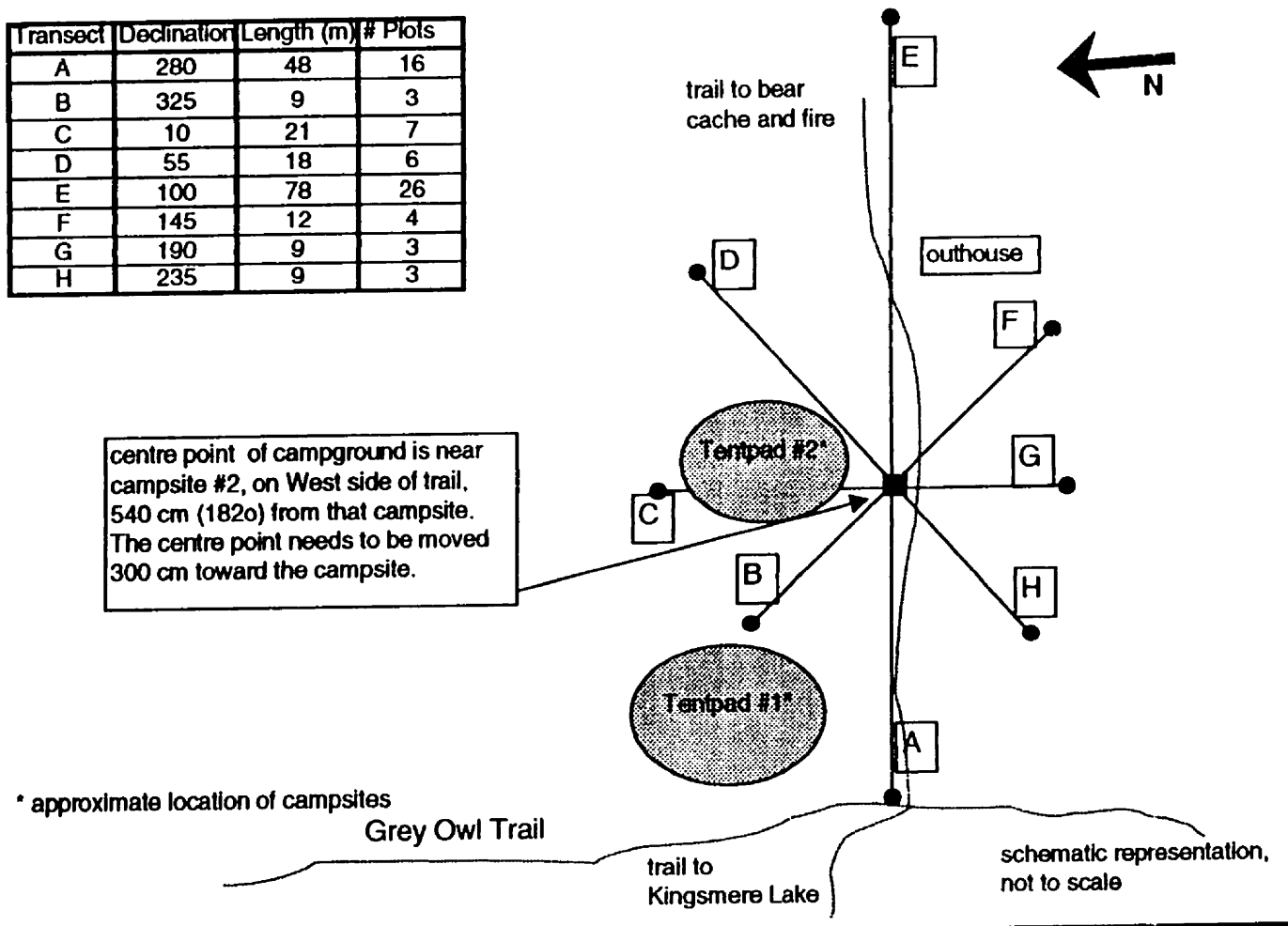
Campsite #4

Westwind Campsite #4

direction/n	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	30	50	0	0	0	100	0	20	60	0	
N-2	20	20	10	0	50	40	0	40	60	0	aspen leaning into shrub layer
N-3	10	10	40	0	30	30	0	60	40	0	
N-4	20	40	70	0	20	10	0	40	60	0	
N-5	20	40	70	0	0	30	20	15	65	0	
N-6	trail to Lake										
W-1	5	20	20	0	0	80	0	14	60	0	
W-2	0	30	0	0	60	40	10	10	80	0	
W-3	0	50	10	0	30	60	0	0	30	10	
W-4	20	20	40	0	0	60	0	0	85	15	aspen leaning into shrub layer
W-5	60	30	10	0	0	90	0	0	80	20	2 pines leaning into shrub layer
W-6	60	10	0	0	0	100	10	0	70	20	
S-1	20	10	100	0	0	0	60	20	20	0	
S-2	60	10	0	0	0	100	10	0	30	20	
S-3	70	20	0	0	0	100	0	0	80	20	
E-1	60	30	0	0	60	40	40	0	60	0	aspen leaning into shrub layer
E-2	20	50	10	0	60	30	85	0	15	0	

Chipewyan Portage Campground

Transect	Declination	Length (m)	# Plots
A	280	48	16
B	325	9	3
C	10	21	7
D	55	18	6
E	100	78	26
F	145	12	4
G	190	9	3
H	235	9	3



Chipewyan Portage Campground

The centre point of the campground is near campsite #2, next to a small pine and large pine on the west side of the trail. 182o, and 540cm, facing across the trail to the campsite. The centre point needs to be moved 300cm toward the campsite, as the pin could not be placed in the trail.

Centre

centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	20	0	0	0	0	0	0	0	5	95	0	15% tree roots

Transect A (280o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	15	20	0	0	50	50	0	5	60	0	5% tree roots
6	0	10	5	0	0	0	100	15	40	30	0	in main trail
9	0	0	0	0	0	0	0	5	80	20	0	in main trail
12	0	20	40	20	0	10	70	20	40	10	0	half plot in main trail
15	0	0	70	20	0	10	70	0	5	10	0	adjacent to main trail
18	40	20	50	0	0	30	70	60	0	5	0	adjacent to main trail
21	0	0	10	50	0	0	50	0	0	90	0	slightly East of main trail
24	0	0	30	20	0	0	70	0	0	0	0	
27	0	10	30	20	0	10	0	0	0	75	0	adjacent to group campsite and main trail
30	70	0	50	0	0	0	100	0	0	30	0	adjacent to main trail
33	30	0	15	0	0	0	80	30	0	50	0	20% tree in herb layer
36	0	5	30	0	0	0	100	30	0	30	0	adjacent to main trail
39	0	60	20	10	0	10	80	0	0	20	0	adjacent to main trail
42	0	10	40	60	0	10	30	30	0	0	30	near small trail
45	0	30	60	20	0	0	80	20	0	30	0	
48	40	20	70	30	0	0	70	10	0	50	0	

Transect B (325o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	50	30	20	0	0	0	100	0	0	90	0	10% tree trunk, spruce in shrub layer
6	30	50	20	0	0	0	100	70	0	30	0	
9	40	70	0	0	0	0	0	0	0	0	10	spruce in shrub layer

Chipewyan Portage Campground

Transect C (10o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	0	0	0	0	0	0	0	60	40	0	in campsite #2
6	10	0	0	0	0	0	0	0	20	80	0	
9	20	30	20	100	0	0	0	10	0	70	0	
12	40	0	30	0	0	0	100	0	0	50	10	
15	30	0	10	0	0	0	100	10	0	60	5	
18	0	0	10	30	0	40	40	90	0	0	5	
21	0	80	0	0	0	0	0	30	0	50	10	

Transect D (55o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	in tentpad											
6	in tentpad											
9	70	20	5	0	0	0	100	0	0	90	0	10% tree trunk, pine leaning into shrub layer
12	70	40	10	0	0	0	100	30	0	30	0	pine leaning into shrub layer
15	10	20	20	50	0	0	50	80	0	0	0	20% tree trunk, pine leaning into shrub layer
18	10	60	0	0	0	0	0	20	0	80	0	pine leaning into shrub layer, adjacent to large pine

Chipewyan Portage Campground

Transect E (100o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	0	0	0	0	0	0	80	0	0	enterance to campsite #2
6	0	20	20	0	0	0	100	10	0	70	0	adjacent to main trail, pine in shrub layer
9	15	10	15	0	0	0	100	40	0	60	0	pine in shrub layer, 30% plot main trail
12	0	0	5	0	0	0	100	5	30	75	0	plot on main trail
15	0	0	0	0	0	0	0	0	25	75	0	plot on main trail
18	0	0	5	0	0	0	100	10	0	85	0	plot on main trail
21	20	0	20	0	0	0	100	60	0	35	0	30% plot on main trail
24	40	0	20	0	0	20	80	10	0	70	0	
27	20	0	10	0	0	0	100	15	0	80	15	
30	0	0	10	0	0	0	100	30	20	60	0	plot on main trail
33	0	0	5	0	0	70	30	30	30	40	0	plot on main trail
36	0	0	5	0	0	0	100	5	50	50	0	plot on main trail
39	0	0	20	0	0	0	100	20	40	40	0	5% tree in shrub layer
42	0	0	5	100	0	0	0	40	0	60	0	
45	0	0	30	20	0	0	0	60	5	35	0	80% spruce in shrub layer
48	0	0	5	0	0	0	100	0	20	80	0	at bear cache
51	0	0	0	0	0	0	0	0	75	25	0	at bear cache
54	0	0	5	100	0	0	0	15	20	80	0	at bear cache
57	0	0	5	0	0	100	0	20	0	80	0	
60	0	0	0	0	0	0	0	0	15	70	0	
63	0	0	0	0	0	0	0	30	0	70	0	
66	0	0	30	40	0	20	40	70	0	20	0	
69	0	0	10	50	0	30	20	80	10	0	0	
72	0	0	40	50	0	50	0	95	0	0	0	
75	10	0	5	100	0	0	0	95	0	0	0	
78	10		5	100	0	0	0	100	0	0	0	

Chipewyan Portage Campground

Transect F (145o) marker approx. 40cm behind stump

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	60	20	10	0	0	0	100	10	5	85	0	
6	10	50	10	0	0	0	100	75	0	25	0	pine leaning into shrub layer
9	0	30	10	0	0	0	100	90	0	10	0	pine leaning into shrub layer
12	10	40	10	0	0	0	100	85	10	5	0	15% large stump

Transect G (190o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	20	40	80	0	0	20	80	0	10	0	
6	10	0	30	100	0	0	0	90	0	0	15	
9	80	30	10	0	0	0	100	30	0	50	0	50% of plot large pine

Transect H (235o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	30	60	40	0	0	60	85	0	15	0	
6	0	20	70	30	0	0	70	80	0	20	0	
9	0	20	70	20	0	0	80	95	0	0	5	

Chipewyan Campsites

Campsite #1, nearest main trail, double campsite

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	20	0	0	0	100	0	0	80	0	
N-2	10	30	0	0	30	70	0	0	95	0	small apsen in shrub layer
N-3	30	40	0	0	0	100	0	5	95	0	
N-4	50	40	0	0	0	100	0	5	95	0	spruce leaning into shrub layer
N-5	40	30	0	0	10	90	15	0	85	0	40% of shurb layer >2m
W-1	0	0	0	0	0	0	0	20	80	0	
W-2	0	30	20	0	30	50	0	5	80	0	
W-3	40	50	20	0	20	60	0	0	80	0	50% of shrub layer >2m
W-4	70	30	0	0	0	100	0	0	80	0	spruce leaning into shrub layer
S-1	MinSoil to main trail							100	0	0	
S-2	MinSoil to main trail							100	0	0	
S-3	MinSoil to main trail							100	0	0	
S-4	MinSoil to main trail							100	0	0	
E-1	0	50	40	0	20	40	25	0	60	0	
E-2	0	70	20	0	20	60	10	0	40	0	stump covers 10% of plot

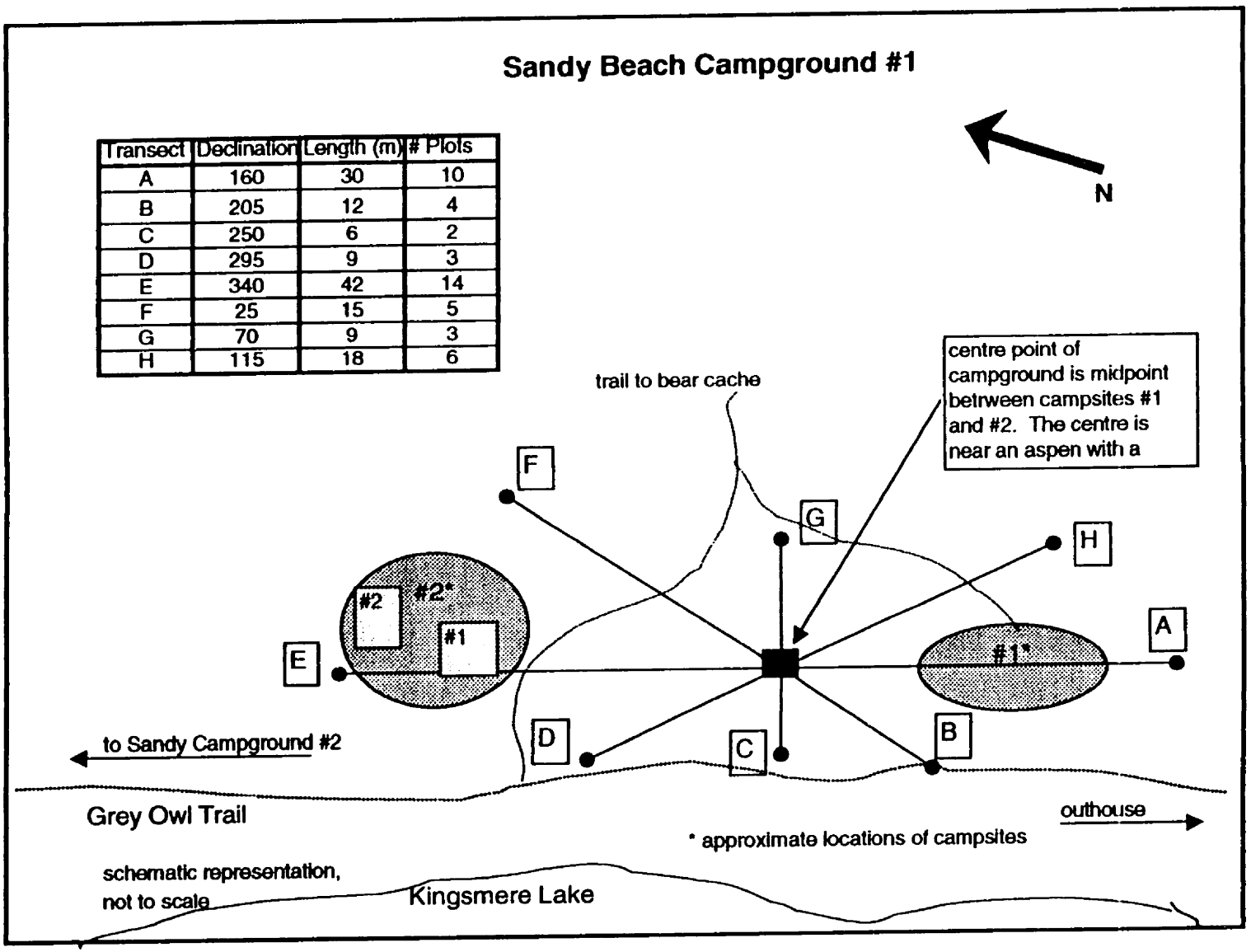
Chipewyan Campsites

Campsite #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	0	100	0	
N-2	0	0	0	0	0	0	0	0	90	0	stump 10% of plot
N-3	0	0	0	0	0	0	0	0	100	0	
N-4	30	30	0	0	100	0	20	0	80	0	small spruce in shrub layer
N-5	50	20	0	0	0	100	20	0	80	0	2 small pines in shrub layer
N-6	0	20	0	0	0	100	0	10	90	0	
N-7	0	40	0	0	0	100	0	0	90	0	stump 10% of plot
N-8	20	30	0	0	0	100	0	0	90	10	
N-9	20	10	0	0	0	100	50	0	35	15	
N-10	0	10	0	0	0	100	100	0	0	0	
W-1	0	0	0	0	0	0	0	100	0	0	
W-2	0	0	0	0	0	0	0	100	0	0	
W-3	10	0	0	0	0	0	0	100	0	0	pine leaning into shrub layer
W-4	30	10	0	0	0	100	0	20	80	0	
W-5	0	10	0	0	0	100	0	10	70	0	
W-6	0	10	0	0	0	100	0	0	100	0	
W-7	50	10	0	0	0	100	0	0	85	0	15% tree and exposed roots
W-8	70	20	0	0					90	0	10% tree and exposed roots
S-1	50	20	0	0	0	100	10	0	70	20	pine leaning into shrub layer
S-2	75	10	0	0	0	100	0	0	80	20	pine leaning into shrub layer
E-1	10	0	0	0	0	0	15	10	75	0	small spruce in shrub layer
E-2	60	10	0	0	0	100	0	0	100	0	small pine in shrub layer
E-3	50	0	0	0	0	0	10	0	90	0	
E-4	25	20	10	0	30	60	80	0	20	0	pine leaning into shrub layer
E-5	0	20	30	0	10	60	100	0	0	0	pine leaning into shrub layer

Sandy Beach Campground #1

Transect	Declination	Length (m)	# Plots
A	160	30	10
B	205	12	4
C	250	6	2
D	295	9	3
E	340	42	14
F	25	15	5
G	70	9	3
H	115	18	6



Sandy Beach Campground # 1,
two campsites closest to outhouse (one single site, one double site

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	20	30	40	0	0	60	40	60	0	40	0	20% tree trunk

Transect A (160o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	10	0	30	10	0	30	60	60	0	40	0	
6	0	0	30	0	0	0	100	60	0	40	0	
9	50	10	20	0	0	100	0	0	30	60	0	10% spruce
12	0	0	0	0	0	0	0	0	80	20	0	in campsite #1
15	0	0	0	0	0	0	0	0	90	10	0	in campsite #1
18	0	0	5	0	0	100	0	0	90	5	0	in campsite #1
21	0	0	15	80	0	20	0	10	80	10	0	end of campsite #1
24	50	80	20	0	0	30	70	20	0	80	0	
27	10	0	70	50	0	20	30	90	0	10	0	
30	10	10	30	0	0	30	70	90	0	10	0	

Transect B 205o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	60	30	50	0	0	80	20	0	0	80	0	
6	0	0	40	0	0	30	70	70	10	20	0	small trail leading to bear cache
9	0	0	70	80	0	20	0	10	0	90	0	
12	on main trail to Grey Owl's cabin, pin placed at 12m											

Transect C 250o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	70	0	70	60	0	40	0	30	0	70	0	
6	0	20	30	30	0	50	20	10	50	40	0	50% on trail to Grey Owl's cabin

Sandy Beach Campground # 1

Transect D 295o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	70	80	0	10	10	70	20	10	0	
6	30	10	60	70	0	10	20	100	0	0	0	
9	50	30	70	80	0	0	20	50	0	10	0	
meets main trail to Grey Owl's Cabin												

Transect E 340o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	60	0	70	20	0	70	10	0	0	90	0	
6	20	10	20	30	0	40	30	10	0	90	0	
9	10	0	40	20	0	10	70	30	0	70	0	
12	10	60	50	30	0	20	50	90	0	10	0	
15	50	0	10	0	0	60	40	20	0	80	0	
18	0	10	10	0	0	0	100	0	30	70	0	fir leaning into plot
21	0	0	0	0	0	0	0	0	95	5	0	
24	0	0	0	0	0	0	0	0	60	40	0	
27	in campsite #2											
30	in campsite #2											
33	50	10	40	0	0	50	50	20	0	80	0	fir leaning into plot
36	10	30	60	20	0	30	50	70	0	30	0	
39	30	5	60	0	0	20	80	70	0	30	0	fir leaning into plot
42	50	50	20	0	0	30	70	60	0	40	0	

Transect F 25o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	70	0	30	40	0	60	0	10	0	90	0	
6	70	70	0	0	0	0	0	10	0	90	10	spruce leaning into shrub layer
9	50	20	40	20	0	0	80	60	0	40	0	
12	0	0	60	0	0	20	80	90	0	10	0	
15	0	30	50	60	0	20	20	20	0	80	0	

Sandy Beach Campground # 1

Transect G 70o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	30	20	40	20	0	40	40	50	0	50	0	
6	20	0	50	10	0	20	70	70	0	20	10	
9	10	0	60	60	0	10	30	80	0	20	0	

Transect H 115o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	0	50	20	0	30	50	60	0	40	0	
6	10	0	60	30	0	30	40	50	0	50	0	
9	70	30	20	60	0	10	30	0	0	100	0	
12	0	0	90	30	0	10	30	50	0	50	0	40% herb layer fir leaning into plot
15	0	0	40	60	0	10	30	70	10	20	0	
18	30	30	40	0	0	20	80	90	0	10	0	small trail to bear cache

Sandy Beach Campground #1, campsite #1

centre point is halfway between stump and hibachi

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	0	0	
N-2	0	0	0	0	0	0	0	95	5	0	
N-3	0	0	0	0	0	0	0	95	5	0	
N-4	0	0	0	0	0	0	0	50	50	0	
N-5	0	0	0	0	0	0	0	60	40	0	
N-6	0	5	100	0	0	0	0	90	5	0	
N-7	15	10	100	0	0	0	0	40	35	0	
N-8	40	40	100	0	0	0	0	0	70	0	fir leaning into plot
N-9	60	40	40	0	20	40	20	0	80	0	fir leaning into plot
W-1	0	0	0	0	0	0	0	95	5	0	
W-2	0	0	0	0	0	0	0	95	5	0	
W-3	0	0	0	0	0	0	0	90	10	0	
W-4	0	0	0	0	0	0	0	80	20	0	
W-5	0	30	100	0	0	0	0	60	40	0	
W-6	0	60	80	0	0	0	0	20	80	0	
W-7	Trail to Grey Owl's cabin										
S-1	0	0	0	0	0	0	0	95	5	0	
S-2	0	0	0	0	0	0	0	80	20	0	
S-3	30	10	20	0	80	0	0	70	30	0	spruce leaning into plot
S-4	40	30	30	0	70	0	20	10	70	0	
S-5	50	20	70	0	0	30	70	0	30	0	
E-1	0	0	0	0	0	0	0	95	5	0	
E-2	0	0	0	0	0	0	0	95	5	0	
E-3	0	100	100	0	0	0	0	90	5	0	
E-4	0	90	90	0	10	0	0	70	10	0	
E-5	5	40	40	0	40	20	0	40	60	0	
E-6	10	60	60	0	40	0	20	10	90	0	
E-7	40	30	30	0	20	50	40	0	60		

Sandy Beach Campground #1, campsite #2 tentpad #1

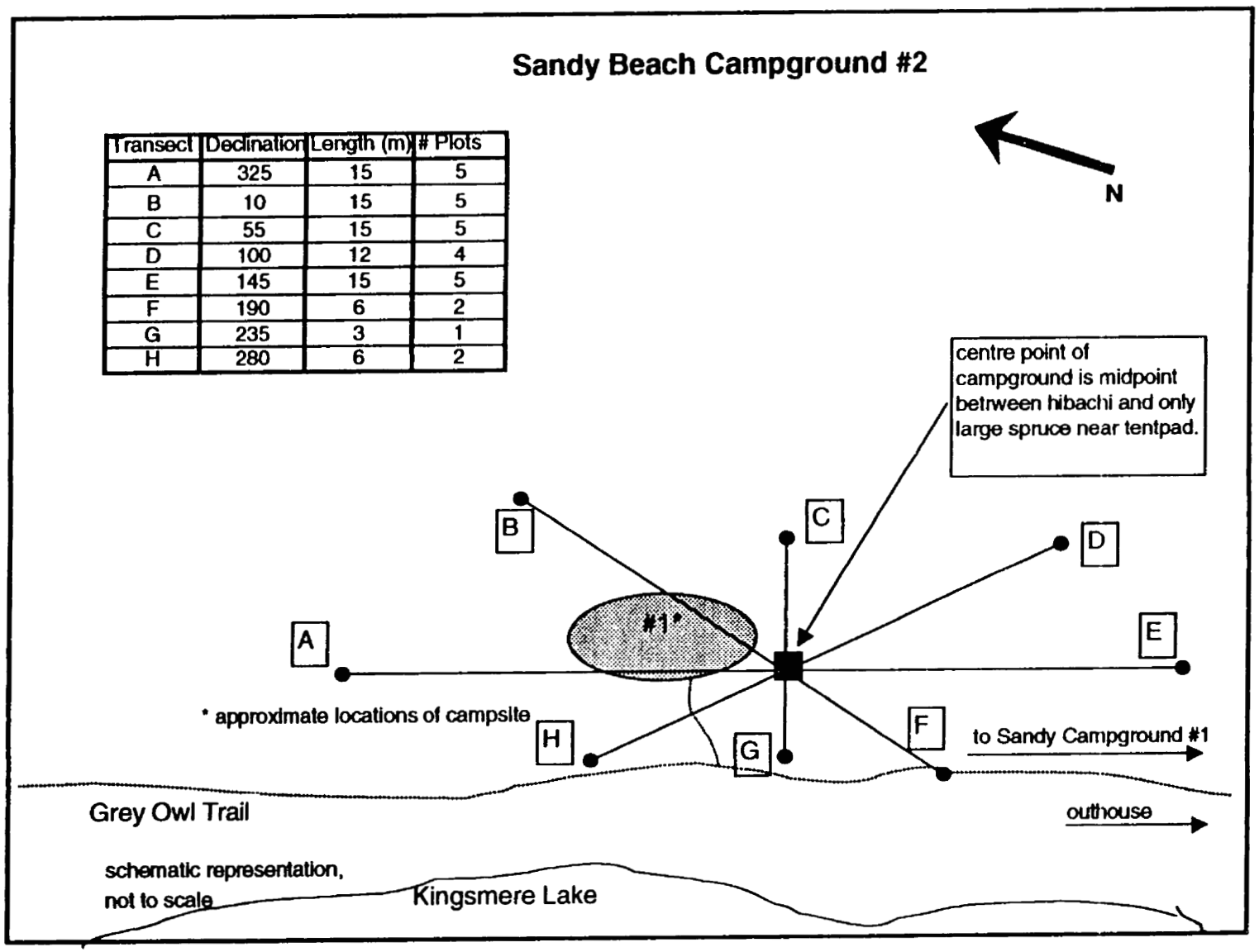
direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	10	10	100	0	0	0	0	20	70	0	
N-2	80	20	100	0	0	0	0	0	100	0	fir tree in plot
N-3	40	10	50	0	0	50	60	0	40	0	
W-1	0	0	0	0	0	0	0	40	60	0	
W-2	0	0	0	0	0	0	0	50	50	0	
W-3	0	0	0	0	0	0	0	50	50	0	
W-4	0	0	0	0	0	0	0	60	40	0	
W-5	0	20	10	0	80	10	10	20	70	0	
W-6	60	60	10	0	80	10	30	0	70	0	
W-7	50	30	0	0	30	70	70	0	30	0	
S-1	0	0	0	0	0	0	0	70	30	0	
S-2	0	0	0	0	0	0	0	30	10	0	
S-3	10	10	0	0	0	0	0	10	90	0	fir leaning in
S-4	0	0	0	0	0	0	0	0	100	0	
S-5	0	20	50	0	0	50	60	0	40	0	
S-6	0	40	15	0	15	70	50	0	50	0	
S-7	0	50	10	0	20	70	90	0	10	0	
E-1	20	20	50	0	50	0	40	0	40	0	
E-2	20	40	30	0	40	30	60	20	40	0	
E-3	60	30	50	0	10	60	60	0	25	10	fir leaning in

Sandy Beach Campground #1, campsite #2 tentpad #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	40	30	30	0	0	70	0	0	100	0	
N-2	50	30	30	0	0	70	0	0	100	0	
W-1	0	0	100	0	0	0	0	0	100	0	
W-2	0	0	5	0	70	25	0	0	100	0	
W-3	0	0	20	0	60	20	30	0	70	0	small trail leading to main trail
W-4	0	0	50	0	0	50	60	0	30	0	small trail leading to main trail
W-5	0	0	60	0	0	40	90	0	10	0	
S-1	0	0	0	0	0	0	0	20	80	0	
S-2	0	0	0	0	0	0	0	80	20	0	
S-3	0	0	0	0	0	0	0	60	40	0	
S-4	0	0	0	0	0	0	0	70	30	0	
S-5	0	0	0	0	0	0	0	70	30	0	
S-6	0	0	0	0	0	0	0	60	40	0	crosses in front of tentpad #1
S-7	20	10	80	0	0	20	40	10	50	0	spruce leaning into plot
S-8	0	20	30	0	30	40	70	30	0	0	trail
S-9	50	60	60	0	0	40	30	0	50	0	small spruce
S-10	0	40	30	0	40	30	70	0	30	0	fir leaning into plot
E-1	0	30	5	0	70	20	0	0	100	0	
E-2	0	40	20	0	70	10	10	0	80	0	
E-3	0	60	40	0	50	10	20	0	80	0	
E-4	20	20	10	0	60	30	40	0	60	0	

Sandy Beach Campground #2

Transect	Declination	Length (m)	# Plots
A	325	15	5
B	10	15	5
C	55	15	5
D	100	12	4
E	145	15	5
F	190	6	2
G	235	3	1
H	280	6	2



Sandy Beach Campground # 2

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	40	0	0	0	0	0	0	0	70	30	0	midpoint between hib and large spruce

Transect A (325o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	0	0	0	0	0	0	30	70	0	30% of plot in tentpad
6	80	0	10	50	0	10	40	0	0	100	0	
9	70	0	50	70	0	10	20	0	0	85	15	
12	30	20	50	40	0	10	50	70	0	20	0	
15	20	20	40	30	0	20	50	80	0	30	0	

Transect B (10o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	0	0	0	0	0	0	0	30	70	0	40% of plot in tentpad
6	30	30	10	0	0	100	0	0	0	100	0	70% of plot in tentpad
9	20	40	40	30	0	10	60	60	0	40	0	
12	20	20	30	30	0	10	60	80	0	20	0	
15	0	10	40	20	0	0	80	90	0	10	0	

Transect C (55o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	10	5	10	30	0	0	70	0	10	90	0	
6	70	10	30	60	0	10	30	0	0	100	0	
9	20	40	40	60	0	10	30	20	0	70	10	
12	0	0	20	70	0	10	20	0	0	80	20	
15	20	15	40	80	0	0	20	40	0	60	0	

Sandy Beach Campground # 2

Transect D (100o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	5	30	30	0	20	50	0	10	80	0	
6	0	10	60	40	0	40	20	70	0	30	0	
9	0	20	50	20	0	10	70	80	0	20	0	
12	0	40	60	10	0	10	80	90	0	10	10	

Transect E (145o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	10	70	30	0	10	60	0	0	40	0	
6	0	30	50	0	0	20	80	0	0	50	0	60% of shrub layer is herbs
9	0	30	20	0	0	20	80	70	0	30	0	small spruce leaning into plot
12	0	70	20	0	0	10	90	90	0	10	0	
15	0	50	70	30	0	0	70	70	0	20	0	

Transect F (190o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	50	50	20	60	30	0	
6	0	0	60	30	0	30	40	20	0	30	0	30% of plot in mal trail to Grey Owl

Transect G (235o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	20	50	50	0	20	30	70	0	30	0	crosses trail to Grey Owl's Cabin

Transect H (280o)

distance /r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	20	30	50	0	30	20	20	30	50	0	
6	0	0	30	20	0	50	30	30	20	50	0	trail to Grey Owl's cabin

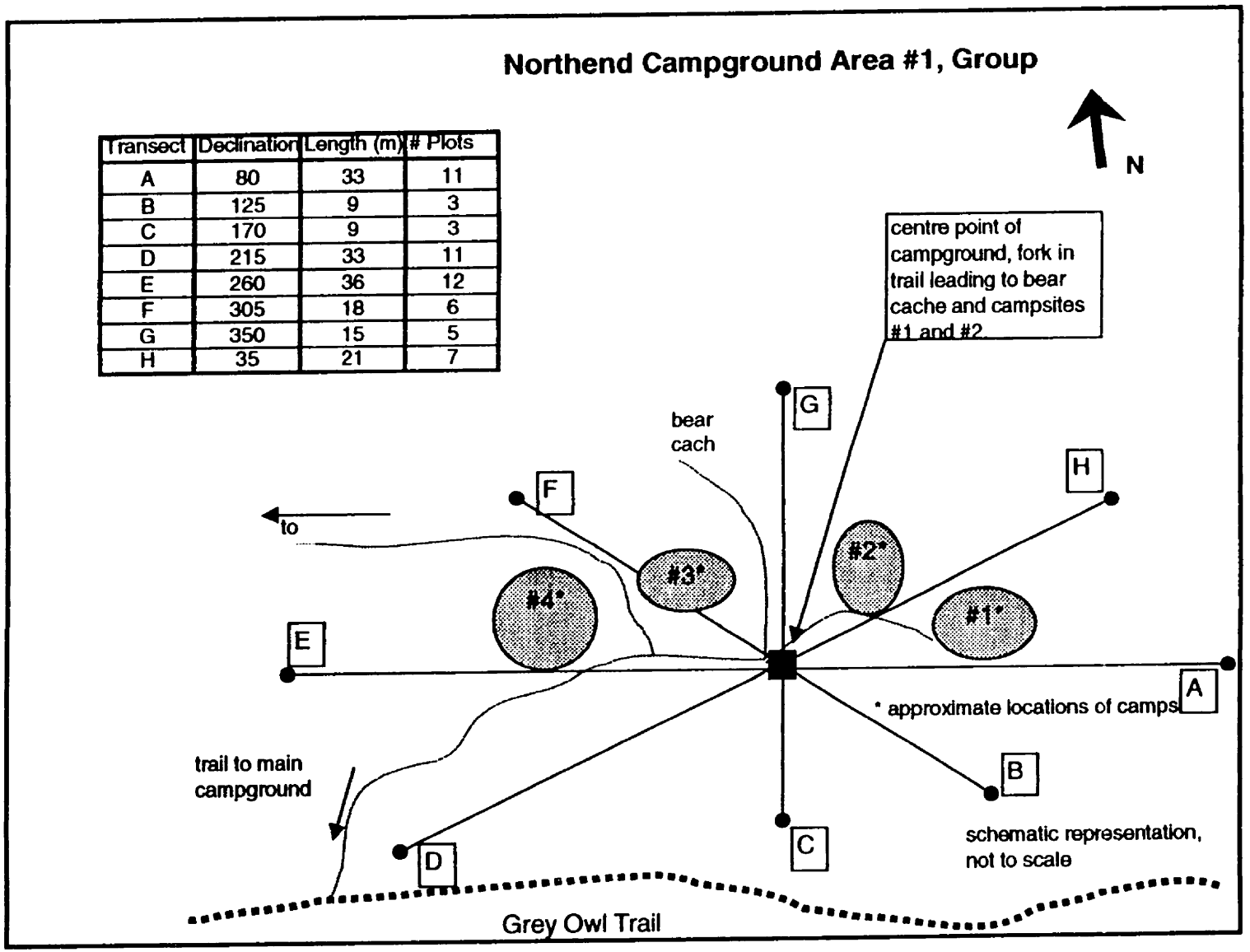
Sandy Beach Campground #2, campsite #1

centre point is halfway between stump and hibachi

direction/m	Shrub	Herbaceous					Moss	Mineral S	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	20	20	0	0	100	0	0	0	100	0	
N-2	70	10	0	0	50	50	40	0	60	0	small fir tree in plot
N-3	10	70	10	0	70	20	90	0	10	0	
W-1	0	0	0	0	0	0	0	0	100	0	
W-2	0	5	0	0	100	0	0	0	100	0	
W-3	0	15	10	0	30	60	0	0	0	0	
W-4	30	50	30	0	40	30	20	0	70	10	
W-5	0	50	10	0	70	20	70	0	20	10	
S-1	0	0	0	0	0	0	0	80	20	0	
S-2	0	0	0	0	0	0	0	80	20	0	
S-3	0	0	0	0	0	0	0	80	20	0	
S-4	0	0	0	0	0	0	0	80	20	0	
S-5	0	10	30	0	40	30	10	60	40	0	
S-6	0	60	10	0	50	30	60	10	30	0	
S-7	30	60	10	0	60	30	50	0	50	0	
E1	10	20	20	0	50	30	0	30	70	0	
E-2	60	10	30	0	20	50	10	0	90	0	
E-3	20	40	20	0	60	20	70	0	30	0	

Northend Campground Area #1, Group

Transect	Declination	Length (m)	# Plots
A	80	33	11
B	125	9	3
C	170	9	3
D	215	33	11
E	260	36	12
F	305	18	6
G	350	15	5
H	35	21	7



Northend Campground Area #1 (Group Area)

Centre

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
0	50	0	50	50	0	20	30	10	0	80	0	

Transect A (80o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	20	30	30	0	0	70	0	0	80	0	
6	60	0	10	70	0	0	30	0	30	70	0	next to hibachi
9	30	30	20	0	0	30	70	10	0	80	0	10% rock
12	50	20	60	60	0	10	30	20	0	80	0	small birch leaning into shrub laye
15	20	40	30	50	0	10	40	0	0	80	0	
18	10	50	20	50	0	0	50	0	0	100	0	50% herb in shrub layer
21	0	0	40	30	0	10	60	10	0	90	0	
24	10	0	20	20	0	0	80	0	0	100	0	directly next to hibachi
27	60	40	30	20	0	20	60	20	0	70	0	20% tree
30	40	40	40	0	0	40	60	0	0	100	0	80% herbs in shrub layer
33	0	40	40	0	0	30	70	30	0	70	0	

Transect B (125o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	30	50	70	0	0	30	10	0	80	10	
6	0	30	50	40	0	10	50	20	0	80	0	
9	0	40	50	30	0	10	60	40	0	50	10	

Transect C (170o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	40	40	50	60	0	0	40	10	0	90	0	
6	30	10	60	30	0	10	60	20	0	80	0	
9	20	10	50	10	0	20	70	30	0	70	0	pin in place

Northend Campground Area #1 (Group Area)

Transect D (215o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	10	20	30	0	10	60	10	20	70	0	
6	50	0	10	60	0	40	0	0	10	80	0	10% exposed roots
9	20	0	0	0	0	0	0	0	10	85	0	5% exposed roots
12	20	0	0	0	0	0	0	0	80	20	0	
15	30	0	0	0	0	0	0	0	70	30	0	
18	50	30	50	50	0	0	50	10	0	70	0	
21	30	0	40	60	0	0	40	40	0	30	0	
24	20	0	20	60	0	0	40	20	0	80	0	
27	50	30	30	20	0	0	80	60	0	30	0	
30	30	10	30	40	0	0	60	80	0	20	0	
33	30	30	20	60	0	0	40	70	0	30	0	

Transect E (260o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	40	20	40	20	0	0	80	0	0	90	0	
6	50	20	30	20	0	10	70	20	0	80	0	
9	40	30	30	20	0	10	70	10	0	80	0	10% tree in plot
12	30	0	10	60	0	0	40	0	0	100	0	
15	60	20	20	70	0	0	30	10	0	80	0	10% tree in plot
18	50	50	50	70	0	0	20	10	0	90	0	
21	60	10	50	70	0	0	30	10	0	90	0	
24	30	in tentpad							80	20	0	
27	70	0	20	80	0	10	10	0	50	50	0	
30	50	40	40	60	0	0	40	30	0	70	0	spruce leaning into shrub layer
33	30	0	30	30	0	10	60	80	0	20	0	
36	10	10	30	30	0	0	70	90	0	10	0	pin in place

Transect F (305o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	40	30	30	30	0	0	70	10	0	90	0	
6	40	20	50	70	0	10	20	20	0	70	10	10% tree roots
9	30	40	20	0	0	0	100	20	0	80	0	5% tree roots
12	60	30	30	60	0	0	40	5	0	95	0	
15	60	20	60	60	0	0	40	10	0	80	10	
18	70	20	40	40	0	10	50	20	0	80	0	spruce leaning into plot

Northend Campground Area #1 (Group Area)

Transect G (350o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	60	40	30	50	0	10	40	10	0	80	0	10% tree in plot
6	50	30	30	50	0	10	40	5	0	95	0	
9	40	50	40	0	10	20	70	10	0	90	0	
12	60	20	40	40	0	0	60	20	0	80	0	on trail to bear cache
15	50	50	40	20	0	10	70	0	0	100	0	

Transect H (35o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	0	30	60	0	0	40	0	10	90	0	
6	30	0	0	0	0	0	0	0	80	10	0	in campsite
9	50	0	10	0	0	50	50	0	10	80	0	
12	60	20	40	20	0	20	40	10	0	80	0	10% aspen in plot
15	50	20	50	40	0	20	40	20	0	80	0	
18	50	10	70	20	0	20	60	0	0	80	0	
21	60	20	60	10	0	10	80	30	0	70	0	

Northend Group Campground, Area #1

Campsite #1

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	30	20	0	0	70	30	0	0	100	0	spruce leaning into shrub layer
N-4	20	20	0	0	0	100	10	0	90	0	spruce leaning into shrub layer
N-5	70	20	0	0	0	100	0	0	100	0	spruce leaning into shrub layer
N-6	40	40	0	0	20	80	10	0	90	0	spruce leaning into shrub layer
W-1	0	0	0	0	0	0	0	100	0	0	
W-2	30	10	0	0	0	100	0	30	70	0	spruce leaning into shrub layer
W-3	40	30	0	0	20	80	0	0	100	0	spruce leaning into shrub layer
W-4	30	50	0	0	40	60	0	0	100	0	spruce leaning into shrub layer
S-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-4	0	30	0	0	100	0	0	20	80	0	
S-5	0	10	0	0	0	100	0	0	100	0	
S-6	0	10	0	0	0	100	0	0	100	0	
S-7	0	10	0	0	30	70	10	10	80	0	
S-8	10	30	10	0	10	80	20	0	80	0	
S-9	30	50	0	0	20	80	20	0	70	0	
S-10	30	60	0	0	20	80	50	0	50	0	
E-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-3	30	30	0	0	60	40	0	0	80	20	spruce leaning into shrub layer
E-4	30	30	0	0	60	40	0	0	100	0	spruce leaning into shrub layer
E-5	70	10	0	0	70	30	10	0	90	0	spruce leaning into shrub layer
E-6	60	20	0	0	80	20	10	0	90	0	spruce leaning into shrub layer

Northend Group Campground, Area #1

Campsite #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-5	10	20	10	0	70	20	0	0	100	0	
N-6	20	50	10	0	60	30	0	0	100	0	spruce leaning into shrub layer
N-7	20	40	0	0	70	30	10	0	80	0	birch leaning into shrub layer
W-1	0	0	0	0	0	0	0	0	0	0	
W-2	0	0	0	0	0	0	0	0	0	0	
W-3	0	0	0	0	0	0	0	0	0	0	
W-4	10	0	0	0	0	0	0	10	80	0	10% tree in plot
W-5	0	20	0	0	70	30	0	0	100	0	
W-6	0	20	0	0	80	20	10	0	90	0	
W-7	40	40	0	0	40	60	10	0	90	0	
W-8	30	40	10	0	30	60	10	0	90	0	
S-1	0	0	0	0	0	0	0	50	50	0	
S-2	0	0	0	0	0	0	0	50	50	0	
S-3	0	0	0	0	0	0	0	50	50	0	
S-4	0	0	0	0	0	0	0	50	50	0	
S-5	0	0	0	0	0	0	0	50	50	0	
S-6	0	10	0	0	0	100	0	0	100	0	
S-7	10	40	0	0	30	70	20	0	80	0	
S-8	20	30	0	0	60	40	30	0	70	0	small spruce in shrub layer
E-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-4	0	10	0	0	100	0	10	20	70	0	
E-5	10	30	10	0	20	70	10	0	90	0	birch leaning into shrub layer
E-6	0	60	0	0	50	50	0	0	80	20	
E-7	20	50	0	0	20	80	10	0	90	0	

Northend Group Campground, Area #1

Campsite #3

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	0	10	0	0	20	80	0	0	100	0	
N-4	10	30	0	0	40	60	0	0	100	0	
N-5	10	30	0	0	20	80	0	0	100	0	
N-6	40	40	20	0	50	30	0	0	100	0	
N-7	30	30	30	0	0	100	10	0	90	0	
W-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-5	10	10	0	0	80	20	0	0	100	0	
W-6	20	40	40	0	0	60	10	0	90	0	
W-7	30	30	0	0	30	70	10	0	80	0	
S-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-5	0	10	60	0	0	40	0	60	40	0	
S-6	10	30	40	0	40	20	0	10	90	0	
S-7	0	40	10	0	60	30	0	0	100	0	
S-8	10	50	0	0	80	20	0	0	80	0	
S-9	40	40	10	0	60	30	10	0	80	0	
S-10	40	60	0	0	60	40	20	0	80	0	
E-1	0	0	0	0	0	0	0	50	50	0	
E-2	0	0	0	0	0	0	0	50	50	0	
E-3	0	0	0	0	0	0	0	50	50	0	
E-4	0	0	0	0	0	0	0	50	50	0	
E-5	0	10	0	0	100	0	10	10	85	0	
E-6	0	20	0	0	60	40	0	0	100	0	
E-7	0	40	0	0	70	30	10	0	85	0	10% tree
E-8	50	10	0	0	0	100	10	0	80	0	spruce leaning into shrub layer, 10% tree
E-9	70	10	0	0	0	100	10	0	80	0	spruce leaning into shrub layer

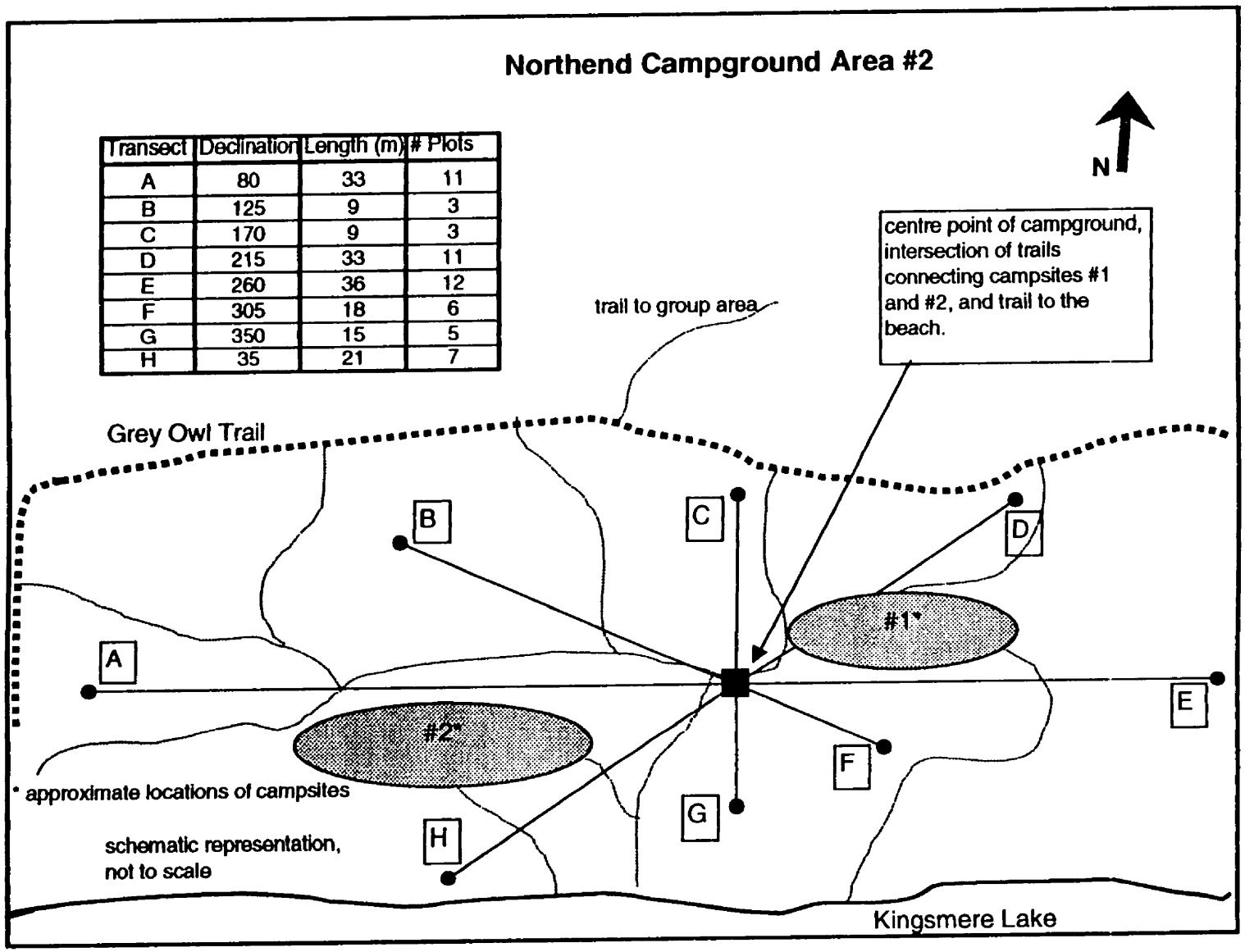
Northend Group Campground, Area #1

Campsite #4

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	20	80	0	0	20	0	70	20	0	
N-2	0	50	20	0	0	80	0	0	80	0	
N-3	10	60	20	0	0	80	0	0	90	0	spruce leaning into shrub layer
N-4	70	70	10	0	0	90	0	0	80	0	spruce leaning into shrub layer >1m
W-1	0	10	50	0	0	50	0	80	20	0	
W-2	0	10	100	0	0	0	0	50	50	0	
W-3	0	20	0	0	0	100	0	0	100	0	
W-4	0	10	0	0	0	100	0	0	100	0	
W-5	0	50	20	0	10	70	0	0	100	0	
W-6	0	60	30	0	0	70	10	0	80	0	
W-7	0	40	10	0	10	80	20	0	80	0	
S-1	0	10	10	0	0	90	0	60	40	0	
S-2	0	50	10	0	0	90	0	0	90	0	
S-3	10	60	10	0	30	60	0	0	100	0	
S-4	50	20	0	0	40	60	0	0	90	0	50% herbs in shrub layer
E-1	0	10	60	0	0	40	0	70	20	0	
E-2	0	10	80	0	0	20	0	50	50	0	
E-3	0	30	20	0	0	80	30	10	50	0	
E-4	0	50	30	0	0	70	10	0	90	0	
E-5	10	60	20	0	0	80	0	0	90	0	herbs in shrub layer
E-6	70	20	0	0	40	60	10	0	90	0	

Northend Campground Area #2

Transect	Declination	Length (m)	# Plots
A	80	33	11
B	125	9	3
C	170	9	3
D	215	33	11
E	260	36	12
F	305	18	6
G	350	15	5
H	35	21	7



Northend Campground Area #2

centre point

distance (n	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	10	20	50	40	0	20	40	40	0	60	0	

Transect A (255o)

distance (n	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	10	0	50	70	0	10	20	10	0	60	20	
6	0	0	10	50	0	50	0	10	20	70	0	
9	in tentpad											
12	in tentpad											
15	in tentpad											
18	in tentpad											
21	30	0	20	50	0	30	20	0	50	40	0	
24	0	30	70	80	0	0	20	0	0	40	20	small pine in shrub layer
27	0	0	40	60	0	0	40	40	0	60	0	
30	0	0	60	70	0	0	30	60	0	40	0	
33	0	20	20	60	0	0	40	0	0	70	0	pine leaning into shrub layer, 30%stump
36	0	30	60	100	0	0	0	90	0	10	0	small spruce leaning into plot
39	0	0	80	90	0	10	0	0	10	10	0	
42	0	30	40	40	0	0	60	60	20	20	0	
45	0	20	30	0	0	30	70	80	0	20	0	

Transect B (300o)

distance (n	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	5	0	0	100	0	0	20	80	0	
6	30	0	20	40	0	0	60	20	0	80	0	
9	30	10	10	70	0	0	30	10	0	90	0	spruce leaning into shrub layer
12	0	30	10	100	0	0	0	0	0	80	10	spruce leaning into shrub layer
15	0	0	70	10	0	30	60	50	0	30	0	
18	0	10	40	70	0	10	20	50	0	40	0	pine leaning into shrub layer
21	0	0	20	90	0	0	10	10	20	70	0	trail to campsite
24	0	10	70	80	0	0	20	100	0	0	0	pine leaning into shrub layer
27	0	0	50	80	0	10	10	80	0	20	0	
30	10	10	70	90	0	0	10	80	0	10	10	pine leaning into shrub layer

Northend Campground Area #2

Transect C (345o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	30	30	20	20	0	40	40	5	0	85	0	spruce leaning into shrub layer, 15% stump
6	30	40	20	0	0	0	100	70	0	10	15	
9	10	80	20	0	0	0	100	80	0	10	10	
12	0	70	20	50	0	0	50	90	0	10	0	end pin in place

Transect D (30o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	10	10	70	0	0	30	0	0	100	0	trail from site 1 to site 2
6	50	0	50	70	0	5	25	30	0	70	0	
9	40	10	10	30	0	0	70	10	0	90	0	spruce leaning into shrub layer
12	70	0	0	0	0	0	0	0	50	50	0	between hibachi and spruce
15	20	0	0	0	0	0	0	0	40	50	0	
18	0	10	40	20	0	10	70	50	0	50	0	
21	10	20	20	0	0	0	100	70	0	30	0	spruce leaning into shrub layer
24	0	10	20	70	0	0	30	100	0	0	0	1.5m from main trail in campground

Transect E (75o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	40	20	40	20	0	10	70	40	0	60	0	
6	70	20	20	20	0	0	80	30	0	70	0	spruce leaning into shrub layer
9	10	20	30	50	0	0	50	60	0	30	0	intersection of 2 trails to beach
12	0	20	40	50	0	0	50	70	0	30	0	
15	50	70	40	70	0	0	30	10	0	90	0	shurb layer <1m
18	50	0	30	40	0	0	60	40	0	40	0	
21	0	70	20	0	0	0	100	90	0	10	0	
24	60	30	30	70	0	0	30	50	0	30	0	
27	0	50	50	0	0	0	100	70	0	30	0	pin in place

Transect F (120o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	30	0	20	50	90	0	10	0	
6	20	50	30	60	0	0	40	90	0	10	0	
9	10	30	60	40	0	10	50	40	0	50	0	10% stump in plot

Northend Campground Area #2

Transect G (165o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	30	20	40	20	0	10	70	70	0	30	0	birch and spruce leaning into shrub layer
6	0	30	50	50	0	0	50	30	0	70	0	
9	30	30	30	70	0	0	30	20	0	60	20	birch leaning into plot, pin in place

Transect H (210o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	50	40	0	10	50	20	0	80	0	
6	0	0	60	20	0	10	70	70	0	20	10	
9	60	0	30	20	0	0	80	10	0	70	20	
12	50	30	60	10	0	80	10	20	0	80	0	
15	0	0	70	60	0	20	20	20	0	40	0	
18	0	10	20	70	0	30	0	0	60	30	0	trail to beach
21	0	30	30	30	0	70	0	0	0	80	0	
24	0	70	10	0	0	100	0	0	0	100	0	spruce tree leaning into plot, next plot on beach

Northend Campground #2

Campsite #1 centre point is 5m from hibachi at 95o

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-4	10	30	10	0	50	40	40	0	60	0	birch leaning into shrub layer
N-5	20	40	0	0	40	60	60	0	40	0	birch leaning into shrub layer
W-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-6	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-7	20	10	0	0	0	100	0	10	80	0	spruce leaning into shrub layer
W-8	0	10	0	0	0	100	10	0	70	0	20% tree stump
W-9	0	20	0	0	40	60	60	0	40	0	
W-10	0	10	0	0	0	100	80	0	20	0	
S-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-4	0	10	0	0	100	0	0	0	80	0	20% pine tree
S-5	0	0	0	0	0	0	0	0	90	0	10% tree roots
S-6	10	20	0	0	60	40	10	0	80	0	
S-7	0	20	0	0	50	50	30	0	70	0	
S-8	10	30	0	0	30	70	80	0	20	0	alders leaning into shrub layer
S-9	30	30	0	0	30	70	80	0	20	0	
E-1	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
E-2	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
E-3	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
E-4	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
E-5	0	20	0	0	40	60	10	0	90	0	
E-6	30	40	0	0	60	40	0	40	60	0	alders leaning into shrub layer
E-7	30	20	0	0	40	60	80	0	20	0	alders leaning into shrub layer

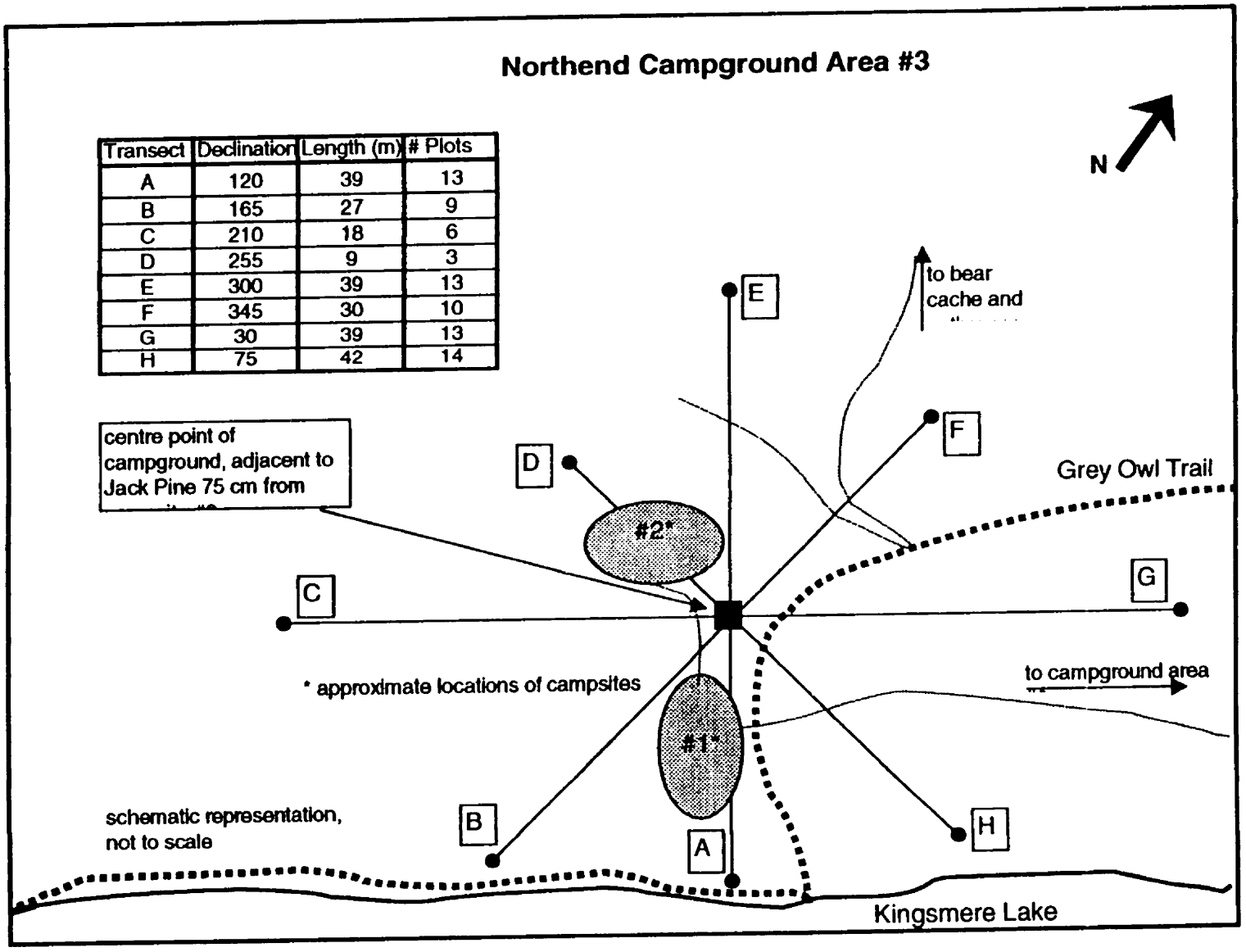
Northend Campground #2

Campsite #2 centre point of campsite is the midpoint between spruce on the South side of the campsite, and the birch on the North side

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only, in tentpad
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only, in tentpad
N-3	0	20	70	0	30	0	0	20	80	0	
N-4	0	40	100	0	0	0	10	0	50	0	
N-5	0	40	10	0	40	50	10	0	90	0	
N-6	20	20	20	0	40	40	20	0	60	0	20% tree in plot, pine in shrub layer
N-7	0	40	10	0	30	60	90	0	10	0	
N-8	0	60	10	0	40	50	100	0	0	0	
W-1	0	0	0	0	0	0	0	100	0	0	in tentpad
W-2	0	0	0	0	0	0	0	100	0	0	in tentpad
W-3	0	0	0	0	0	0	0	100	0	0	in tentpad
W-4	0	10	100	0	0	0	10	60	40	0	
W-5	0	0	0	0	0	0	0	40	60	0	
W-6	0	0	0	0	0	0	0	30	70	0	
W-7	0	10	100	0	0	0	0	20	70	0	10% exposed tree roots
W-8	10	10	0	0	0	100	0	20	80	0	on trail leading to bear cache
W-9	0	30	0	0	100	0	0	40	30	0	
W-10	0	20	0	0	100	0	30	0	70	0	
W-11	20	10	0	0	100	0	20	0	80	0	
W-12	0	30	0	0	80	20	0	0	100	0	
W-13	0	60	0	0	70	30	0	0	60	30	
W-14	50	30	0	0	50	50	0	0	70	0	deadfall in shrub layer
S-1	0	0	0	0	0	0	0	100	0	0	in tentpad
S-2	0	0	0	0	0	0	0	100	0	0	in tentpad
S-3	0	0	0	0	0	0	0	100	0	0	in tentpad
S-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-6	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-7	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-8	0	30	20	0	80	0	0	30	70	0	
S-9	30	50	40	0	30	30	0	0	40	0	
S-10	70	40	0	0	70	30	20	0	40	0	spruce leaning into shrub layer
E-1	0	0	0	0	0	0	0	100	0	0	in tentpad
E-2	0	0	0	0	0	0	0	100	0	0	in tentpad
E-3	0	0	0	0	0	0	0	100	0	0	in tentpad
E-4	20	20	20	0	60	20	0	30	60	0	10% in tentpad
E-5	0	20	10	10	80	0	0	0	100	0	
E-6	0	10	100	0	0	0	20	20	70	20	
E-7	0	30	0	0	30	70	30	0	70	0	
E-8	0	40	10	0	80	10	30	0	30	20	
E-9	0	50	20	30	50	0	20	0	50	10	

Northend Campground Area #3

Transect	Declination	Length (m)	# Plots
A	120	39	13
B	165	27	9
C	210	18	6
D	255	9	3
E	300	39	13
F	345	30	10
G	30	39	13
H	75	42	14



Northend Campground Area #3

centre point, adjacent to Jack Pine, 75cm from tentpad, roots very exposed.

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
0	20	0	0	0	0	0	0	5	10	80	0	10% exposed roots

Transect A (120o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	0	10	0	0	100	0	0	10	90	0	
6	20	0	5	100	0	0	0	10	20	80	0	
9	40	0	0	0	0	0	0	0	10	90	0	
12	in tentpad											
15	in tentpad											
18	in tentpad											
21	40	0	5	0	0	0	100	0	90	20	0	
24	10	30	40	20	0	20	60	0	40	60	0	
27	0	0	5	0	0	100	0	0	90	10	0	main trail to beach
30	0	30	70	80	0	20	0	20	0	30	0	
33	0	40	40	90	0	10	0	0	40	40	0	
36	0	50	30	0	0	20	80	30	0	70	0	
39	0	30	20	0	0	50	50	20	0	80	0	pin next to Northend sign on Beach

Transect B (165o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	0	10	100	0	0	0	30	0	70	0	
6	20	0	5	100	0	0	0	0	0	100	0	
9	20	0	20	70	0	0	30	0	0	100	0	
12	30	50	20	80	0	10	10	0	0	80	0	
15	0	20	40	80	0	0	20	40	0	60	0	small spruce leaning into shrub layer
18	30	70	40	60	0	0	40	0	0	80	0	small spruce leaning into shrub layer
21	0	0	90	70	0	10	20	0	0	30	0	
24	0	20	50	90	0	10	0	40	0	60	0	small spruce leaning into shrub layer
27	0	0	40	60	0	20	20	40	0	20	0	no pin, beach 2m away

Northend Campground Area #3

Transect C (210o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	20	0	10	100	0	0	0	10	0	90	0	
6	20	0	20	100	0	0	0	80	0	20	0	
9	0	0	20	80	0	20	0	40	0	60	0	
12	0	0	50	80	0	20	0	90	0	10	0	
15	30	60	60	80	0	0	20	70	0	30	0	spruce leaning into shrub layer
18	10	30	40	90	0	0	10	80	0	20	0	spruce leaning into shrub layer

Transect D (255o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	20	0	70	80	0	0	20	60	0	40	0	
6	0	20	80	90	0	0	10	70	0	30	0	small birch leaning into shrub layer
9	0	10	70	90	0	0	10	80	0	20	0	small birch leaning into shrub layer

Transect E (300o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	20	0	20	60	0	0	40	10	0	90	0	
6	50	0	0	0	0	0	0	0	50	50	0	
9	0	0	0	0	0	0	0	0	90	10	0	
12	under hibachi								100	0	0	
15	0	0	5	0	0	100	0	30	10	60	0	
18	0	10	40	70	0	10	20	30	0	70	0	
21	0	0	40	0	0	40	60	40	30	30	0	
24	0	10	70	0	0	20	80	30	20	50	0	
27	0	0	60	0	0	60	40	40	0	60	0	
30	0	10	40	90	0	10	0	10	20	30	0	
33	0	20	50	90	0	10	0	50	0	30	0	small spruce in shrub layer
36	30	40	40	100	0	0	0	10	0	50	0	pine leaning into shrub layer
39	0	10	70	80	0	10	10	50	0	20	0	pine leaning into shrub layer

Northend Campground Area #3

Transect F (345o)

distance (n	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	0	0	0	0	0	0	0	20	80	0	
6	60	0	0	0	0	0	0	0	40	60	0	in tent pad
9	70	0	0	0	0	0	0	0	0	100	0	
12	60	0	10	70	0	30	0	0	20	80	0	
15	40	0	30	10	0	60	30	20	0	80	0	
18	40	40	30	60	0	20	20	20	0	80	0	small pine trees in shrub layer
21	0	0	80	70	0	10	20	10	0	40	0	
24	60	0	90	90	0	10	0	0	0	10	0	
27	40	10	40	90	0	10	0	20	0	60	10	spruce tree leaning into plot
30	20	10	80	90	0	10	0	70	0	30	0	small pine tree in shrub layer

Transect G (30o)

distance (n	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	80	0	0	20	60	0	40	0	
6	20	0	60	80	0	10	10	40	0	40	0	
9	0	0	30	80	0	0	20	60	0	40	0	
12	0	10	60	40	0	0	30	60	0	40	0	pine leaning into shrub layer, spruce in herb layer
15	10	0	30	0	0	20	80	70	0	30	0	
18	0	0	20	0	0	80	20	50	0	50	0	
21	0	0	30	50	0	50	0	60	0	40	0	
24	0	10	10	50	0	50	0	20	20	60	0	
27	0	20	80	100	0	0	0	20	10	30	0	
30	0	0	60	100	0	0	0	40	20	40	0	trail to bear cache
33	0	0	40	100	0	0	0	30	0	20	60	
36	80	40	10	0	0	0	100	0	0	100	0	spruce boughs in shrub layer
39	90	50	10	0	0	0	100	0	0	100	0	pin between large spruce/small spruce

Northend Campground Area #3

Transect H (75o)

distance (r	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	0	10	100	0	0	0	10	10	80	0	
6	30	0	20	60	0	0	40	20	20	60	0	
9	40	10	10	40	0	0	10	40	0	60	0	small pine in shrub, small spruce in herb
12	50	0	5	0	0	100	0	5	70	25	0	
15	0	0	0	0	0	0	0	0	90	10	0	main trail to beach from bear cache
18	0	0	0	0	0	0		30	0	70	0	
21	30	0	0	0	0	0	0	10	30	60	0	
24	0	0	0	0	0	0	0	10	10	80	0	
27	80	0	0	0	0	0	0	0	0	95	0	tree roots 5%
30	60	40	10	0	0	0	100	0	0	100	0	spruce leaning into shrub layer
33	0	0	0	0	0	0	0	10	20	70	0	trail leading to beach
36	30	0	40	70	0	0	30	70	0	20	0	pine tree 10% of plot
39	0	40	40	80	0	0	20	60	0	40	0	small spruce trees
42	0	30	40	50	0	0	50	70	0	30	0	

Northend Campground Area #3

Campsite #1 (double site)

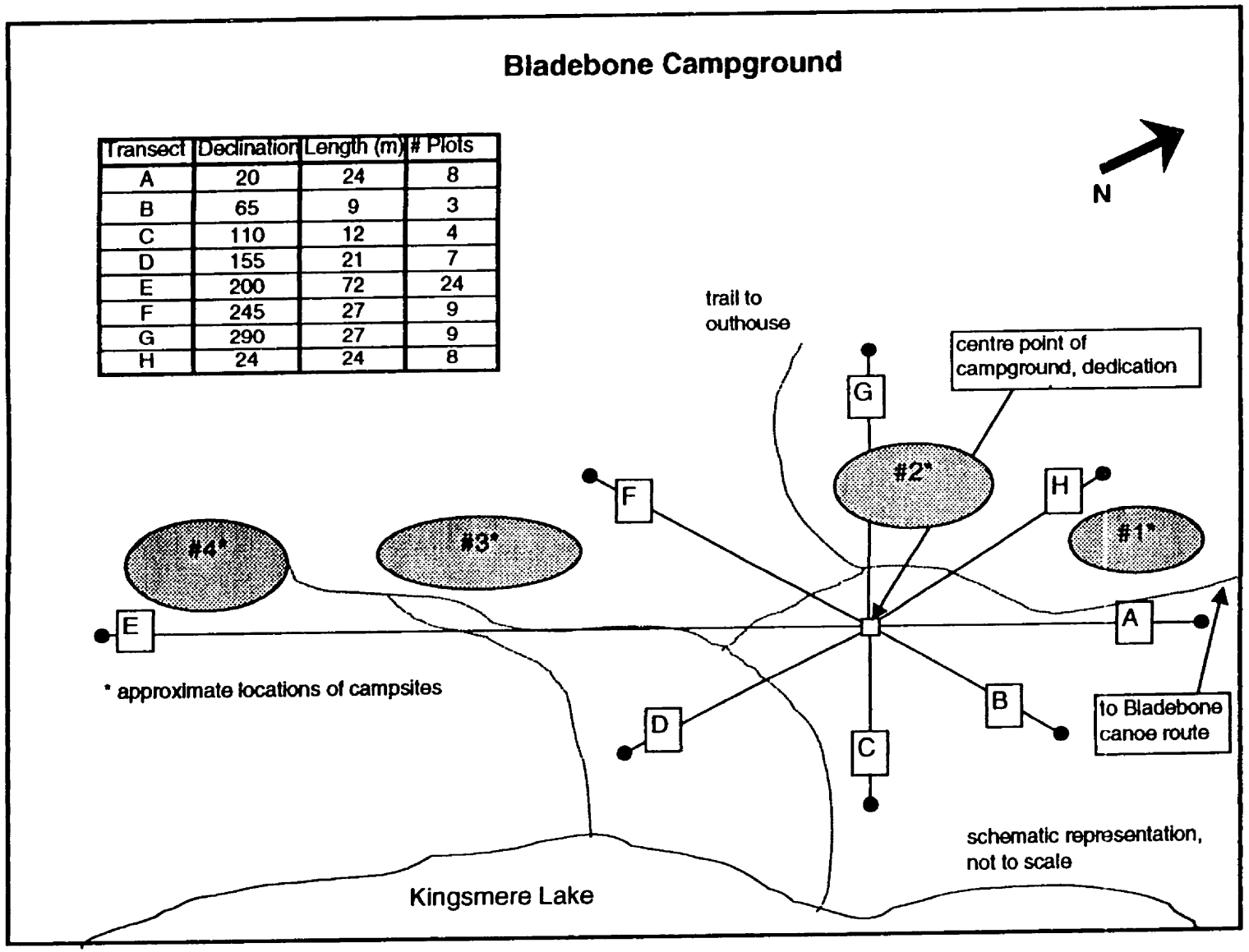
direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-6	0	10	50	0	0	50	0	30	70	0	
N-7	0	30	100	0	0	0	0	10	90	0	
N-8	0	60	80	0	0	20	0	10	70	0	
N-9	0	70	10	0	50	40	0	0	80	0	
N-10	0	60	0	0	80	20	0	0	80	0	
W-1	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-2	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-3	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-4	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-5	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-6	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-7	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-8	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-9	0	0	0	0	0	0	0	0	0	0	mineral soil and litter only
W-10	0	30	0	0	100	0	0	0	80	0	
W-11	0	40	0	0	100	0	10	0	70	0	
W-12	10	50	0	0	100	0	20	0	60	0	
W-13	0	30	0	0	100	0	50	0	50	0	
S-1	0	10	0	0	100	0	0	30	50	0	pine tree 30% of plot
S-2	0	20	10	0	90	0	0	0	95	0	exposed roots 5%
S-3	20	40	30	0	50	20	0	0	90	0	
S-4	40	60	30	0	10	60	10	0	90	0	
S-5	70	20	10	0	20	70	0	0	100	0	small spruce in shrub layer
E-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-6	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-7	0	10	100	0	0	0	5	80	10	0	
E-8	0	5	60	0	0	40	10	80	10	0	
E-9	0	5	50	0	0	50	5	90	5	0	
E-10	0	10	100	0	0	0	5	80	15	0	
E-11	0	5	100	0	0	0	0	90	5	0	
E-12	0	5	50	0	0	50	50	20	30	0	
E-13	0	10	100	0	0	0	40	60	0	0	
E-14	15	10	50	0	0	50	80	0	20	0	spruce leaning into shrub layer
E-15	70	30	0	0	0	100	80	0	20	0	

Campsite #2 centre point is the midpoint between two tentpad markers, looking 270o toward hibachi

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
N-6	0	20	70	0	0	0	0	10	90	0	
N-7	0	30	40	0	60	0	20	0	80	0	pine in herb layer
N-8	20	40	20	0	40	40	30	0	70	0	pine in shrub layer
N-9	0	60	10	0	70	20	40	0	40	0	
W-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-5	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-6	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-7	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
W-8	0	10	100	0	0	0	0	80	20	0	mineral soil and litter only
W-9	0	0	0	0	0	0	20	50	30	0	
W-10	0	0	0	0	0	0	20	40	40	0	
W-11	0	0	0	0	0	0	20	70	30	0	
W-12	0	10	0	0	50	50	30	60	10	0	
W-13	0	10	100	0	0	0	60	0	40	0	
W-14	0	10	100	0	0	0	50	10	40	0	
W-15	0	10	50	0	0	50	70	0	30	0	
W-16	0	40	60	0	40	0	70	10	20	0	
S-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
S-4	0	30	0	0	70	30	0	0	80	0	
S-5	0	50	0	0	80	20	40	0	60	0	
S-6	0	70	0	0	80	20	80	0	20	0	
E-1	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-2	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-3	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-4	0	0	0	0	0	0	0	50	50	0	mineral soil and litter only
E-5	0	10	50	0	0	50	0	0	100	0	
E-6	0	60	10	0	70	20	0	0	50	0	
E-7	20	70	10	0	60	30	10	0	60	0	spruce leaning into shrub layer
E-8	0	40	0	0	70	30	80	0	20	0	

Bladebone Campground

Transect	Declination	Length (m)	# Plots
A	20	24	8
B	65	9	3
C	110	12	4
D	155	21	7
E	200	72	24
F	245	27	9
G	290	27	9
H	24	24	8



Bladebone Campground

Centre

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					monument centre of campground
0	0	0	40	0	0	70	30	0	20	20	0	monument 40%

Transect A (20o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	50	0	0	100	0	0	75	25	0	main entrance to campground
6	80	0	5	0	0	100	0	0	5	95	0	10% tree root exposed
9	50	0	5	100	0	0	0	0	0	95	0	5% tree root exposed
12	90	0	5	0	0	0	100	0	0	90	0	10% tree
15	80	0	0	0	0	0	0	0	0	75	0	25% tree
18	70	0	5	0	0	0	100	0	0	95	0	5% tree root exposed
21	40	30	50	60	0	40	0	0	0	60	0	
24	20	70	70	70	0	10	20	0	0	90	0	

Transect B (65o) begins at east side of monument toward campground sign

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	10	60	0	0	90	10	60	0	60	0	15% stump in plot
6	0	0	20	0	0	100	0	70	30	30	0	
9	0	0	20	0	0	40	60	70	30	30	0	marker adjacent to sign

Transect C (110o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	30	0	0	60	40	70	0	30	0	
6	0	0	60	0	0	70	30	30	20	50	0	
9	0	0	10	0	0	60	40	40	40	20	0	trail to campsites 3 & 4
12	10	10	5	0	0	50	50	60	0	40	0	

Transect D (155o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	60	80	0	10	10	30	0	30	0	
6	0	0	30	0	0	100	0	10	5	50	40	large fallen tree in plot
9	0	0	70	0	0	100	0	20	0	40	0	
12	50	0	10	0	0	100	0	20	0	75	0	5% exposed tree root
15	70	30	70	0	0	0	100	0	0	70	0	
18	40	30	30	0	0	80	20	30	0	60	0	
21	0	0	50	0	0	30	70	100	0	0	0	

Bladebone Campground

Transect E (200o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	5	0	0	100	0	50	10	40	0	
6	0	0	20	0	0	70	30	60	0	40	0	
9	0	0	20	0	0	40	60	20	0	50	30	
12	10	0	30	0	0	70	30	80	0	30	5	
15	70	20	20	0	0	100	0	0	0	85	0	spruce leaning into plot
18	10	0	10	0	0	60	40	0	0	100	0	
21	0	0	5	0	0	0	100	5	0	95	0	
24	0	0	0	0	0	0	0	0	60	40	0	
27	0	0	0	0	0	0	0	0	60	40	0	
30	0	0	0	0	0	0	0	0	90	10	0	next to hibachi
33	0	0	0	0	0	0	0	0	40	60	0	next to hibachi
36	0	80	10	0	0	0	100	60	0	40	0	2 small fir trees
39	0	40	40	0	0	0	100	80	0	20	0	small fir tree
42	80	0	60	10	0	80	10	0	0	40	0	
45	0	10	60	30	0	0	70	100	0	0	0	fir tree
48	20	40	20	0	0	0	100	80	0	20	0	
51	0	40	30	0	0	0	100	80	0	20	0	
54	0	0	20	0	0	0	0	0	30	70	0	trail to campsite #4
57	0	0	40	30	0	0	70	20	0	80	0	small fir tree
60	0	0	5	100	0	0	0	5	40	60	0	
63	10	20	10	50	0	0	50	40	10	50	0	fir tree leaning in
66	30	0	30	20	0	0	80	90	0	10	0	small fir tree
69	0	40	10	20	0	0	80	80	0	20	0	fir tree leaning in
72	0	70	0	0	0	0	0	80	0	20	0	

Transect F (245o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	70	30	5	20	75	0	
6	0	20	20	40	0	60	0	10	20	60	0	crosses main trail
9	10	0	10	0	0	30	0	10	0	70	0	small spruce tree
12	20	10	20	0	0	10	70	80	0	20	0	fir tree leaning in
15	0	0	20	20	0	30	50	80	0	20	0	
18	0	40	20	0	0	70	30	30	0	30	0	40% plot tree stump
21	20	50	20	0	0	0	100	50	0	50	0	trail to campsites 3&4
24	40	0	20	30	0	10	60	90	0	10	10	
27	0	60	40	60	0	10	30	40	0	60	10	fir tree leaning in

Bladebone Campground

Transect G (290o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	10	90	0	20	80	0	
6	0	0	30	0	0	100	0	0	20	10	0	50% in campsite #2
9	0	0	0	0	0	0	0	0	0	0	0	in campsite tentpad
12	0	10	60	80	0	5	15	20	0	60	0	
15	0	30	50	50	0	0	50	70	0	30	0	
18	30	20	50	50	0	10	40	20	0	80	0	
21	50	20	40	40	0	10	50	90	0	10	0	plot approx. 50 cm side of trail
24	40	40	30	40	0	30	30	40	0	60	15	
27	20	20	30	60	0	10	30	70	0	30	0	

Transect H (335o)

distance (m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	100	0	0	70	30	0	
6	0	0	30	0	0	100	0	0	30	70	0	
9	0	0	5	0	0	100	0	0	10	90	0	
12	30	0	30	0	0	100	0	0	0	80	0	
15	70	0	0	0	0	0	0	0	0	100	0	
18	50	20	30	50	0	20	30	60	0	20	0	20 % stump in plot
21	30	70	20	60	0	0	40	70	0	30	0	fir and pine trees leaning over plot
24	20	70	10	0	0	0	100	90	0	10	0	fir tree leaning

Bladebone Campsites

Campsite #1

direction/m	Shrub	erbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	30	70	0	10	20	0	0	90	0	
N-2	0	30	100	0	0	0	0	0	90	0	
N-3	20	50	90	0	10	0	0	0	70	0	
N-4	40	20	50	0	50	0	0	0	80	0	3 trees in plot
N-5	0	30	0	0	0	100	80	0	20	0	
N-6	10	30	0	0	0	100	80	0	20	0	
W-1	70	60	30	0	0	70	20	0	80	0	
W-2	80	30	10	0	10	70	80	0	20	0	
S-1	0	50	70	0	0	30	0	0	80	0	
S-2	0	30	40	0	0	60	60	0	40	0	
S-3	20	70	10	0	20	70	30	0	70	0	spruce leaning in
E-1	0	0	0	0	0	0	0	80	20	0	
E-2	0	0	0	0	0	0	0	80	20	0	
E-3	0	0	0	0	0	0	0	80	20	0	
E-4	0	30	70	0	30	30	0	0	100	0	
E-5	0	40	20	0	0	80	5	10	80	0	
E-6	80	20	10	0	0	90	5	0	95	0	fir tree leaning in
E-7	60	30	0	0	20	80	80	0	20	0	

Campsite #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	30	30	0	0	70	40	0	60	0	
N-2	20	50	20	0	0	80	20	0	80	0	birch leaning into plot
W-1	0	70	20	0	40	40	20	10	70	0	
W-2	60	50	20	0	30	50	30	0	70	0	
S-1	0	10	30	0	0	70	0	30	70	0	
S-2	0	80	15	0	20	50	0	5	30	0	small fir tree in plot
S-3	0	50	10	0	70	20	0	50	20	0	
S-4	0	40	10	0	20	0	10	50	20	0	small spruce tree in plot
S-5	0	60	60	0	0	20	0	0	20	0	60% stump in plot
S-6	0	80	40	0	30	20	0	0	50	0	20% stup and roots
East	open area containing hibachi, picnic table and toward monument at Bladebone campground										

Bladebone Campsites

Campsite #3

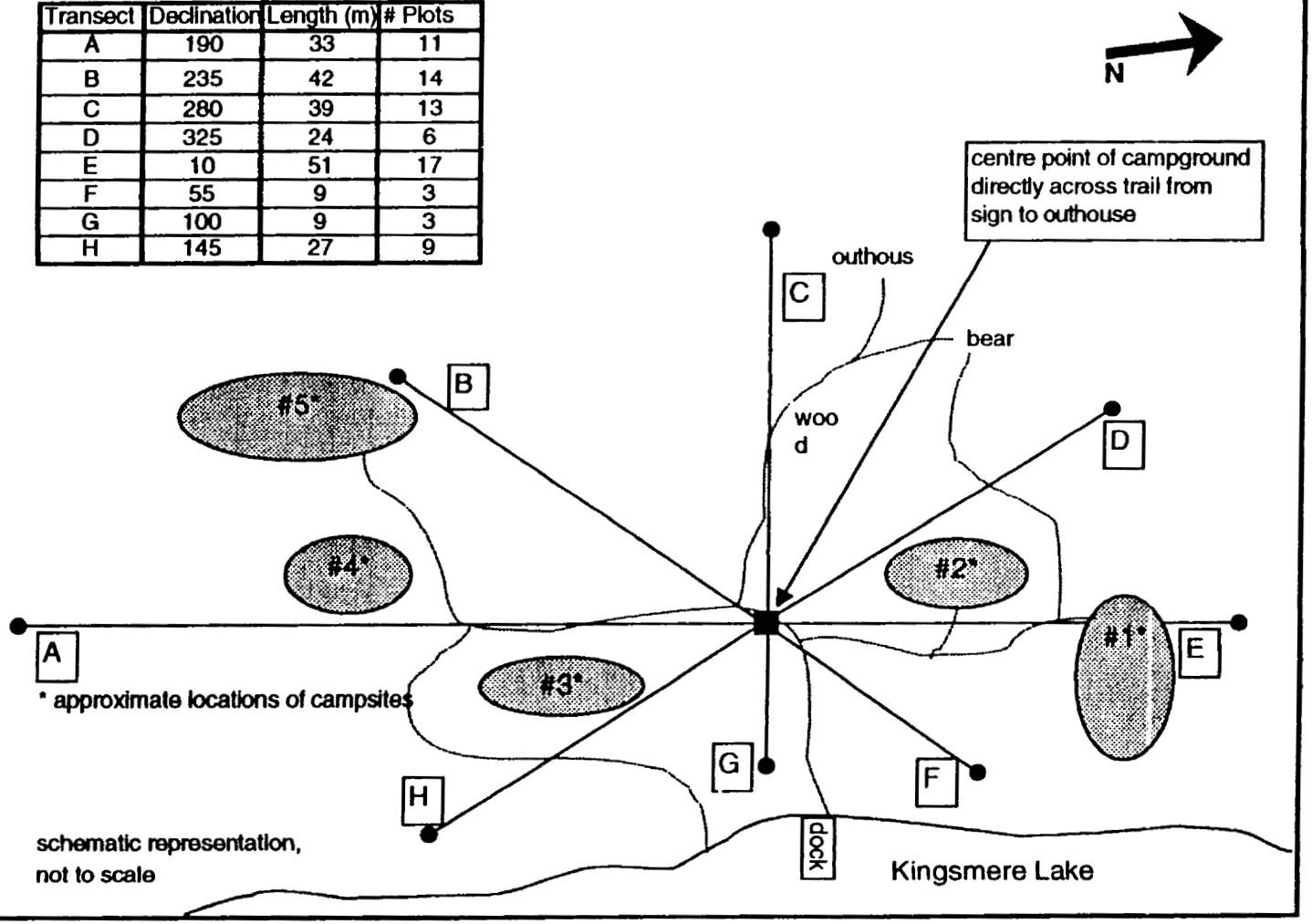
direction/m	Shrub	erbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	0	100	0	
N-2	0	10	70	0	0	30	0	0	100	5	
N-3	80	10	40	0	40	20	0	0	100	0	
N-4	60	10	50	0	0	50	0	20	100	0	small spruce and alder
W-1	0	50	0	0	0	80	30	0	50	0	
W-2	30	60	10	0	10	80	40	0	60	0	fir tree leaning into plot
W-3	50	20	0	0	0	100	90	0	10	0	
S-1	50	10	0	0	0	100	30	0	20	0	
S-2	30	90	0	0	0	50	30	0	70	0	
S-3	20	40	0	0	0	100	80	0	20	0	
East 1-8	and litter										
E-9	20	20	60	0	0	40	30	0	70	0	small fir tree leaning into plot
E-10	10	10	70	0	0	30	20	0	70	0	small fir tree leaning into plot
E-11	0	5	50	0	0	50	20	0	80	0	
E-12	10	20	10	0	40	50	80	0	20	0	
E-13	20	30	0	0	60	40	90	0	10	0	

Campsite #4

direction/m	Shrub	rbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	70	20	0	20	60	30	10	60	0	
N-2	10	90	5	0	25	70	10	0	30	0	alder leaning into plot
W-1	0	60	10	0	10	80	60	0	40	0	
W-2	20	40	0	0	0	100	80	0	20	0	alder leaning into plot
S-1	10	60	80	0	0	20	10	20	60	0	
S-2	10	30	40	0	0	60	70	0	30	0	
S-3	20	30	20	0	0	80	80	0	20	0	
E-1	0	0	0	0	0	0	0	40	60	0	
E-2	0	0	0	0	0	0	0	50	50	0	
E-3	0	0	0	0	0	0	0	70	30	0	
E-4	0	0	0	0	0	0	0	20	80	0	
E-5	0	20	0	0	0	100	0	20	80	0	
E-6	0	50	10	0	50	40	20	5	80	0	
E-7	0	70	0	0	50	30	90	0	10	0	small fir tree leaning into plot
E-8	0	50	0	0	60	30	90	0	10	0	small fir tree leaning into plot

Pease Point Campground

Transect	Declination	Length (m)	# Plots
A	190	33	11
B	235	42	14
C	280	39	13
D	325	24	6
E	10	51	17
F	55	9	3
G	100	9	3
H	145	27	9



Pease Point Campground

The centre point of the campground is directly across from the sign pointing to the outhouse, on the main trail in the campground.

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
0	0	20	40	0	0	80	20	0	50	50	0	

Transect A (190o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	20	80	0	80	20	0	
6	0	0	10	0	0	0	100	0	100	20	0	main entrance to campsite #1
9	10	40	70	0	0	30	70	20	30	50	0	
12	30	10	70	20	0	30	50	10	0	90	0	
15	0	0	5	0	0	50	50	15	40	50	0	
18	0	0	5	0	0	100	0	0	100	20	0	
21	0	20	70	20	0	60	20	0	10	100	0	
24	0	20	40	0	10	70	20	0	0	100	0	
27	0	50	70	15	0	70	15	0	0	100	0	adjacent to tent pad
30	0	60	30	0	0	20	80	40	0	50	10	
33	40	60	50	20	0	0	80	30	0	70	0	pine leaning into shrub layer

Transect B (235o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	0	40	10	0	70	20	10	40	60	0	
6	70	50	20	30	0	30	40	0	0	100	0	spruce leaning into shrub layer
9	70	40	20	50	0	10	40	0	0	100	0	spruce leaning into shrub layer
12	60	40	10	80	0	0	20	0	0	80	0	spruce leaning into shrub layer
15	0	10	70	10	0	10	80	90	0	10	0	spruce leaning into shrub layer
18	0	10	90	15	0	5	80	90	0	10	0	spruce leaning into shrub layer
21	0	20	60	20	0	10	70	60	20	20	0	spruce leaning into shrub layer, 20% plot in trail
24	0	0	10	0	0	100	0	10	80	10	0	intersection of two trails
27	0	0	5	0	0	50	50	0	90	50	0	
30	0	0	5	0	0	0	100	0	95	30	0	
33	60	0	10	0	0	10	90	60	20	40	0	
36	70	60	10	20	0	0	80	20	0	90	0	spruce leaning into shrub layer
39	0	10	30	30	0	0	70	100	0	10	0	
42	0	0	50	30	0	0	70	100	0	0	0	

Pease Point Campground

Transect C (280o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	30	30	10	0	60	30	0	20	80	0	
6	0	20	60	20	0	60	20	0	15	85	0	spruce adjacent to plot
9	30	30	60	10	0	70	20	0	15	85	0	spruce leaning into shrub layer
12	10	10	60	40	0	20	40	70	10	20	0	
15	30	10	50	40	0	20	40	60	0	40	0	
18	70	0	30	60	0	30	10	40	0	60	0	pine with fork adjacent to plot
21	30	0	20	0	0	70	30	40	10	60	0	
24	0	0	50	80	0	10	10	50	10	50	0	
27	50	10	20	30	0	10	60	0	80	70	0	
30	50	0	20	0	0	0	100	40	30	70	0	
33	10	0	60	20	0	15	70	10	0	70	30	
36	10	20	70	0	0	60	40	10	0	70	15	
39	0	40	70	60	0	10	30	0	0	100	0	

Transect D (325o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	20	80	10	0	30	60	10	0	90	0	
6	0	10	70	40	0	20	40	30	0	70	0	
9	50	20	40	0	0	20	80	20	0	50	30	
12	0	10	20	0	0	50	50	50	0	10	40	herbs in shrub layer
15	10	20	30	0	0	20	80	0	30	70	0	
18	50	40	50	0	0	30	70	10	0	70	10	
21	0	80	30	40	0	0	60	10	0	90	0	
24	30	30	60	80	0	0	20	10	0	80	10	

Transect E (10o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	0	10	80	10	0	60	30	0	10	10	0	
6	0	20	60	10	0	50	40	0	0	20	0	
9	0	40	60	10	0	70	20	10	0	30	0	
12	20	40	80	30	0	70	0	0	0	20	10	
15	80	0	5	0	0	100	0	0	60	40	0	
18	70	0	10	0	0	60	40	0	40	60	0	
21	10	0	50	50	0	20	30	20	20	40	0	
24	0	0	5	0	0	100	0	0	80	10	0	
27	10	30	15	0	0	70	30	0	50	70	0	
30	20	0	0	0	0	0	0	0	70	25	0	
33	0	0	0	0	0	0	0	0	90	10	0	
36	in tentpad											
39	40	50	50	20	0	70	10	10	30	30	0	10% of plot in tentpad
42	80	10	20	70	0	0	30	20	0	80	0	
45	60	10	60	0	0	10	90	80	0	20	0	
48	10	10	60	50	0	10	40	50	0	40	0	
51	0	5	70	20	0	60	20	40	0	20		

Pease Point Campground

Transect F (55o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	30	60	50	0	0	40	60	0	0	100	0	
6	0	40	60	30	0	20	50	0	0	100	0	
9	0	60	80	10	0	10	80	0	0	100	0	

Transect G (100o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	70	60	80	10	0	20	70	0	0	100	0	
6	30	60	40	50	0	10	40	0	0	100	0	spruce leaning into shrub layer
9	20	80	30	10	0	10	80	0	0	100	0	

Transect H (145o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	70	10	20	0	0	60	40	0	40	60	0	
6	30	20	15	0	0	60	40	0	60	70	0	
9	In tentpad											
12	0	30	80	30	0	60	10	0	0	100	0	
15	0	30	80	20	0	40	40	20	0	80	10	
18	0	20	30	0	0	60	40	10	50	40	0	trail to Lake
21	0	40	70	0	0	60	30	0	0	100	0	
24	0	40	70	20	0	40	40	0	0	100	0	
27	0	70	40	20	0	10	70	20	0	100	0	pin placed between 2 poplar trees

Pease Point Campsites

Campsite #1, tentpad #1

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	20	50	70	0	30	0	0	0	20	0	
N-2	30	40	60	0	40	0	0	0	50	0	under spruce tree
W-1	50	50	30	0	0	70	30	0	70	0	
W-2	70	20	0	0	0	100	0	0	80	0	3 trees in plot
S	5m to adjacent tentpad, 100% mineral soil										
E-1	0	0	0	0	0	0	30	30	20	0	
E-2	0	20	0	0	0	100	30	30	50	0	trail to Lake

Campsite #1, tentpad #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1-4	4m to adjacent tentpad, 100% mineral soil and litter										
W-1-3	3m until crosses trail, 100% mineral soil and litter										
S-1	80	20	50	0	0	50	0	0	100	0	
S-2	80	20	50	0	0	50	0	0	70	0	
E-1	0	0	0	0	0	0	0	100	0	0	
E-2	0	0	0	0	0	0	0	100	0	0	
E-3	40	10	0	0	80	20	0	0	90	0	
E-4	30	30	0	0	10	90	0	0	90	0	
E-5	0	30	0	0	20	80	40	0	80	0	

Campsite #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	80	40	20	0	0	80	0	0	0	0	
N-2	60	50	20	0	0	80	10	0	10	0	
W-1	30	50	20	0	20	60	20	0	20	0	
W-2	50	70	10	0	50	40	20	0	20	0	
S-1	0	0	0	0	0	0	0	100	0	0	
S-2	0	0	0	0	0	0	0	100	0	0	
S-3	0	0	0	0	0	0	0	100	0	0	
S-4	0	0	0	0	0	0	0	100	0	0	
S-5	40	40	20	0	20	60	0	0	0	0	
S-6	80	20	10	0	20	70	0	0	0	0	
E-1	0	0	0	0	0	0	0	100	0	0	
E-2	0	0	0	0	0	0	0	100	0	0	
E-3	0	0	0	0	0	0	0	100	0	0	
E-4	0	40	100	0	0	0	0	20	0	0	
E-5	0	20	100	0	0	0	0	20	0	0	trail to campsite #1

Pease Point Campsites

Campsite #3

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	70	90	20	0	40	30	0	0	0	0	
N-2	80	20	0	0	0	100	0	0	90	0	
W-1-7	100% mineral soil										
W-8	0	20	70	0	0	30	0	60	40	60	
W-9	0	20	70	0	0	30	0	40	60	60	
W-10	0	30	80	0	0	20	0	0	20	80	trail
S-1	10	40	30	0	10	60	0	10	30	0	
S-2	0	50	40	0	30	30	0	40	20	0	on trail to campsite #4
S-3	20	100	40	0	0	60	0	0	20	0	
S-4	0	70	30	0	10	60	0	0	30	0	
E-1	0	30	70	0	20	10	0	40	20	0	trail to Lake
E-2	30	80	40	0	40	20	0	0	0	0	
E-3	50	80	60	0	20	20	0	0	0	0	

Campsite #4, tentpad #1

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1-8	100 % mineral soil and litter										
N-9	0	10	100	0	0	0	0	70	30	0	
N-10	30	50	80	0	0	20	0	0	70	0	
N-11	70	20	20	0	0	80	0	0	60	0	
W-1	30	70	30	0	20	50	0	0	30	0	
W-2	50	30	60	0	0	10	0	0	50	0	
S-1	30	20	20	0	0	80	0	20	40	0	
S-2	70	20	0	0	60	40	0	0	80	0	
S-3	30	40	10	0	20	70	20	0	80	0	
E-1	10	50	50	0	30	20	10	0	20	0	
E-2	0	70	10	0	60	30	10	0	30	0	
E-3	30	50	30	0	50	20	10	0	30	0	

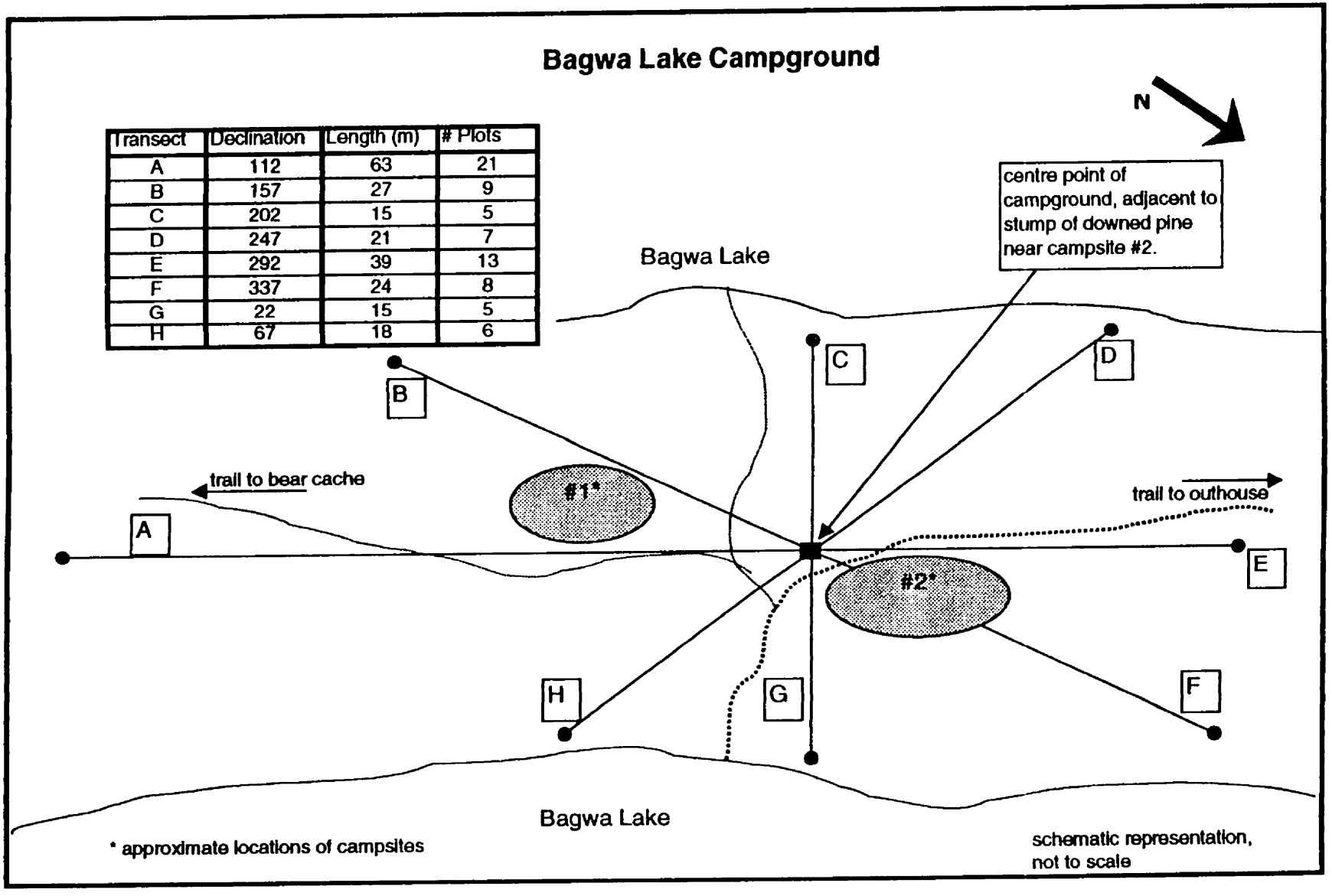
Campsite #4, Tentpad #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	5	0	0	0	100	0	80	20	0	10% exposed roots
N-2	10	40	70	0	20	10	0	10	50	0	trail to campsite #5
W-1	0	10	50	0	0	50	0	20	70	0	20% exposed roots
W-2	0	10	50	0	0	50	0	0	90	0	
W-3	0	10	0	0	0	100	0	0	100	0	
W-4	0	15	0	0	20	80	0	0	100	0	
W-5	0	15	0	0	0	100	0	0	70	0	
W-6	20	50	10	0	0	90	0	0	30	0	
S-1	20	60	60	0	10	30	0	20	0	0	
S-2	40	40	60	0	0	40	0	0	40	0	
E-1-6	100% mineral soil and litter, crosses path to Lake										crosses path to Lake, thus ending campsite

Pease Point Campsites

Campsite #5

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	0	0	
N-2	0	0	0	0	0	0	0	100	0	0	
N-3	0	0	0	0	0	0	0	100	0	0	
N-4	0	10	0	0	0	100	0	20	80	0	
N-5	20	50	60	0	20	20	0	0	20	0	
N-6	10	80	30	0	0	70	40	0	20	0	
W-1	30	40	50	0	0	50	20	0	30	0	
W-2	70	40	50	0	10	40	0	0	20	0	
S-1	0	30	50	0	0	50	20	0	50	0	
S-2	20	50	20	0	0	80	30	0	20	0	
S-3	20	30	60	0	20	20	40	0	50	0	
E-1	0	5	10	0	30	60	10	0	60	0	
E-2	0	10	0	0	0	100	0	5	90	0	
E-3	0	5	0	0	0	100	0	20	80	0	
E-4	0	5	0	0	0	100	5	5	95	0	
E-5	0	10	20	0	0	80	0	10	90	0	10% exposed tree roots
E-6	0	5	0	0	0	100	0	5	95	0	20% exposed tree roots



Transect	Declination	Length (m)	# Plots
A	112	63	21
B	157	27	9
C	202	15	5
D	247	21	7
E	292	39	13
F	337	24	8
G	22	15	5
H	67	18	6

Bagwa Campground Inventory

Centre Plot

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
centre	20	0	0	0	0	0	0	0	40	60	20	adjacent to stump

Transect A 112o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	70	0	20	0	0	100	0	10	80	10	0	
6	50	0	0	0	0	0	0	0	100	0	0	
9	20	0	25	0	0	80	20	0	80	20	0	
12	0	0	30	0	0	100	0	0	70	30	0	
15	0	5	20	0	0	100	0	0	85	15	0	
18	0	0	0	0	0	0	0	0	100	0	0	
21	50	0	0	0	0	0	0	0	100	0	0	
24	0	0	0	0	0	0	0	0	90	10	0	
27	20	0	20	0	0	0	100	10	90	0	0	10% stump in plot
30	30	0	10	0	0	0	100	0	100	0	0	
33	50	0	10	100	0	0	0	10	70	0	20	fallen log in plot
36	80	0	10	0	0	100	0	10	90	0	10	fallen log in plot
39	90	0	40	0	0	60	40	0	60	0	0	
42	80	10	25	0	0	0	100	10	90	0	0	
45	90	10	20	0	0	0	100	10	90	0	0	
48	80	20	10	50	0	50	0	0	10	0	20	
51	60	0	25	40	0	40	20	30	50	20	0	20% tree in plot
54	40	0	30	10	0	60	30	50	20	30	0	
57	80	30	40	40	0	40	20	10	30	60	10	
60	90	20	30	40	0	60	0	0	10	30	20	
63	80	10	50	20	0	0	80	20	0	10	20	

Transect B 157o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	80	30	70	0	0	80	20	0	15	0	0	
6	80	20	60	0	0	80	0	0	15	0	0	
9	20	0	20	20	0	0	80	0	80	0	0	
12	10	50	30	0	0	80	20	0	15	0	10	
15	0	40	10	0	0	50	50	10	0	0	60	
18	40	20	50	0	0	80	20	5	15	0	10	
21	80	20	20	0	0	100	0	20	0	0	30	
24	80	60	10	0	0	100	0	0	40	0	0	2 trees
27	80	40	30	0	0	10	90	0	20	0	20	

Bagwa Campground Inventory

Transect C 202o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	20	0	15	20	0	80	0	0				
6	20	0	15	100	0	0	0	0				
9	80	0	0	0	0	0	0	0				wood pile
12	20	20	30	50	50	0	0	0				
15	0	10	60	0	30	0	70	20	0	0	0	
17.5	water											

Transect D 247o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	90	30	50	50	0	50	0	0	20	0	0	
6	0	30	30	20	0	50	30	50	0	0	0	
9	20	20	25	50	0	50	0	10	0	0	0	
12	10	0	70	60	0	40	0	0	20	0	0	
15	30	0	70	15	0	25	60	0	0	0	0	
18	15	30	40	30	0	20	50	30	0	70	0	
21	0	60	60	0	0	0	100	0	0	30	0	

Transect E 292o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	80	0	0	0	0	0	0	0	80	0	20	
6	80	0	0	0	0	0	0	0	85	0	0	birch tree
9	0	0	5	0	0	100	0	0	100	0	0	adjacent to campsite
12	0	10	50	10	0	10	80	20	20	0	0	
15	0	0	70	5	0	15	70	70	0	0	0	
18	0	0	30	0	0	40	60	70	0	0	0	
21	0	10	15	20	0	80	0	5	0	0	0	
24	0	100	0	0	0	0	0	0	0	0	0	
27	0	100	0	0	0	0	0	0	0	0	0	
30	0	100	0	0	0	0	0	0	0	0	0	
33	80	0	20	20	0	80	0	10	0	0	10	
36	0	30	20	0	0	60	40	5	0	70	0	
39	20	0	15	20	0	0	80	60	0	0	10	

Bagwa Campground Inventory

Transect F 337o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	0	0	0	0	0	0	0	100	0	0	campsite
6	20	0	0	0	0	0	0	0	100	0	0	campsite
9	10	0	10	50	0	0	50	0	60	0	0	campsite
12	0	30	70	20	0	0	80	20	0	0	10	
15	0	40	10	50	0	0	50	30	0	40	0	
18	0	0	10	0	0	0	100	10	0	0	50	
21	0	50	40	10	0	0	90	90	0	0	0	
24	0	80	20	100	0	0	0	15	0	0	0	

Transect G 22o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	20	0	40	50	0	0	50	10	0	80	0	adjacent to campsite
6	10	60	10	70	0	0	30	0	15	0	0	
9	0	0	30	30	0	0	70	40	0	0	40	
12	80	30	50	0	0	0	100	10	0	40	0	
15	60	40	50	20	0	0	80	10	0	70	10	

Transect H 67o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	comments
			Total	shrub	sedge	grass	herb					
3	50	0	40	80	0	20	0	15	0	70	0	
6	30	5	30	50	0	0	50	0	0	70	0	
9	0	10	15	0	0	0	100	0	0	70	0	
12	40	90	20	0	0	0	100	0	0	70	10	
15	90	80	10	0	0	0	100	0	0	60	10	
18	20	60	30	0	0	0	100	10	0	40	0	0.5m to water

Bagwa Campsite Inventory

Campsite 1

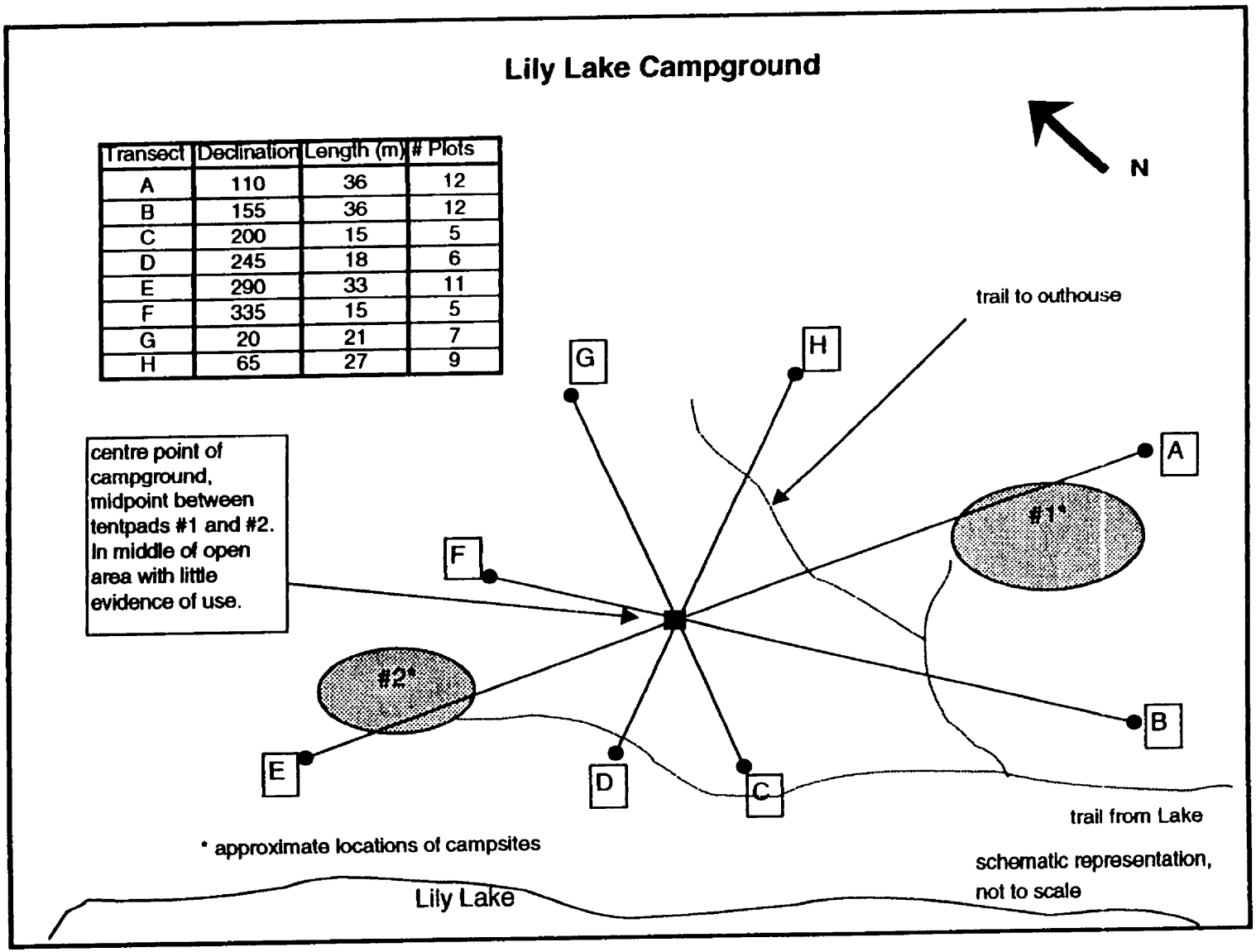
direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	20	80	0	30	70	0	0	0	0	0	
N-2	5	30	0	50	50	0	0	60	0	0	
N-3	0	0	0	0	0	0	0	100	0	0	into main camping area
W-1	70	40	30	30	40	0	0	0	0	0	
W-2	40	50	0	40	60	0	0	30	0	0	trail leading to lake
S-1	0	0	0	0	0	0	0	100	0	0	
S-2	0	10	0	20	80	0	0	80	0	0	
S-3	20	50	0	20	30	50	10	0	30	0	
S-4	5	70	0	70	20	10	0	0	0	0	
E-1	0	0	0	0	0	0	0	100	0	0	into main camping area
E-2	0	0	0	0	0	0	0	100	0	0	into main camping area
E-3	0	0	0	0	0	0	0	100	0	0	into main camping area

Campsite 2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	0	0	0	0	0	0	0	100	10	0	
N-2	0	10	100	0	0	0	0	20	20	0	
N-3	0	60	60	0	30	50	0	5	30	0	
N-4	40	50	0	0	40	60	0	0	20	0	
N-5	10	70	0	0	10	90	10	0	20	0	
W-1	0	0	0	0	0	0	0	100	0	0	
W-2	0	5	100	0	0	0	0	70	30	0	
W-3	0	10	100	0	0	0	10	30	60	0	
W-4	0	30	60	0	0	40	20	10	40	0	
W-5	0	50	70	0	0	30	0	20	30	0	trail to outhouse
W-6	0	70	40	0	10	50	10	0	30	0	
W-7	70	70	30	0	0	70	0	0	0	0	
S-1	0	0	0	0	0	0	0	100	0	0	
S-2	5	5	100	0	0	0	0	0	0	0	
S-3	0	0	0	0	0	0	5	60	40	0	
S-4	0	20	80	0	0	20	10	40	60	0	stump
S-5	0	40	20	0	20	60	0	10	40	0	main trail
S-6	10	40	30	0	20	50	0	50	40	0	main trail
S-7	0	20	70	0	30	0	10	50	30	0	main trail
S-8	0	10	30	0	70	0	20	40	40	0	main trail
E1-6	0	0	0	0	0	0	0	100	0	0	
E-7	0	10	0	0	0	100	0	90	50	0	
E-8	0	60	0	0	30	70	0	0	40	0	
E-9	0	40	0	0	10	90	10	0	30	30	
E-10	0	60	10	0	40	50	5	0	40	5	

Lily Lake Campground

Transect	Declination	Length (m)	# Plots
A	110	36	12
B	155	36	12
C	200	15	5
D	245	18	6
E	290	33	11
F	335	15	5
G	20	21	7
H	65	27	9



Lily Lake Campground

centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
centre	0	10	75	0	0	50	50	0	0	0	0	

Transect A (110o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			total	shrub	sedge	grass	herb					
3	10	20	70	0	0	40	60	0	0			
6	0	50	65	40	0	20	40	0	10			
9	0	10	90	50	0	10	40	0	0			
12	0	5	80	45	0	5	30	5	10			
15	0	20	80	0	0	40	60	0	5			
18	0	10	50	0	0	70	30	0	30			
21	0	0	0	0	0	0	0	0	0			in tent pad
24	0	0	0	0	0	0	0	0	0			in tent pad
27	0	0	50	20	0	20	60	0	0			
30	0	70	15	0	0	0	100	30	0			
33	0	70	70	50	0	0	50	0	0			
36	0	80	30	50	0	0	50	10	0			

Transect B (155o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	20	50	40	0	0	30	70	0	0			
6	0	30	50	10	0	20	70	15	0			
9	0	0	40	10	0	70	20	80	0			
12	0	40	30	0	0	50	50	5	0			
15	0	0	70	20	0	20	60	30	0			
18	80	0	5	100	0	0	0	0	0			
21	30	10	15	0	0	30	70	0	0			
24	0	0	30	0	0	50	50	5	50			
27	10	0	30	0	0	60	40	5	60			
30	0	5	80	0	0	40	60	20	0			
33	0	70	30	30	0	50	20	20	0			
36	0	20	30	10	0	10	80	70	0			

Lily Lake Campground

Transect C 200o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	20	60	10	0	50	40	0	0		30	
6	50	0	40	20	0	50	30	0	0	80	0	
9	60	0	70	30	0	20	50	20	0	80	10	
12	0	0	30	15	0	50	35	40	0	90	0	
15	0	0	50	30	0	20	50	5	0	20	30	

Transect D 245o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	30	30	40	0	0	20	80	0	0	20	20	
6	20	0	30	50	0	0	50	0	0	0	50	
9	20	10	20	0	0	10	90	5	0	20	20	
12	5	10	30	0	0	10	90	70	20	0	0	crosses trail leading to Campsite #2
15	20	0	30	0	0	20	80	80	0	20	10	
18	30	0	20	0	0	60	40	90	0	10	0	

Transect E 290o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	90	20	0	20	60	10	0	20	0	
6	0	0	70	0	0	20	80	10	0	0	30	
9	0	0	90	10	0	30	60	10	0	70	0	
12	20	10	60	0	0	10	90	15	0	0	20	
15	0	20	40	0	0	10	90	60	0	0	10	
18	0	0	0	0	0	0	0	0	100	0	0	in tent pad
21	0	0	0	0	0	0	0	0	100	0	0	in tent pad
24	50	0	40	10	0	20	70	10	20	0	20	adjacent to tent pad
27	0	30	2	0	0	0	100	10	0	0	60	
30	60	0	50	0	0	40	60	70	0	0	15	
33	60	30	20	0	0	0	100	80	0	0	20	

Lily Lake Campground

Transect F 335o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	90	20	0	10	70	0	0	10	0	
6	0	30	90	15	0	0	85	5	0	10	0	
9	0	30	90	15	0	40	45	0	0	10	0	
12	20	60	20	0	0	40	60	0	0	40	15	
15	0	70	20	0	0	40	60	5	0	70	20	adjacent to large pine

Transect G 20o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	80	20	0	20	0	80	0	0	70	0	
6	0	80	20	20	0	0	80	20	0	40	40	
9	20	60	90	20	30	0	50	0	0	10	0	
12	0	30	40	0	0	40	60	0	0	10	40	
15	0	15	20	0	0	40	60	0	0	0	40	
18	0	30	40	20	10	10	60	15	0	0	10	
21	0	60	10	50	20	0	30	60	0	10	20	

Transect H 65o

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	60	30	30	0	40	30	0	0	0	15	
6	15	40	40	60	0	30	60	0	0	0	40	
9	0	5	95	30	0	40	30	0	0	0	0	
12	0	0	60	0	0	40	0	0	25	0	0	trail to outhouse
15	0	50	20	0	0	20	0	10	0	0	30	
18	0	60	30	0	0	0	0	0	0	0	30	
21	0	70	30	0	0	0	0	0	0	0	40	
24	30	0	15	25	0	5	25	0	0	0	70	
27	70	40	20	0	0	0	0	10	0	0	80	

Lily Lake Campground

Campsite #1

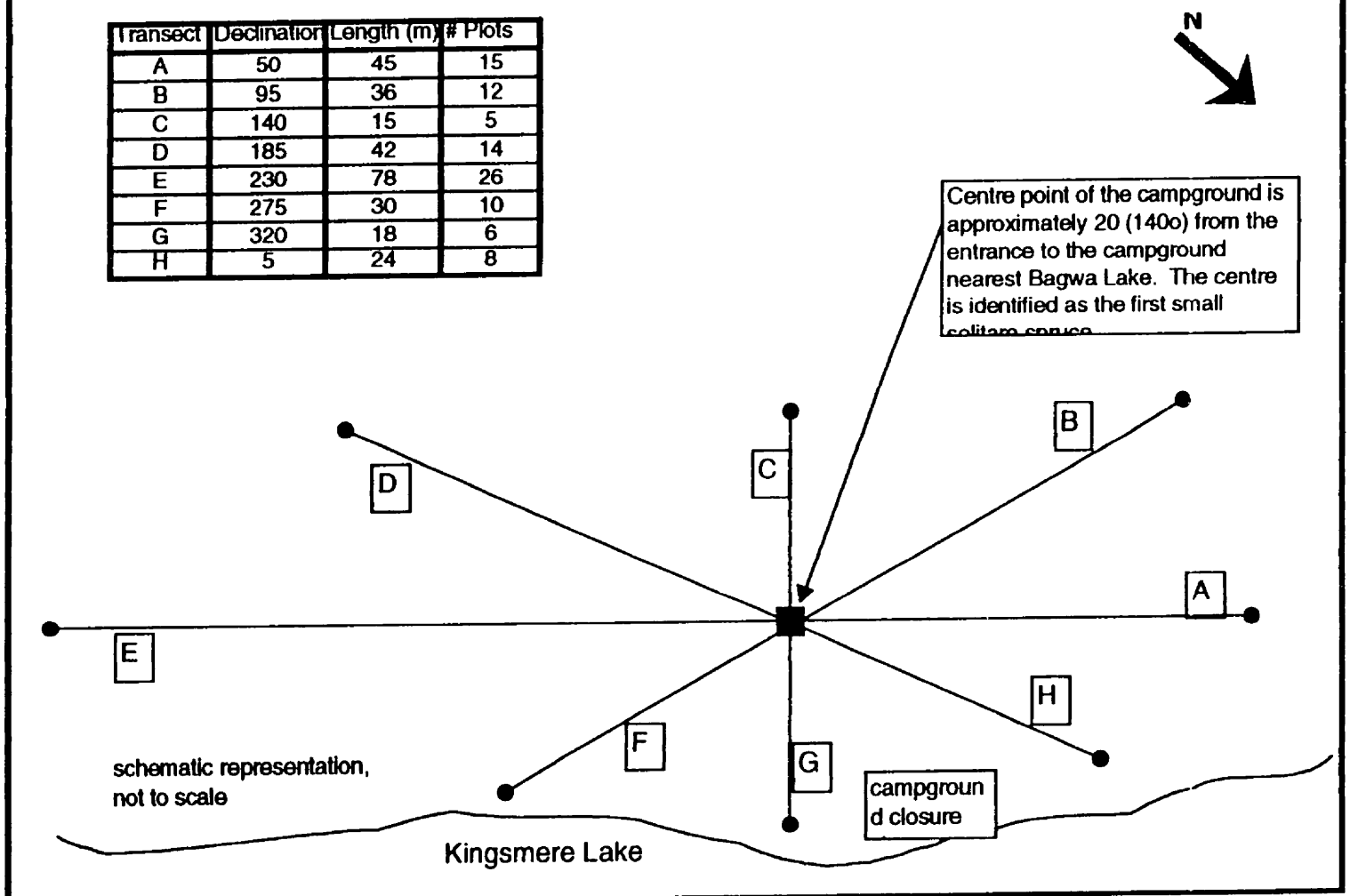
direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb					
N-1	10	85	50	0	0	50	0	0	0	5	
N-2	30	80	20	0	20	60	0	0	0	20	
W-1	0	75	20	0	40	40	15	0	80	20	
W-2	50	40	30	0	40	30	30	0	40	40	
S-1	0	90	30	0	70	0	0	5	0	0	
S-2	20	50	10	0	20	70	0	0	40	0	
E-1	0	60	50	0	0	50	0	5	0	5	
E-2	10	75	20	0	20	60	0	0	0	0	
E-3	0	90	20	0	40	40	0	0	0	10	

Campsite #2

direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		total	grass	sedge	shrub	herb		0			
N-1	30	15	80	0	0	20	0	0	0	70	
N-2	0	0	0	0	0	0	0	0	0	0	2 trees
N-3	30	70	10	0	30	60	80		20	0	
W-1	0	40	50	0	50	0	30	20	0	0	
W-2	0	70	20	0	20	60	50	0	0	25	
W-3	15	60	40	0	30	30	5	0	0	30	
S-1	0	0	0	0	0	0	0	100	0	0	
S-2	0	5	100	0	0	0	0	95	0	0	
S-3	0	5	100	0	0	0	0	95	0	0	
S-4	0	0	0	0	0	0	0	90	0	0	
S-5	0	0	0	0	0	0	0	100	0	0	
S-6	0	5	100	0	0	0	0	95	0	0	adjecent to hibachi
S-7	0	10	30	0	70	0	25	75	0	0	adjecent to hibachi
S-8	5	15	10	0	0	40	50	0	0	0	
S-9	0	30	30	0	0	70	80	0	0	20	
S-10	0	20	50	0	0	0	75	0	0	25	
E-1	0	30	20	0	30	50	30	15	0	20	
E-2	0	70	20	0	50	30	5	0	0	30	

Old Pease Point Campground

Transect	Declination	Length (m)	# Plots
A	50	45	15
B	95	36	12
C	140	15	5
D	185	42	14
E	230	78	26
F	275	30	10
G	320	18	6
H	5	24	8



Old Pease Point Campground

Centre: From the entrance to the campground nearest Bagwa Lake, the first white spruce (140o) near the middle of the clearing, has a nail placed on the South side.

Centre	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
0	0	10	10	0	0	20	80	0	60	40	0	spruce in shrub layer

Transect A (50o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	10	0	90	0	0	80	40	0	spruce in herb layer
6	0	20	30	0	0	100	0	0	0	100	0	
9	0	0	20	80	0	20	0	5	0	95	0	spruce in herb layer
12	20	0	10	80	0	20	0	0	10	90	0	
15	10	0	5	60	0	40	0	0	10	80	0	10% exposed roots
18	0	20	10	0	0	70	30	0	10	90	0	deadfall in shrub layer, spruce in herb layer
21	0	0	0	0	0	0	0	0	50	50	0	
24	0	0	0	0	0	0	0	10	40	70	0	
27	0	0	5	0	0	100	0	80	0	20	0	
30	0	0	0	0	0	0	0	80	10	0	10	
33	0	0	10	70	5	0	25	70	0	30	0	spruce in herb layer
36	0	0	5	0	0	0	100	80	0	20	0	
39	20	0	30	0	0	20	80	80	0	20	0	
42	30	50	10	0	0	30	70	40	0	60	10	fir leaning into shrub layer
45	20	10	30	0	0	0	100	90	0	0	0	fir leaning into shrub layer

Transect B (95o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	50	20	0	30	30	10	5	85	0	spruce in herb layer
6	0	40	30	50	0	40	10	0	10	90	0	
9	0	0	20	70	0	0	0	30	20	70	0	spruce in herb layer
12	0	10	30	60	0	0	0	20	10	80	0	spruce in herb layer
15	20	10	20	0	0	100	0	30	0	70	0	fir leaning into shrub layer
18	0	0	20	0	0	70	30	60	10	50	0	
21	30	15	5	0	0	100	0	60	0	30	0	
24	30	10	20	0	0	40	60	80	0	20	0	
27	20	40	10	0	0	100	0	30	0	70	0	fir leaning into shrub layer
30	0	40	40	50	0	10	40	100	0	10	0	
33	20	10	50	30	0	10	60	70	0	30	10	
36	30	20	50	40	0	0	60	60	0	40	30	

Transect C (140o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	50	50	0	90	20	0	
6	0	30	20	0	0	10	90	30	50	30	20	
9	0	60	30	100	0	0	0	80	0	30	0	
12	10	40	60	0	0	20	80	80	0	20	10	
15	10	10	20	0	0	30	70	70	0	30	10	

Transect D (185o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	70	30	10	70	30	0	
6	0	0	30	30	0	30	40	20	0	80	0	spruce and aspen in herb layer
9	0	0	60	40	0	60	0	0	0	100	0	
12	0	40	40	60	0	10	30	0	0	100	0	
15	60	30	70	20	0	10	70	10	0	80	0	
18	50	50	10	20	0	10	70	15	0	80	0	spruce leaning into shrub layer, >1.5m
21	10	10	10	0	0	0	100	70	0	30	0	5% exposed tree roots
24	0	10	20	50	0	0	50	50	0	50	15	
27	0	0	0	0	0	0	0	15	0	80	10	
30	30	0	10	0	0	100	0	10	0	50	0	between fork of two trees
33	40	10	30	0	0	40	60	0	10	90	0	
36	60	30	30	40	0	0	60	0	0	100	20	
39	70	10	60	40	0	40	20	0	0	90	10	
42	0	70	50	40	0	20	40	0	0	100	0	

Transect E (230o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	20	0	0	100	0	0	0	100	0	
6	0	0	10	0	0	100	0	0	0	100	0	
9	10	0	40	0	0	100	0	0	0	70	0	
12	0	0	50	0	0	80	0	5	0	80	0	spruce in herb layer
15	0	0	20	0	0	20	80	10	0	90	0	
18	0	0	10	0	0	100	0	0	5	95	0	
21	0	0	10	15	0	5	80	0	5	90	0	5% exposed roots
24	10	0	0	0	0	0	0	10	0	90	0	5% exposed roots
27	50	0	0	0	0	0	0	5	0	90	10	
30	10	0	0	0	0	0	0	5	0	95	15	
33	0	0	0	0	0	0	0	20	0	80	15	
36	0	0	0	0	0	0	0	10	0	90	40	
39	50	0	0	0	0	0	0	0	0	100	5	
42	50	0	0	0	0	0	0	0	0	100	5	
45	40	0	0	0	0	0	0	0	5	95	0	
48	10	20	5	0	0	100	0	5	0	95	0	fir leaning into shrub layer
51	20	0	5	0	0	100	0	10	0	90	0	10% tree roots
54	0	10	20	60	0	20	20	10	0	80	5	10% tree roots
57	0	0	5	0	0	100	0	5	0	95	0	
60	10	10	0	0	0	0	0	0	0	95	0	5% tree roots
63	50	0	5	0	0	100	0	0	10	85	0	5% tree roots
66	20	20	20	0	0	40	60	0	0	70	30	
69	70	70	0	0	0	0	0	20	0	80	0	spruce leaning into shrub layer
72	50	50	0	0	0	0	0	90	0	20	0	spruce leaning into shrub layer
75	80	0	5	0	0	0	100	0	0	100	0	adjacent to large spruce
78	90	20	5	0	0	40	60	0	0	100	0	under large spruce, pin adjacent to stump

Transect F (275o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	10	0	0	100	0	0	5	95	0	
6	0	0	5	100	0	0	0	0	0	90	0	spruce in herb layer, 10% exposed roots
9	20	0	0	0	0	0	0	5	0	90	15	
12	20	0	0	0	0	0	0	0	0	100	10	
15	40	0	0	0	0	0	0	5	0	80	20	
18	30	0	0	0	0	0	0	0	0	100	30	
21	20	0	20	0	0	0	100	5	0	95	0	
24	60	20	20	40	0	20	40	40	0	60	0	spruce and fir leaning into shrub layer
27	10	30	20	0	0	0	100	90	0	10	0	fir in shrub layer
30	40	40	10	0	0	10	90	90	0	10	0	

Transect G (320o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	5	0	0	100	0	0	20	80	0	
6	0	0	5	100	0	0	0	60	0	40	0	spruce in herb layer
9	0	0	10	0	0	100	0	5	40	30	0	10% tree roots
12	20	0	0	0	0	0	0	0	60	35	0	5% tree roots
15	0	0	0	0	0	0	0	20	60	40	0	5% tree roots
18	0	0	0	0	0	0	0	5	80	30	0	5% tree roots, water 3m, no pin

Transect H (5o)

distance/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	dead fall	Comments
			Total	shrub	sedge	grass	herb					
3	0	0	0	0	0	0	0	0	60	40	0	
6	40	0	20	0	0	100	0	0	5	90	0	spruce in herb layer
9	30	0	5	0	0	100	0	0	0	100	0	
12	10	0	10	0	0	100	0	15	0	85	0	
15	40	40	10	0	0	100	0	0	5	70	0	15% tree stump and roots
18	40	30	0	0	0	0	0	10	0	90	0	spruce leaning into shrub layer
21	0	0	20	70	0	0	30	25	0	75	0	
24	60	0	10	60	0	0	40	40	0	40	0	20% exposed roots, water 2m, no pin

APPENDIX E: USER SURVEY ADMINISTERED BY VISITOR SERVICES

This survey is intended to ensure that the users of the Kingsmere area are capable of having high quality experiences. Your participation in the survey is greatly appreciated. Your comments will remain anonymous. This survey focuses on issues that users have deemed important components of the Kingsmere area, and we are making efforts to ensure that the conditions in the Kingsmere area are acceptable to its users.

Please circle the correct response to each question.

1. Was the number of people you saw? a) too many, b) about right, c) too few?
2. Were the groups you met? a) too large, b) about right, c) too small?
3. How was the level of access? a) too hard, b) about right, c) too easy?
4. How would you rate the campground you visited?

   a) less than acceptable, b) acceptable, c) better than acceptable
5. Were there people participating in activities that you felt were inappropriate for the Kingsmere wilderness area? Y/N

   If Yes, which activities _____.
6. How would you rate your Kingsmere experience?

Very poor	Poor	Average	Good	Very good
1	2	3	4	5

7. How could your experience have been improved? _____.
8. Would you like to make any comments about your experience or make suggestions to improve users experiences in the Kingsmere wilderness area?

   _____

   _____.

APPENDIX F: MONITORING FIELDBOOK

This fieldbook is intended to help the warden responsible for monitoring resource conditions in the Kingsmere wilderness area.

MONITORING WILDERNESS QUALITY:
KINGSMERE CAMPGROUNDS AND CAMPSITES

FIELDBOOK

The warden responsible for monitoring will require:

- A compass
- A logging chain
- A 1m *x* 1m transect
- A clip board
- A pencil
- Data sheets
- A metal detector

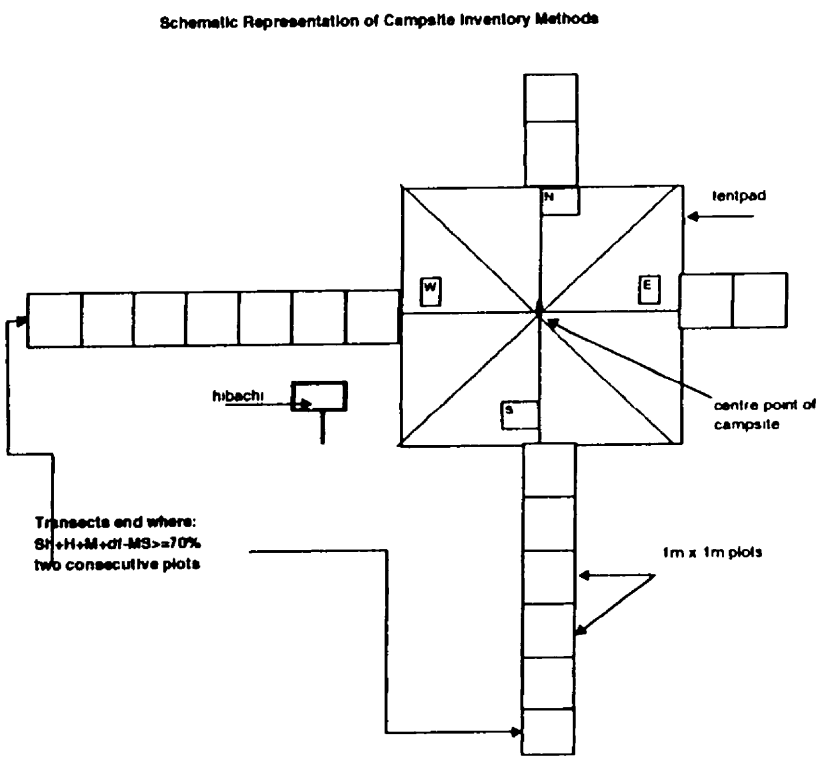
CAMPSITE MONITORING

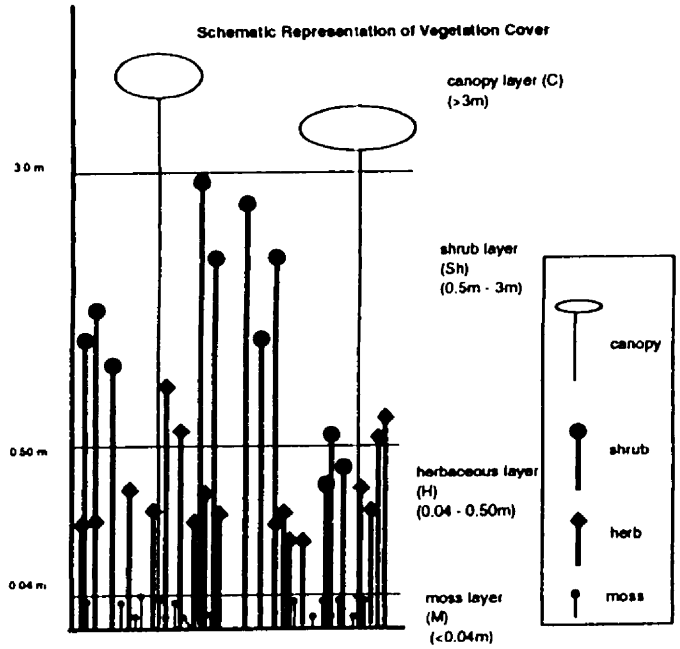
1. Determine and identify the centre of the campsite as being the centre point of the tent pad, determined as the crossing point from the corners of the tent pad.
2. Set four transects from the centre point (North, South, East, West).
3. Measurements along each transect should begin where the transect meets the tent pad marker. Starting adjacent to the tent pad, 1m *x* 1m plots should be laid consecutively until the rule of campsite extent is met (see step 4).
4. Measurements will focus on percent cover at the shrub (Sh), herbaceous (H), and moss (M) layers. In addition, the amount of mineral soils (Ms), leaf litter (ll) and dead fall (df) should also be recorded. The class of species, either shrub, grass, sedge, or herb, should identify the herbaceous layer.

   The percentage of cover at each layer is determined by looking directly down on the layer, for those layers below eye-level, or directly up for those above. By focusing on each individual layer the researcher can visually subdivide the plot to determine how much of the particular layer has vegetation, and how much does not.

5. Campsite sampling transects will end where Sh+H+M+df-MS $\geq$ 70% cover for two consecutive plots[1]. Campsites also end where the transect crosses any trails that are obviously well used. If a trail goes through the campsite, the campers do not use that area.
6. Results should be recorded as presented below (Table 1)

[1] The campsite rule (Sh+H+M+df-Ms $\geq$70%) was the result of preliminary work completed in the area. Four tent pads were surveyed, (a total of 8 transects) where obvious ends of use were present, the transect stopped. The data were recorded and analyzed to determine common features. The purpose of meeting the rule for two consecutive plots was to ensure that anomalies did not skew the results, and that the transect was ending at the end of the campsite. The result was the simple formula described, which can be applied consistently to the campsites throughout the Kingsmere area.


Schematic Representation of Campsite Inventory Methods
tentpad
N
W
E
S
fireplace
centre point of campsite
Transects end where:
Sh+H+M+df-MS>=70%
two consecutive plots
1m x 1m plots


Schematic Representation of Vegetation Cover
canopy layer (C)
(>3m)
3.0 m
shrub layer
(Sh)
(0.5m - 3m)
0.50 m
herbaceous layer
(H)
(0.04 - 0.50m)
0.04 m
moss layer
(M)
(<0.04m)
canopy
shrub
herb
moss

CAMPGROUND MONITORING

1. Determined and placed a permanent marker at the centre of the campground. The centre of the campground point is the mid-point of the longest axis of the campground (see Campground Map). A permanent marker has been placed at the centre point of each campground. The markers used were 25 cm nails sunken approximately 15cm below the surface. A metal detector will locate the centre point for the monitoring purposes.
2. From the centre point eight transects were laid at 45° from the centre point (which is split into two transects 180° apart; see Campground Map). The declinations identified did not incorporate magnetic corrections.
3. Along each transect a 1m *x* 1m plot was placed at 3m intervals, until the rule for campground extent (see point #5) was met for three consecutive plots. The centre point of the campground should also have a plot taken, with the centre point as the centre of the plot.
4. Measurements focused on percent cover at four forest layers, adding the canopy layer (>3m) to those previously mentioned. Measurements will focus on percent cover at half of the canopy (½ C), the shrub (Sh), herbaceous (H), and moss (M) layers. In addition, the amount of mineral soils (Ms), leaf litter (ll) and dead fall (df) should also be recorded.

   The percentage of cover at each layer is determined by looking directly down on the layer, for those below eye-level, or directly up for those above. By focusing on each individual layer the researcher can visually subdivide the plot to determine how much of the particular layer has vegetation, and how much does not. This technique is commonly applied to vegetation studies.
5. Campground sampling transects will end where ½ C+Sh+H+M+df-Ms ≥ 100%cover for three consecutive plots (nine metres)[2].
6. When the transect crossed either the main trail to the campground, or a trail leading out of the campground, the transect ended. It was assumed that if the transect crossed either type of the above mentioned trails that the end of the campground was evident, even if the rule for ending transects was not met.

   The results should be recorded as presented below in Table 2

---

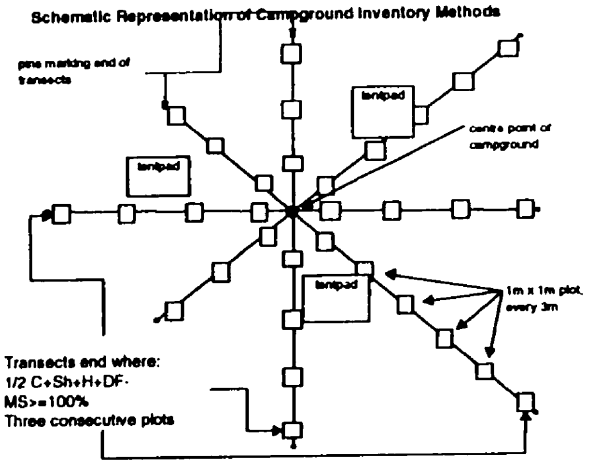
[2] The campground rule (½ C+Sh+H+M+df-Ms ≧100%) was the result of preliminary work completed in the area. Two campsites were surveyed (16 transects), where obvious ends of use were present, the transect stopped. With all the data recorded, it was then analyzed to determine common features. The purpose of meeting the rule for three consecutive plots was to ensure that anomalies did not skew the results, and that the transect was ending at the end of the campground. The result was the simple formula described, which could be applied consistently throughout the Kingsmere area. A permanent marker was placed at the end of each transect to ensure that the future monitoring efforts retrace the same transect[79] This will ensure that the same plots are being monitored.

Table 1 Sample Table for Campsite Inventory

Campground Name: _____

Campsite Number: _____

Direction/m	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
		Total	grass	sedge	Shrub	herb					
North											


Schematic Representation of Campground Inventory Methods
pins marking end of transects
tentpad
tentpad
tentpad
centre point of campground
1m x 1m plot, every 3m
Transects end where:
1/2 C+Sh+H+DF-
MS>=100%
Three consecutive plots

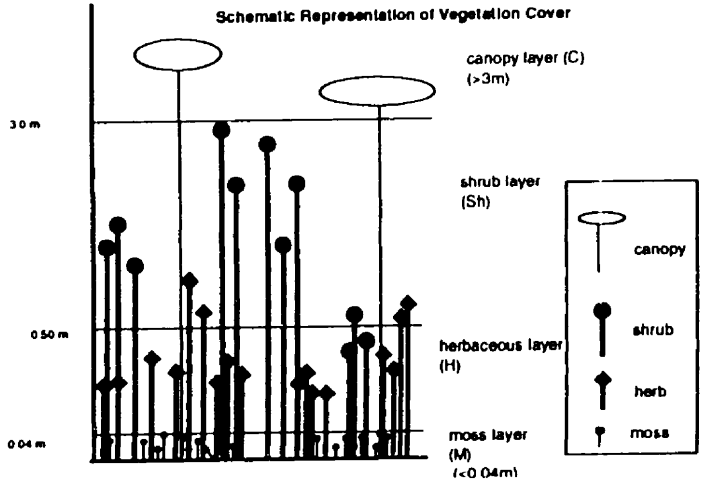

Schematic Representation of Vegetation Cover
canopy layer (C)
(>3m)
3.0 m
shrub layer
(Sh)
0.50 m
herbaceous layer
(H)
0.04 m
moss layer
(M)
canopy
shrub
herb
moss

Table 2 Sample Table for Campground Inventory

Campground Name: _____

Direction/m	Canopy	Shrub	Herbaceous					Moss	MinSoil	litter	deadfall	Comments
			total	grass	sedge	shrub	herb					